		Suppl	ementary Table 1		
			Engine 1		
	ICI - general	ICI - general	ICI - general	ICI - general	ICI - general
Question	Which patient populations should not receive immune checkpoint inhibitors?	What are the main treatments for grade 3 or higher immune checkpoint inhibitor toxicities? Please include dose and duration of any medications	What are the major complications of high dose steroids?	What surveillance labs should be obtained in all patients treated with immune checkpoint inhibitors?	What are the risks of using combination immune checkpoint inhibition compared with anti-PD-1 monotherapy?
Answer Engine 1 (ChatGPT)	Immune checkpoint inhibitors (ICIs) are a class of drugs that have revolutionized cancer therapy by unleashing the body's immune system to attack tumor cells. However, there are certain patient populations in which the use of ICIs may be contraindicated or used with caution: Patients with autoimmune diseases: Patients with pre-existing autoimmune conditions might experience a flare of their disease or develop new autoimmune side effects when treated with ICIs. Patients with a history of organ transplantation: ICIs might increase the risk of graft rejection due to enhanced immune activation. Patients with certain neurological disorders: There's a risk of exacerbating conditions like multiple sclerosis or myasthenia gravis. Patients with certain cardiovascular conditions: ICIs may exacerbate some heart conditions, especially those with a history of myocarditis. Patients with untreated or active brain metastases: There is a concern about potential exacerbation of neurological symptoms,	include dose and duration of any medications Management of grade 3 or higher immune checkpoint inhibitor (ICI) toxicities requires swift recognition and intervention. Here's a generalized approach for managing some of the most common severe ICI-induced toxicities: 1. ICI-Induced Colitis: Immediate Management: Hold or discontinue the ICI. First-Line Therapy: High-dose corticosteroids: Oral or intravenous (IV) methylprednisolone (or its equivalent) at 1-2 mg/kg/day. Once symptoms improve to grade 1 or less, taper the steroids over 4-6 weeks. Second-Line Therapy (If no improvement after 3-5 days of corticosteroids or if recurrent symptoms during taper): Infliximab: 5 mg/kg IV, can be repeated once after 2 weeks if no response. 2. ICI-Induced Hepatitis: Immediate Management: Hold or discontinue the ICI. First-Line Therapy: High-dose corticosteroids: Oral or IV methylprednisolone (or its equivalent) at 1-2 mg/kg/day. Once liver enzymes improve and stabilize, taper the steroids over 4-6 weeks. Second-Line Therapy (If no improvement after 3-5 days of	High-dose corticosteroids, while therapeutically effective for many conditions, come with a range of potential complications. Here are some major complications associated with high-dose corticosteroid use: 1. **Endocrine/Metabolic Complications:** - **Hyperglycemia and Diabetes Mellitus**. Steroids increase blood glucose levels and can precipitate diabetes or worsen pre-existing diabetes. - **Osteoporosis and Bone Fractures*: Chronic steroid use can lead to decreased bone density. - **Adrenal Suppression**: Chronic use can suppress the body's own production of cortisol, leading to adrenal insufficiency when the steroids are tapered or discontinued. 2. **Cardiovascular Complications:** - **Hypertension**: Elevated blood pressure. - **Fluid Retention**: Leading to edema or swelling. - **Dyslipidemia*: Altered blood lipid levels, potentially increasing the risk of atherosclerosis and cardiovascular diseases. 3. **Gastrointestinal Complications:** - **Peptic Ulcer Disease**: Increased risk of gastric or duodenal ulcers. - **Pancreatitis**: Inflammation of the pancreas.	inhibitors? Surveillance labs for patients treated with immune checkpoint inhibitors (ICIs) are essential to monitor for potential toxicities, especially immune-related adverse events (irAEs). The specific labs you should obtain might vary based on the particular ICI and the clinical context, but here's a general list of labs that are frequently monitored: 1. **Complete Blood Count (CBC) with differential**: - To assess for anemia, thrombocytopenia, or neutropenia, which can occasionally occur with ICIs. 2. **Comprehensive Metabolic Panel (CMP)**: - **Electrolytes**: For detecting any imbalances. - **Liver function tests (LFTs)**: Alanine monitored to detect hepatotoxicity, which is a potential side effect of ICIs. - **Renal function**: Blood urea nitrogen (BUN) and creatinine to monitor for nephrotoxicity or nephritis. - **Glucose**: As ICIs can cause endocrinopathies, including diabetes. 3. **Thyroid function tests**: - Thyroid-stimulating hommone (TSH) and free thyroxine (T4) levels to monitor for thyroid	Combination immune checkpoint inhibition typically refers to the use of two immune checkpoint inhibitors simultaneously, often an anti-CTLA-4 agent (like iplimumab) and an anti-PD-1/PD-L1 agent (like nivolumab or pembrolizumab). While combination therapy can offer increased efficacy in some cancers compared to anti-PD-1 monotherapy, it also comes with a heightened risk of adverse events. Here are the main risks associated with combination checkpoint inhibition compared to anti-PD-1 monotherapy: 1. **Increased Immune-Related Adverse Events (irAEs)**: - Combination therapy substantially increases the risk of irAEs. These can affect virtually any organ system, including the skin (rash, pruritus), gastrointestinal tract (colits, hepatitis), endocrine glands (thyroiditis, hypophysits, adrenalitis), lungs (pneumonitis), heart (myocarditis), kidneys (nephritis), and more. 2. **Severity of irAEs**: - Not only is the incidence of irAEs higher with combination therapy, but the severtix (which are severe to life-threatening) are more common with combination therapy. 3. **Early Discontinuation of Treatment**: - Due to the higher risk and severity of adverse events, patients on combination therapy may have to discontinue treatment earlier than if they were on monotherapy.
	although newer data suggest that some of these patients may still benefit. Patients with severe or life-threatening immune- related adverse events (irAEs) from prior ICI theraov: If a patient has	corticosteroids or if recurrent symptoms during taper): Mycophenolate mofetil or infliximab can be considered, but consult hepatology. 3. Other toxicities (e.g., pneumonitis, dermatitis, endocrinopathies. neobritis.	 4. **Neuropsychiatric Complications:** - **Mood Changes**: Including depression, euphoria, irritability, or psychosis. - **Insomnia**: Difficulty sleeping. 	dystruction, as ICIs can induce both hypo- and hyperthyroidism. 4. **Adrenal function tests**: - Cortisol and ACTH levels if there's clinical suspicion of adrenal insufficiency.	4. **Increased Need for Immunosuppression**: - The management of severe irAEs often requires high-dose corticosteroids and, in some cases, other immunosuppressive agents. The need for these agents is higher with combination therapy compared to monotherapy.
	previously experienced severe side effects from ICIs, it might be risky to use them again. Pregnant or breastfeeding women: The safety of ICIs during pregnancy and	etc.): For most other grade 3 or higher ICI toxicities, the general approach involves: Holding or discontinuing the ICI. Initiating high-dose	5. **Immunologic Complications:** - **Immunosuppression**: Increased susceptibility to infections. - **Impaired Wound Healing**.	5. **Other endocrine tests**: - Depending on symptoms, you might consider tests for pituitary function (like LH, FSH, and prolactin) or for diabetes insipidus (like serum	5. **Hospitalization and Mortality**: - There's a higher rate of hospitalization due to irAEs with combination therapy. In rare cases, irAEs can be fatal.

	1	1		
lactation has not been	corticosteroids (1-2		osmolality and urine specific	6. **Economic Costs**:
well-studied, and there's	mg/kg/day of	6. **Ophthalmologic	gravity).	 Using two agents is generally
potential risk to the fetus	methylprednisolone or its	Complications:**		more expensive than one, leading
or infant.	equivalent) and then tapering over weeks based on clinical	 - **Cataract Formation**: Especially posterior 	 6. **Muscle enzymes**: Creatine kinase (CK) if 	to higher direct costs of treatment.
It's essential to note that	response.	subcapsular cataracts.	there's concern for myositis.	7. **Potential Drug-Drug
should be individualized	immunosupprossive agents	intraocular prossure	7 **Inflammatory	Combining therapies may raise
taking into account the	for refractory cases	intraocular pressure.	7. Initialititatory	the notential for drug drug
notontial honofits and risks	Close menitoring of the	7 **Musculoskolotal	Such as C reactive protein	interactions, although this is loss of
for each nationt. In some	nations and consultation with	Complications:**	(CRP) or envtbrocyte	a concern with the checknoint
cases even if a nationt has	specialists (e.g.	- **Myonathy**: Weakness	sedimentation rate (ESR) if	inhibitors used in combination as
a contraindication the	astroenterology for colitis	and muscle wasting	there's concern for	they have different targets
notential benefits of the	henatology for henatitis) are	- **Avascular Necrosis**:	inflammatory conditions like	they have unterent targets.
therapy might outweigh	crucial It's also essential to	Particularly of the femoral	colitis	It's important to note that while
the risks especially if other	rule out other potential	and humeral heads	contis.	the risks with combination therapy
treatments are not	causes of the symptoms such	and numeral neads.	8 **Urinalysis**	are higher the notential benefits
available or have failed	as infections.	8. **Dermatologic	- To monitor for proteinuria	in terms of tumor response and
		Complications:**	which could indicate	overall survival, can also be greater
Always consult with an	Note: These are general	- **Skin Thinning**.	nephritis.	in certain cancers and patient
oncologist or specialist	guidelines, and clinical	- **Easy Bruising**.		populations. The decision to use
when considering the use	decisions should be	- **Striae** (stretch marks).	The frequency of surveillance	monotherapy versus combination
of immune checkpoint	individualized for each	- **Acne**.	will depend on multiple	therapy should be based on a
inhibitors for a specific	patient. Always consult the		factors, including the specific	thorough assessment of the
patient.	latest clinical guidelines and	9. **Electrolyte	ICI being used, the phase of	potential benefits and risks for
	discuss with appropriate	Disturbances**:	treatment (induction vs.	each patient, the specific type and
	specialists before initiating	 **Hypokalemia**: Low 	maintenance), and whether	stage of cancer, and other
	treatment.	potassium levels.	the patient has had prior	individual factors. Always consult
		 Hypocalcemia: Low 	irAEs. Initially, labs might be	current clinical guidelines and trials
		calcium levels.	drawn more frequently (e.g., before each infusion) and	when making treatment decisions.
		10. **Weight Gain and Fat	then less frequently as the	
		Redistribution**: Leading to	treatment course progresses	
		the characteristic "moon	and if the patient remains	
		face", dorsal cervical fat pad	stable.	
		("buffalo hump"), and central		
		obesity.	It's essential to tailor the	
			surveillance approach to	
		11. **Growth Retardation**:	each patient and to always	
		In children, chronic use can	consult current guidelines	
		lead to reduced growth.	and clinical best practices.	
		It's worth noting that the risk		
		of these complications		
		depends on the dose of the		
		corticosteroid, the duration of		
		therapy, and the specific		
		corticosteroid used.		
		Monitoring for these		
		complications is essential, and		
		whenever possible, the		
		lowest effective dose should		
		be used for the shortest		
	1	ouration necessary.	1	1

a	Colitis	Colitis	Colitis	Colitis	Colitis
Question	What is the primary diagnostic workup for	What are other conditions in the differential diagnosis	Are there any situations	What are the diagnostic	What are the primary treatments
	suspected immune	when considering immune	inhibitors can be continued	diarrhea from immune	associated colitis that does not
	checkpoint inhibitor	checkpoint inhibitor	even if colitis is suspected?	checkpoint inhibitors?	respond to high-dose steroids?
	colitis?	associated colitis?	-	-	-
Answer Engine 1	Immune checkpoint	When evaluating a patient for	The decision to continue or	The grading for colitis or	Immune checkpoint inhibitor (ICI)-
(ChatGPT)	inhibitor (ICI) colitis is an	suspected immune	withhold immune checkpoint	diarrhea due to immune	associated colitis that does not
	immune-related adverse	checkpoint inhibitor (ICI)	inhibitors (ICIs) when colitis is	checkpoint inhibitors (ICIs) is	respond to high-dose
	the use of ICIs. If ICI colitis	important to consider other	suspected depends on the	Terminology Criteria for	refractory and requires additional
	is suspected, prompt	conditions that can present	overall clinical context, and	Adverse Events (CTCAE).	interventions. Here's a general
	evaluation is crucial to	with similar gastrointestinal	the potential risks and	which is a standardized	approach to the management of
	ensure accurate diagnosis	symptoms. Here's a list of	benefits of continuing	classification used to report	refractory ICI-associated colitis:
	and management. Here's a	differential diagnoses to	therapy. Here's a general	adverse events in clinical	
	general approach to the	consider:	approach based on the	trials. Here's the specific	1. **Infliximab**:
	diagnostic workup:	1 **Infectious Colitis**	seventy of symptoms:	colitis or diarrhea related to	- A tumor necrosis factor-alpha (TNE-g) inhibitor
	1. **Clinical	- **Clostridium difficile	1. **Mild symptoms (Grade	ICIs:	- Dose: Typically 5 mg/kg given as
	Assessment**: Begin by	colitis**: Especially relevant	1)**		an intravenous infusion.
	taking a thorough history	in hospitalized patients or	- Symptoms: Fewer than 4	**Grade 3 Diarrhea**:	- This can be effective in steroid-
	and performing a physical	those recently on antibiotics.	stools per day above baseline,	 Increase of ≥ 7 stools per 	refractory cases, but it's important
	examination.	- **Other bacterial	abdominal pain, or blood in	day over baseline	to rule out infections (especially
	Symptoms: Assess	caused by Salmonella	stools without other systemic	- Incontinence	administration as it can exacerbate
	progression of diarrhea.	Shigella, Campylobacter.	- Management: ICIs may	of daily living (ADL)	them.
	abdominal pain, mucus or	Escherichia coli (E. coli), and	often be continued with close	- Hospitalization or	- A second dose may be given if
	blood in stool, urgency, or	Yersinia.	monitoring. Symptomatic	intravenous hydration	there's no improvement after the
	tenesmus.	- **Viral infections**:	treatment (e.g., loperamide	indicated	first dose.
	- **Medication review**:	Including cytomegalovirus	for diarrhea) might be	**Crada 2 Calific**	2 **\/odolizumab**
	are not due to other	(CIVIV) OF HOFOVIFUS.	exclude other causes	- Severe abdominal nain	 An integrin recentor antagonist
	medications (e.g.,	Such as Entamoeba histolytica	particularly infections.	- Perforation (bowel)	that specifically targets the gut.
	antibiotics, NSAIDs).	or Giardia.	, ,	- Peritonitis	- Dose: 300 mg given as an
	- **Physical		**Moderate symptoms	- Bowel obstruction	intravenous infusion.
	Examination**: Check for	2. **Inflammatory Bowel	(Grade 2)**	- Fistula formation	- Vedolizumab can be considered
	signs of dehydration,	Disease (IBD)**:	- Symptoms: Between 4-6	- Limiting self-care ADL	in patients who don't respond to
	neritoneal signs	chronic inflammatory	or moderate abdominal pain		infliximab is contraindicated
	peritorical signs.	condition of the colon.	- Management: Typically, ICI	indicated	initial is contrainaleated.
	2. **Laboratory Tests**:	- **Crohn's disease**: Can	therapy is temporarily held.		**Mycophenolate Mofetil
	- **Complete Blood	affect any part of the	The patient is evaluated	It's essential to differentiate	(MMF)**:
	Count (CBC)**: To assess	gastrointestinal tract.	thoroughly, and if colitis is	between diarrhea (an	- An immunosuppressive agent
	for anemia, infection, or other abnormalities	2 **Ischamic Calific**	confirmed, corticosteroids	increase in stool frequency)	that inhibits I and B cell
	- **Comprehensive	Caused by reduced blood flow	mg/kg/day or equivalent)	the bowel which can	- Dose: 1-1 5 g orally twice daily
	Metabolic Panel (CMP)**:	to the colon, often presenting	may be initiated. If symptoms	manifest with diarrhea but	- It can be considered for patients
	To check liver and kidney	with bloody diarrhea.	improve, a taper over at least	may also present with	who do not respond to or are
	function, which can be		4 weeks is generally	abdominal pain, bloody	intolerant of infliximab.
	impacted by dehydration	4. **Radiation Colitis**: In	recommended. ICIs might be	stools, and other symptoms).	1 **Tofocitio: h **:
	or other ITAES.	radiation therapy to the pelvic	resolve to Grade 1 or less	symptoms, especially signs of	4. ** Ioracitinio**:
	markers**: C-reactive	area.	depending on the clinical	bowel perforation or	- Dose: 10 mg orally twice daily.
	protein (CRP) and		context.	obstruction, necessitates	- Preliminary data suggest that it
	erythrocyte sedimentation	5. **Drug-induced Colitis**:		urgent intervention.	may be effective in refractory
	rate (ESR) to gauge the	Other than ICIs, several	 **Severe symptoms (Grade 		cases, but further research is
	evel of inflammation.	medications can induce	5)" *	when encountering a patient	needed.
	rule out infectious causes	- Nonsteroidal anti-	stools per day above baseline	diarrhea or colitis, it's crucial	5. **Other Therapies**:
	Include tests for pathogens	inflammatory drugs (NSAIDs)	severe abdominal pain, or	to conduct a comprehensive	- There's ongoing research into
	like Clostridium difficile,	- Antibiotics	signs of bowel perforation.	evaluation to rule out other	other treatments for refractory ICI-
	Salmonella, Shigella,	- Immunosuppressive agents	- Management: ICIs are	causes, particularly	associated colitis, including other
	Campylobacter, and	- Chemotherapy agents	held. Hospitalization may be	intections, and to assess the	biologics and immunosuppressive
	consider testing for ova	6. **Diversion Colitis**	corticosteroids (e ø	If the patient meets the	agerils.
	and parasites.	Inflammation of a segment of	intravenous	criteria for Grade 3 or higher.	6. **Supportive Care**:
		the large intestine that has	methylprednisolone) are	immediate medical	- Ensure adequate hydration and
	3. **Imaging**:	been surgically diverted and is	initiated. If no improvement is	intervention is required.	nutrition.
	- **Abdominal X-ray**:	no longer in contact with the	observed within 48-72 hours,		- Monitor and correct any
	Useful to rule out bowel	tecal stream.	or if symptoms worsen, additional		electrolyte imbalances.
	particularly if the natient	7. **Microscopic Colitis**·	immunosuppressive therapy		- Avoid nonsteroidal anti-
	has severe symptoms.	Includes collagenous colitis	like infliximab might be		inflammatory drugs (NSAIDs), as
	- **CT Scan**: It may be	and lymphocytic colitis, both	considered. Resuming ICI		they can exacerbate colitis.
	considered in severe cases	of which can cause chronic	therapy in this situation is		- Consider antidiarrheal

to evaluate the extent of	watery diarrhea.	approached with caution and	medications like loperamide for
colonic inflammation, wall		may often be permanently	symptomatic relief, but use with
thickening, or	**Graft-versus-Host	discontinued.	caution and preferably under
complications like	Disease (GvHD)**: Relevant in		medical supervision.
perforation.	patients with a history of	**Life-threatening	
	bone marrow or stem cell	symptoms (Grade 4)**	7. **Monitoring**:
4. **Endoscopic	transplantation.	- Symptoms: Life-	 Regularly assess the patient's
Evaluation**:		threatening complications	response to treatment.
 **Colonoscopy or 	**Pseudomembranous	such as bowel perforation,	- Monitor for complications of
Flexible Sigmoidoscopy**:	Colitis**: Typically due to C.	toxic megacolon, or	colitis, such as dehydration or
These are the key tools for	difficile, but the term refers to	hemodynamic instability.	infections.
directly visualizing the	the endoscopic appearance.	 Management: ICIs are 	 Check for side effects of the
mucosa and obtaining		permanently discontinued.	medications used.
biopsies.	**Neoplastic Colitis**:	High-dose corticosteroids are	
 Histology: Biopsies 	Tumors, both benign and	initiated, and patients often	It's essential to work closely with a
can confirm the diagnosis	malignant, can sometimes	require hospitalization in an	gastroenterologist, especially when
by showing evidence of	mimic colitis symptoms.	intensive care setting.	managing refractory cases. The
immune-mediated colitis,		Additional	decision on which additional
such as increased	 **Irritable Bowel 	immunosuppression and	therapy to use should be
inflammatory infiltrates,	Syndrome (IBS)**: While it's a	potential surgical intervention	individualized, considering the
cryptitis, or crypt	functional disorder without	might be necessary.	patient's overall health, potential
abscesses. It's essential to	the inflammatory changes		drug interactions, and the severity
differentiate ICI colitis from	seen in ICI colitis, the	In any case, even with mild	of the colitis. As with all irAEs, it's
other causes like infectious	symptoms can sometimes	symptoms, it's crucial to rule	also important to remain updated
colitis or inflammatory	overlap.	out other causes of diarrhea	with the latest clinical guidelines
bowel disease.		or colitis, especially	and research findings.
	12. **Other forms of	infections. Furthermore, the	
5. **Other Tests** (if	medication or treatment-	decision to resume or	
indicated):	related gastrointestinal	permanently discontinue ICIs	
 If there's suspicion of 	toxicity**: Such as	should be based on a	
additional irAEs or	chemotherapy-induced	multidisciplinary discussion,	
overlapping symptoms	mucositis or diarrhea.	taking into account the	
(e.g., hepatitis), relevant		overall benefit-risk profile for	
tests (like liver function	It's crucial to perform a	the individual patient.	
tests) should be obtained.	thorough evaluation,		
	including history, physical	Lastly, it's essential to follow	
When assessing patients	examination, laboratory tests,	the latest clinical guidelines	
for ICI colitis, it's crucial to	and imaging or endoscopic	and recommendations, as the	
rule out other potential	procedures, to differentiate	field of oncology and the	
causes of symptoms,	between ICI-associated colitis	understanding of ICI-related	
especially infectious	and other conditions in the	toxicities are rapidly evolving.	
etiologies, as the	differential diagnosis. Proper		
treatment approach differs	diagnosis will guide the		
significantly. Collaboration	appropriate treatment		
with gastroenterologists	strategy and management		
can be invaluable for the	plan.		
workup and management			
of suspected cases.			

Operation What are how promy darge state where a manuse of construction in the differential alignosts where the combined in the differential alignost where the diffe		Hepatitis	Hepatitis	Hepatitis	Hepatitis	Hepatitis
disposite control per subjected immune checkpoint initiation checkpoint initiatio checkpoint initiation checkpoint initiation check	Question	What is the primary	What are other conditions in	Are there any situations	What are the diagnostic	What are the primary treatments
subject of minune helpsgraft in history peptide (chard(r)) subject of minune chardpart in history metagenet (chard(r)) in thoses are continued in history metagenet (chard(r)) insclude helpsgraft (chard(r)) insclude helpsgraft (diagnostic workup for	the differential diagnosis	where immune checkpoint	criteria for grade 3 hepatitis	for immune checkpoint inhibitor-
checkport executed (interpret) executed (interpret) executed (interpret) executed (interpret) (cover (interpret) basebased (interpret)		suspected immune	when considering immune	inhibitors can be continued	from immune checkpoint	associated hepatitis that does not
Interaction Associated Registric The decision to continue of the parties in continue of the parties		checkpoint inhibitor	checkpoint inhibitor	even if hepatitis is suspected?	inhibitors?	respond to high-dose steroids?
Assever from 1: including (1) hepatitis: (2) Audi P17: Including (1) hepatitis: Including (1)		hepatitis?	associated hepatitis?			
(C)AUGPT) Inhibit (C) heading (C)AudCPT) (C)AudCPT) (C)AudCPT) Inhibits (C) heading (C)AudCPT) (C)AudCPT) (C)AudCPT) Inhibits (C) heading (C)AudCPT) (C)AudCPT) (C)AudCPT) Inhibits (C)AudCPT) (C)AudCPT) (C)AudCPT) (C)AudCPT) Inhibits (C)AudCPT) (C)AudCPT) (C)AudCPT) (C)AudCPT) Inhibits (C)AudCPT) (C)AudCPT	Answer Engine 1	Immune checkpoint	When evaluating a patient for	The decision to continue or	The grading for hepatitis due	For immune checkpoint inhibitor
abb to move a simular mediade figeting is abbetting is subset of is provide is subset	(ChatGPT)	inhibitor (ICI) hepatitis,	suspected immune	withhold immune checkpoint	to immune checkpoint	(ICI)-associated hepatitis that
nedder begints, ise controlled legistry, ise discussion of the departs, ise controlled legistry, ise ise controlled legistry, ise discussion of the departs, ise controlled legistry, ise ise controlled legistry, ise controlled legistry, ise ise controlled legistry, ise controlled legistry, ise controlled legistry, ise ise controlled legistry, ise controlled legistry, ise controlled legistry, ise controlled legistry, ise controlled legis		also known as immune-	checkpoint inhibitor (ICI)	inhibitors (ICIs) when	inhibitors (ICIs) is based on	doesn't respond to high-dose
 potential adverse venetion of the security of the		mediated hepatitis, is a	associated hepatitis, it's	hepatitis is suspected largely	the Common Terminology	corticosteroids (referred to as
 The sum of trans. In the days Constructions for K. (1994). The sum of the overall days costs where the sum of the sum of the overall days costs where the sum of the sum of the overall days costs where the sum of the sum of the overall days costs where the sum of the s		potential adverse event	essential to consider other	depends on the severity of	Criteria for Adverse Events	steroid-refractory hepatitis),
 In approximation of the sector of of the sector		resulting from ICI therapy.	conditions that can result in	the liver injury and the overall	(CICAE), which provides a	additional interventions are
 enserting for accurate diagnosis and the construction of segment approximation of the segment approximate approximation of the segment approximation of the segment a		diagnostic workup is	onzymes. Here's a list of	clinical context. Here's a	standardized classification for	primary treatments for refractory
diagrams and management. Here 's a general approach: 1. ** Circuit 2. ** Circuit 3. ** Circii 4. ** Circuit 4. ** Circii 4. ** Circii 5. ** Circii 4. ** Circii 5. ** Circii 4. ** Circii 5. ** Colore 5. ** Colore		essential for accurate	differential diagnoses to	the severity of liver enzyme	clinical trials. Here's the	ICL-associated benatitis:
 Controlling of the origination of the		diagnosis and	consider:	elevations:	specific diagnostic criteria for	ici-associated nepatitis.
 semanta approach: 1. "Thicktoos reparts: 1. "Thicktoos reparts:		management. Here's a	consider	ciciations	Grade 3 hepatitis related to	1. **Mycophenolate Mofetil
 L.**Clinical Assessment?*: L.**Clinical Assessment?*:		general approach:	1. **Infectious Hepatitis**:	1. **Mild liver enzyme	ICIs:	(MMF)**
1.**Clinical Assessment*: 0. and E ₁ cytomegalowing (FW), and heres simple with the post tor organize or adsorbing howing and reactions to ensure and reactions the degree and reactions the degree and reaction the degree and reaction reactions the and reaction reaction reactions the and reaction reaction reaction reaction and reaction reaction reaction and reaction reaction reaction reaction and reaction reaction reaction and reaction reaction reaction and reaction reaction reaction reaction and reaction re		0	- **Viral**: Hepatitis A, B, C,	elevations (Grade 1)**		- An immunosuppressive agent
Assessment**: • ***istroy • ***istroy<		1. **Clinical	D, and E, cytomegalovirus	- **AST/ALT**: Less than 3	**Grade 3 Hepatitis**:	that inhibits T and B cell
 istory: Check for key services (LVA), - normal (LVA), - normal (LVA), - ***istory**: Check more services (LTA), - ***istory**: Check more more services (LTA), - ***istory**: Check		Assessment**:	(CMV), Epstein-Barr virus	times the upper limit of	- **AST (Aspartate	proliferation.
the onset and progression of symptons is junnofer, of symptons is junnofer, and predications to ensure and medications to ensure and medications to ensure or certain paratic infections, or splenomegic infections, ensure it caused is splander, hepathists**, and information**. to certain paratic infections, or splenomegic infections, or splenomegic infections, or splenomegic informatic infections, or splenomegic informatic infections, amountandersas(AT), splanders (AT), alaliang phosphatase and block it for ensure informatic amountandersas(AT), alaliang phosphatase and block it for ensure informatic it infections and absence informatic paratic infections, or splenomegic informatic infections, amountandersas(AT), alaliang phosphatase and block it infections, alaliang phosphatase (APP)**: 5 to call infections, amountandersas(AT), alaliang phosphatase and block it infections, alaliang phosphatase and block it infections, alaliang phosphatase and block it infections, alaliang phosphatase and block it infections, alaliang phosphatase and block it infections, and block it infections, and block it infections, and block it infections, and alaliang phosphatase and the ensure infection and manatese infections, and alaliang phosphatase and the ensure infections, and alaliang phosphatase and the ensure infection and manatese infections, and and the ensure infection and manatese infections,		- **History**: Check for	(EBV), and herpes simplex	normal (ULN).	aminotransferase)**: > 5 to ≤	 Dose: Typically 1-1.5 g orally
 and symptoms like junctions, nauses, or abdominal pain. Review, nutries infectious and septophysios. -**Orter laber enzymes. -**Physical Examined on its efficiency in the segments: Its management: Its magement: Its		the onset and progression	virus (HSV).	 **Bilirubin**: Less than 	20 times the upper limit of	twice daily.
Infigue, anoread, natures an another of seven and medications to ensure that hepatotics of days are stored as legatisses, such as legat		of symptoms like jaundice,	 **Other Infectious 	1.5 times ULN.	normal (ULN).	 It's often the first choice after
or addominal pain. Review In end catalog information that hepatotoxic drugs aren't casaling the elevate inversions** Look for igns of liver dicease, technical base plandice, hepatomsgay. data is left or setting areas in the canadia of the mentanging. To wave, it's as jundice, hepatomsgay. data is left or setting areas and pass of here dicease, technical base plandice, hepatomsgay. data is left or setting an intravenous infusion. 2. **Laboratory Tests**: 1. **Liver function an intravenous infusion. 3. **Alcoholic station, setting an intravenous infusion. 3.		fatigue, anorexia, nausea,	Causes**: Other infectious	- **Alkaline Phosphatase	- **ALT (Alanine	steroids for refractory ICI hepatitis
all medications to ensure that hepetatisca drugs aren't causing the eliveration areause hepatisms. ***Action for drasses. ***Action for drasses. ****Action for drasses. *		or abdominal pain. Review	agents, such as leptospirosis	(ALP)**: Less than 2.5 times	aminotransferase)**: > 5 to ≤	due to its efficacy and safety
India tegrations: unique Cari Luise regardits.		all medications to ensure	or certain parasitic infections,	ULN.	20 times the ULN.	profile.
allow Lubsing the Bender a "*Autominant"2. **Autominante mediated infarmation of the partitis **A name mediated infarmation of the signs of laver diseases, such a signs of laver diseases, such excessive alcoholinate. ***Complete Bioophatase antinotantersae (ALT), apatrate a minintrantersae (ALT), alkaline bophatase (ALP), bilirubin, and help ascertain the degree to hereiting v - **Non-Alcoholic Stratohepatase (ALP), bilirubin, and help ascertain the degree to hereiting v - **Non-Alcoholic Stratohepatase (ALP), bilirubin, and help ascertain the degree to hereiting v - **Complete Bioophatase (ALP), bilirubin, and hereiting v - **Complete Bioophatase (ALP), bilirubin, and hereiting v - **Complete Bioophatase - **Complete Bioophatase - **Complete Bioophatase - **Complete Bioophatase - **Complete Bioophatase - **Stratoher Ophon tor refractory common vial hepatitis. - **Stratoher Ophon tor refractory (Case 3 and 4)*** - **Stratoher Ophon tor refractory (Case 3 and 4)*** - **Stratoher Ophon tor refractory (Case 3 and 4)		that nepatotoxic drugs	can cause nepatitis.	- Management: ICIs may	$-$ **Billrubin**: > 3 to ≤ 10	2 **Inflivimab**
 The standard structure is not structure in the server is no structure in the server is not structure in the ser		liver enzymes	2 **Autoimmuno	monitoring However it's	times the ULN.	A tumor pocrosis factor alpha
 Lasandright **: Lock for signs of liker disase, such as plannergaly. 2.**Lock for signs of liker disase, such as plannergaly. 2.**Lock pattoms galy. 2.**Lock		- **Physical	 Autominune Henstitis**: An immune- 	essential to frequently	$(\Lambda \mathbf{P}) $	(TNE-a) inhibitor
 sigs of liver disease, such as jaundice, lepatitis both inicially and initiologically. 2. **Laboratory Test **: -**Content function and ensure there init ** 2. **Moderate liver ensyme there init ** 2. **Moderate liver ensyme there init ** 2. **Moderate liver ensyme there init ** 3. **Alcoholic Hepatitis*: In the daps of the resyme there init ** 3. **Alcoholic Hepatitis*: Init of the liver injury and tests in order to the		Examination**: Look for	mediated inflammation of the	recheck liver function tests	UIN	- Dose: Typically 5 mg/kg given as
as jundice, hepstonegaly, or splenomegaly.hepstits both clinically and histolgically.progressive elevation: progressive elevation:These elevations indicate manufactor of the clinical induction of the clinical induction of the clinical induction of the clinical induction. It's estenation inducts in more controversial, given concerns about controversial, given concerns about <td></td> <td>signs of liver disease, such</td> <td>liver, which may resemble ICI</td> <td>and ensure there isn't</td> <td>02.11</td> <td>an intravenous infusion.</td>		signs of liver disease, such	liver, which may resemble ICI	and ensure there isn't	02.11	an intravenous infusion.
or splenomegaly. https://integraly. https://integraly. severe liver injury and immune-related adverse events. 2.**ilaboratory Test**: 3.**Alcoholic Hepattis*1: In patients with a history of immune-related adverse events. severa liver injury and immune-related adverse events. aminotrandersse (ALT), aspartate immune-related adverse events. 3.**Alcoholic Hepattis*1: In patients with a history of evaluation (Grade 2)**. -**Alcoholic Hepattis*1: In patients with a history of evaluation (Grade 2)**. aminotrandersse (ALT), aspartate immune-related adverse events. 4. **Non-Alcoholic Hepattis*1: In patients with sistory of evaluation is associated immune-related adverse events. immune-related adverse events. aminotrandersse (ALT), aspartate immune-related adverse events. 5.**Non-Alcoholic fatty liver disease in the patients. -***Serve liver injury and to initiate appropriate monotonic in cases of the immune injury and to initiate appropriate monotonic ing. 3.**Tecrolimus**. -**Congulation in comalizes. 5.**Drug-induced Liver injury. 1.0.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1		as jaundice, hepatomegaly.	hepatitis both clinically and	progressive elevation.	These elevations indicate	- It's effective for various
 2.**Laboratory Tests**: 3.**Alcoholic Hepatitis*: 3.**Alcoholic Hepatitis*: 3.**Alcoholic Hepatitis*: 4.**Nor-Alcoholic 4.**Nor-Alcoholic 5.**Intest can 4.**Nor-Alcoholic 5.**Intest Can 4.**Nor-Alcoholic 5.**Intest Can 4.**Nor-Alcoholic 5.**Torg-Induced Liver Injury. -**Coller Hallow Classertain the dgrass challow in the liver injury inclusion of Class through evaluation to ascertain the dgrass challow in the liver injury. -**Coller Hallow Classertain the dgrass challow in the liver injury. -**Coller Hallow -**Autoinmune -**Autoinmune -**Autoinmune -**Autoinmune -**Autoinmune -**Cholerata Liver Injury. -**Coller Hallow -**Autoinmune -**Autoinmune -**Autoinmune -**Autoinmune -**Autoinmune -**Cholerata Liver Injury. -**Collerata Liver Injury. -**Solf Allorata Liver Injury. <l< td=""><td></td><td>or splenomegaly.</td><td>histologically.</td><td></td><td>severe liver injury and</td><td>immune-related adverse events,</td></l<>		or splenomegaly.	histologically.		severe liver injury and	immune-related adverse events,
 2.**Laboratory Test**: -**Laboratory Test**: -**Congulation -**Laboratory Test**: -**Congulation -**Congulation -**Congulation -**Laboratory Test**: -**Congulation -**Laboratory Test**: -**Congulation -**Strang**: -**Laboratory Test**: -**Congulation or shock. -**Strang*: -**Laboratory Test**: -**Congulation or shock. -**Strang*: -**Congulation or shock. -**Strang*: <li< td=""><td></td><td></td><td></td><td>2. **Moderate liver enzyme</td><td>require prompt medical</td><td>including colitis. However, its use in</td></li<>				2. **Moderate liver enzyme	require prompt medical	including colitis. However, its use in
 -**LVer Function Tests -**LSTALT**: Between 3-5 		**Laboratory Tests**:	3. **Alcoholic Hepatitis**: In	elevations (Grade 2)**	attention. It's essential to	ICI-associated hepatitis is more
(IFI)**. Alanine aminotransfersae (AT), aspartateexcessive alcohol intake.Immes UIN. . **Billivubin**. Between 2.5-5 . *Billivubin**. Between 2.5-5evaluation to ascertain the cause of the uripury and to initiate appropriate with Grade 3 hepatits, ike.potential hepatotoxicity. It's generally research for an more severe for more alcohol fast yliver disease . **Achonical (CO)***1. Other the disease alcohol fast yliver disease.potential hepatotoxicity. It's generally research for an evaluation to ascertain the cause of the inpury and alcohol fast yliver disease.potential hepatotoxicity. It's generally research for an evaluation to ascertain the cause of the inpury and the ascertain the degree alcohol (CO)***1. Other then ICS, several medications can antibude. (Ge)************************************		 **Liver Function Tests 	patients with a history of	- **AST/ALT**: Between 3-5	conduct a thorough	controversial, given concerns about
 aminotransferase (AT), againance (AT), alkaline phosphatase (AST), alkaline photophosphatase (AST), alkaline phosphatase (AST), alkaline phosphatase, AST), alkaline phosphatase (AST), a		(LFTs)**: Alanine	excessive alcohol intake.	times ULN.	evaluation to ascertain the	potential hepatotoxicity. It's
 appartate aminotransferase (AST), alkaline phosphatase (ALP), bilrubin, and alkaline phosphatase (ALP), bilrubin, and albumin levels. These can albumin levels. These can albumin levels. These can albumin levels. These can and type of liver injury, - **Complete Blood Count (CBC)**: 0 to theck for anemia or other another induce liver injury, - **Complete Blood Count (CBC)**: 0 to theck for anemia or other another induce liver injury, - **Complete Blood Count (CBC)**: 0 to theck for anemia or other another induce liver injury, - **Complete Blood Count (CBC)**: 0 to theck for anemia or other another induce liver injury, prothrombin time (PT) and international normalities **Coagulation requires calculation, and antise distributed international normalized, e.g., another, and magement: Ypically, (IC) - **Serologic Tests**: For syntheti function, - **Serologic Tests**: For common viral hepatitids international normalized, for anethod international normalized, - **Autoimmune Workup*: including antibiody (ASMA), and ant liver/Kiney microsomal anothody (ASMA), and ant liver/Kiney microsomal anothody (ASMA), and ant liver/Kiney microsoma another another anothod (ASMA), and ant liver/Kiney microsoma anotho		aminotransferase (ALT),		 **Bilirubin**: Between 	cause of the liver injury and	generally reserved for cases
 aminotransferase (AS1), alkaline phosphates betablepattis (NASH)*: A betablepattis (NASH)*: A c**LO**: Stevene for more alcoholic fatty liver disease (IAEP), bilirubin, and albumin levels. These can help ascertain the degree and type of liver injury. c**Complete Blood Court (BC)**: To check for anemia or other induced liver injury. c**Complete Blood Court (BC)**: To check for anemia or other induce liver injury. c**Complete Blood court (BC)**: To check for anemia or other induce liver injury. catual anet, antepippetris international normalized ratio (IMR) to asses liver synthetic function international normalized ratio day (ASMA), and anti- liver, richous (FCC). **Bliary Disserse*: -**Bliary Disserse*: -**Bliary Disserse*: -**Bliary Disserse*: -**Bliary Disserse*: -**Bliary Disseruction*: -**Bliary Disserse*: -**Bliary Disserse*: -**Bliary		aspartate	4. **Non-Alcoholic	1.5-3 times ULN.	to initiate appropriate	refractory to other treatments and
alkaline phosphatase (ALP), bilirubin, and albumin levels. These can help ascratian the degree and type of liver injury. -**Complete Blood Court (GC)**: To check for anemia or ther albumin lites. -**Coagulation protine and international abnormalities. -**Coagulation protine and international abnormalities. -**Coagulation protine and international international normalized athor there is no -**Coagulation protine and international abnormalities. -**Coagulation protine and international abnormalities. -**Coagulation protine and international international normalized athor there is no -**Coagulation protine and international international normalized athor there is no athory (ANA), and s-mother antibody (ATAM), and s-mother antibody (ATAM), and s-mother antibody (ATAM), and s-mother athory (FSC), -**Abdominal Utrasound**: Evaluates bile for enzymes athory (SC), -**Abdominal Utrasound**: Evaluates bile for enzymes -**Abdominal Utrasound**: Evaluates -**Abdominal Utrasound**: Evaluates -**Abdominal Utrasound**: Evaluates -**Abdominal Utrasound**: Evaluates -**Abdominal Utrasound**: Evaluates -**Abdominal -**Abdominal -**Abdominal Utrasound**: Evaluates -**Abdominal -***Astuch more so -**Abdominal -**Abdominal -**Abdominal -***Astuch International Normalities -***Abdominal -****		aminotransferase (AST),	Steatohepatitis (NASH)**: A	- **ALP**: Between 2.5-5	management. Given the	requires careful consideration and
(ALP, bintuoting and albumin levels. These can help ascertain the degree and type of liver injury. -**Complete Blood Count (CRC)**: To check for anemia or other ahormalites. -**Coagulation prothrombin time (PT) and interation an ormalized ratio (INR) to assess liver (INR) to assess liver <td></td> <td>alkaline phosphatase</td> <td>more severe form of non-</td> <td>times ULN.</td> <td>potential risks associated</td> <td>monitoring.</td>		alkaline phosphatase	more severe form of non-	times ULN.	potential risks associated	monitoring.
abdummeres. Insecution(Mercu).Unempty subport5.• Torug-Induced Liver Injury **Complete Blood(DIU)*: Other than ICIs, several medications can induce liver injury. including abnormalities.5.• Torug-Induced Liver Injury.• * A calcineurin inhibitor that suppresses T-cell activation **CoagulationCount (CBC)**: To check for anemia or other abnormalities.5.• Torug-Induced induce liver injury.• Intering Vision is done to ascertain the cause of the hepatitis sto onfirmed or highly suspected, cortcosteroids may be initized (ICIs might be resumed once liver enzymes)• . * activation.• . * activation **Actoimmune torug out viral causes of hepatitis (hepatitis A, B, C, and E) to rule out viral causes of hepatitis• . * actaining hepatitis (ICIs might be resumed once liver enzymes)• . * activation.• . * activation **Actoimmune (ANA), anti-smooth muscle antibody (ASAM), and and the cause of the rule out viral causes of hepatitis. - **Autoimmune (ANA), anti-smooth muscle antibody (ASAM), and and E) torus is primary bilary circhosis (PBC) or primary sciensing choiangitis rule out viral commandation of CSAB. * **Builary Diseases**: - **Choler State Liver - **Choler State Liver primary sciensing choiangitis primary sciensing choiangitis primary sciensing choiangitis primary sciensing choiangitis cortcosteroids are initiated. A cortcosteroids are i		(ALP), billrubin, and	(NAELD)	- Management: Typically, ICI	with Grade 3 nepatitis, the	2 **Tacrolimuc**
Interpact and the bage5.**Drug-induced Liver Injury, (DIU)**: Other than CIS, **Complete Blood Count (CBC)**: To check for anemia or other abromalities.5.**Drug-induced Liver Injury, (DIU)**: Other than CIS, weral medications can induce liver injury, including antibiotics (e.g., vaproate, phenytoin), statins, acetaminophen, and international normalized ratio (INR) to assess liver synthetic function.5.**Drug-induced Liver Injury, (DIU)**: Other than CIS, weral medications can induce liver injury, including antibiotics (e.g., vaproate, phenytoin), statins, acetaminophen, and international normalized ratio (INR) to assess liver synthetic function.5.**Drug-induced Liver Injury, (DIU)**: Other than CIS, weral medications can induce liver injury, including antibiotics (e.g., vaproate, phenytoin), statins, acetaminophen, and many others.Comport and physical can be acceler enzymes improve and approach near- ormal values, depending on rormal values, depending on rormal values, depending on sociated hepatitis.7.**Biliary Distruction**: sociated hepatitis (or sociated hepatitis (or sociated hepatitis (or sociated hepatitis is based on anecdotal evidence, and it's reserved for severe, Ife- times ULN.7.**Biliary Distruction**: sociated hepatitis.7.**Biliary Di		holp accortain the degree	(NAFLD).	therapy is temporarily field. A	typically approached with	A calcinourin inhibitor that
-**Complete Blood Count (CBC)**: To check for anemia or ther abnormalities.Coult ()**: O check several medications can antibiotics (e.g., amoxicillin- clavulanate), antiepilepitor initiated. ICIs might be resumed once liver enzymes improve and approach near- normal values, depending on the clinical context "t's another option for refractory cases, but its use is based more on its efficacy in autoimmune hepatitis depatitis **Coagulation international normalized ratio (INR) to assess liver synthetic function.c.**Ischemic Hepatitis (or Shock Liver)**: Caused by decreased blood flow to the hepatitis.i.**Severe liver enzymes improve and approach near- normal values, depending on the clinical context **Antithymocyte Globulin (ATG)**- ***Serologic Tests**: For common viral hepatitids intucer antibody antibuder antibody (ANA), and ti- liver/Kidney microsonal antibody (ASMA), and anti- liver/Kidney microsonal antibody (ASMA), and anti- liver anzymes, sincures leading to elevated liver enzymes, sincures leading to elevated liver enzymes, sincures and blood contonal- strictures leading to elevated liver enzymes, sincures leading to elevated liver resures choices are initiated. A contineer there is no continuction at blowd, (ASMA), and anti- liver/kidney microsonal antibody (ASMA), and anti- liver/kidney microsonal antibody (ASMA), and anti- liver/kidney microsonal antibody (ASMA), and anti		and type of liver injury	5 **Drug-Induced Liver Injury	to ascertain the cause of the	caution	suppresses T-cell activation
Count (CBC)**: To check for anemia or other abnormalites.several medications can induce liver injury, including abnormalites.hepatitis is confirmed or hild subjected, corticosteroids may be initiated. ICIs might be resumed one liver enzymes improve and approach near- normon viral hepatitides (hepatitis A, B, C, and E) to rule out viral causes of hepatitis.hepatitis is confirmed or hild subjected, corticosteroids may be initiated. ICIs might be resumed once liver enzymes improve and approach near- normon viral hepatitides (hepatitis A, B, C, and E) to rule out viral causes of hepatitis.hepatitis is confirmed or hight subjected, corticosteroids may be initiated. ICIs might be resumed once liver enzymes improve and approach near- normon viral hepatitides (hepatitis A, B, C, and E) to rule out viral causes of hepatitis.hepatitis is confirmed or his efficacy in autoimmune hepatitis.destitis is confirmed or his efficacy in autoimmune hepatitis***Autoimmune workup**: Including antinuclear antibody (ANA), and thi- liver/kidney microsomal antibody (ASMA), and anti- liver/kidney microsomal antibody (AIMA), and thi- liver viras leading to elevated liver enzymes imary scleases**: Such as primary biliary Obstruction**: Form galistones, tumors, or strictures leading to elevated liver enzymes. imary scleases, submors, in cordification in the enzymes. ***Abdominalhepatitis is confirmed or his efficacy in autoimmune hepatitis. ***Wedolizamb**: - ***Abdominal Ultrasound**: Evaluateshepatitis is confirmed or his efficacy in autoimmune hepatitis. ****Uscluate in the classical in the c		- **Complete Blood	(DILI)**: Other than ICIs.	liver injury. If ICI-induced	coutorn	- It's another option for refractory
for anemia or other abnormalites.induce liver injury, including antibiotics (e.g., amoxicilin- tintated. (IS might be resumed once liver enzymes initated. (IS might be resumed once liver enzymes intated. (IS might be resumed once liver enzymes intated. (IS might be resumed once liver enzymes intated. (IS might be resumed once liver enzymes inter clinical context.its efficacy in autoimmune hepatitis. (ATG)**-**Serologic Tests**: For common viral hepatitides (hepattis, A, B, C, and E) to rule out viral causes of hepatitis. -**Cholestatic Liver out autoimmune hathody (ASMA), and smit liver/kidney microsomal antibody (anti-KW) to rule out autoimmune hepatitis.3.**Severe liver enzyme elevations (Grade 3 and 4)** -**ALVENT3.**Severe liver enzyme elevations (Grade 3 and 4)** -**Silirubin**: More than 3 times ULN. -**ALVENT3.**Severe liver enzyme elevations (Grade 3 and 4)** -**ALVENT-**Silirubin**: Alauses3.**Ingaing**: -**Autoimmune hepatitis.7. **Biliary Diseases**: -**Cholestatic Liver primary sclerosing cholangitis (PSC). -**Silirubin**: An integrin receptor antagonist, might be confirm the diagnosis. In cases where there is no incases where there is no incase		Count (CBC)**: To check	several medications can	hepatitis is confirmed or		cases, but its use is based more on
abnormalities.antibiotics (e.g., amoxicillin- clauulanate), antiepilepticscorticosteroids may be initized. (LIS might be resumed once liver enzymes improve and approach near- normal values, depending on the clinical context.hepatitis than specific data in (Cl- associated hepatitis.• "For galaction(e.g., valproach, phenytoin), statis, acetaminophen, and many others.corticosteroids may be instruct.4. **Antithymocyte Globulin (ATG)**• "Sterologic Tests**: For common viral hepatitids6. **Ischemic Hepatitis (or shock Liver)**: Caused by decreased blood flow to the liver, often due to hepatitis.3. **Severe liver enzyme elevations (Grade 3 and 4)** -**Strologic Tests**: For common viral hepatitis.3. **Severe liver enzyme elevations (Grade 3 and 4)** -**Strologic Tests**: For shock Liver)**: Caused by decreased blood flow to the hypotension or shock.3. **Severe liver enzyme elevations (Grade 3 and 4)** -**Striket Liver, Vict- elevations (Grade 3 and 4)** -**Strologic Tests**: For hypotension or shock.3. **Severe liver enzyme elevations (Grade 3 and 4)** -**Strologic Tests**: For -**Strologic Tests**: For hypotension or shock.3. **Severe liver enzyme elevations (Grade 3 and 4)** -**Strologic Tests**: For -**Strologic Tests**: Such as primary biliary cirrhosis (PBC) or primary sclerosing cholangitis (PSC).3. **Severe liver than 5 times ULN**Other Potential Agents** -**Todactinib**: A lanus kinase corticosteroids are initiated. A comprehensive evaluation, potentially including a liver biosy, is undertaken to considered for those with considered for those with considered for those with considered for those with considered for those with considere		for anemia or other	induce liver injury, including	highly suspected,		its efficacy in autoimmune
-**Cozgulationclavulanate), antiepileptics (e.g., valproate, phenytoin), statins, actaminophen, and international normalized ratio (INR) to assess liver synthetic function.initiated. ICIs might be resumed once liver enzymes improve and approach near- normal values, depending on the clinical context.associated hepatitis**Serologic Tests**: For common viral hepatitides (hepatitis, R., C, and E) to rule out viral causes of hepatitis.6. **Ischemic Hepatitis (or Shock Liver)**: Caused by decreased blood flow to the liver, often due to hypotension or shock.3. **Severe liver enzyme elevations (Grade 3 and 4)** - **Strol/LT**: More than 5 merse utwing causes of hypotension or shock**Strol/LT**: More than 5 - **Strol/LT**: More than 5 - **Billary Diseases**: - **Billary Diseases**:**Autimus - **Autominal untiobdy (ANA), and anti- liver, Kidney microsonal antibody (AIXA), and anti- liver, Kidney microsonal antibody (AIXA), and anti- liver, Kidney microsonal antibody (aIX-LIXM) to pub- to ut autoimmune hepatitis.7. **Billary Diseases**: - **Autoimmune primary sclerosing cholangitis (PSC)**Autoimmune - **Autoimmune - **Autoimmune - **Billary Obstruction**: From gallstones, tumors, or strictures leading to elevated liver, enzymes**Initiated. A correcter scle and approach cause - **Natoimma**Wacular Disorders**: - **Todictinib*: A lanue kinase times ULN.3. **Imaging**: -**Audominal Ultrasound**: Evaluates8. **Vascular Disorders**: - **Billary Obstruction*: From gallstones, tumors, or strictures leading to elevated liver enzymes**Unotimume hepatitis. - **Vacular Disorders**:3. **Imaging**: -**Abdominal Ultras		abnormalities.	antibiotics (e.g., amoxicillin-	corticosteroids may be		hepatitis than specific data in ICI-
Profile**: Including prothrombin time (PT) and international normalized ratio (INR) to assess liver synthetic function.(e.g., valproate, phenytoin), statins, acetaminophen, and many others.resumed once liver enzymes improve and approach near- normal values, depending on the clinical context.4.**Antithymocyte Globulin (ATG)**· **Serologic Tests**: For common viral hepatitids6. **Ischemic Hepatitis (or Shock Liver)**: Caused by decreased blood flow to the liver, often due to hepatits.3. **Severe liver enzyme elevations (Grade 3 and 4)** - **St7/AT*: More than 3- An immunosuppressive agent that targets Tcells.· **Autoimmune Workup**: Including antinoclear antibody (ANA), anti-smooth muscle antibody (ASMA), and anti liver/kidney microsomal antibody (ASMA), and anti liver/kidney microsomal antibody (anti-LKM) to rule out autoimmune hepatitis.7. **Biliary Diseases**: - **Biliary Obstruction**: results **Autoimmune hepatitis. - **Alp**: More than 5 times ULN. - **Alp**: More than 5 times ULN.5. **Other Potential Agents** - **Todistinib**: A Janus kinase (JAK) inhibitor, has been suggested for refractory cases based on its comprehensive evaluation, - **Biliary Obstruction**: receptor antagonist, might be condicating to elevated biosy, is undertaken to comprehensive evaluation, potentially including a liver biosy, is undertaken to considered for those with consult with steroids or improvement with steroids or <br< td=""><td></td><td> **Coagulation </td><td>clavulanate), antiepileptics</td><td>initiated. ICIs might be</td><td></td><td>associated hepatitis.</td></br<>		 **Coagulation 	clavulanate), antiepileptics	initiated. ICIs might be		associated hepatitis.
prothrombin time (PT) and international normalized ratio (INR) to assess liver synthetic function.statins, acetaminophen, and many others.improve and approach near- normal values, depending on the clinical context.4. **Antithymocyte Globulin (ATG)**- **Serologic Tests*: For common viral hepatities (hepatitis A, B, C, and E) to rule out viral causes of hepatits **Severe liver enzyme elevations (Grade 3 and 4)** - **Astr/ALT**: More than 3 times ULN**Silirubin**: More than 3 times ULN*testing causes **Autoimmune workup**: including antinuclear antibody (ANA), and rismooth muscle antibody (IASMA), and anti- liver/kidney microsomal antibody		Profile**: Including	(e.g., valproate, phenytoin),	resumed once liver enzymes		
international normalized ratio (INR) to assess liver synthetic function.many others.normal values, depending on the clinical context.(ATG)**- An immunosuppressive agent that targets T-cells An immunosuppressive agent that targets T-cells An immunosuppressive agent that targets T-cells **Serologic Tests**: For common viral hepatitids (hepatitis A, B, C, and E) to rule out viral causes of hepatitis.5. **Ischemic Hepatitis (or shock Liver)**: Caused by decreased blood flow to the iver, often due to3. **Severe liver enzyme elevations (Grade 3 and 4)** elevations (Grade 3 and 4)** on anecdotal evidence, and it's reserved for severe, life- threatening cases Its use in refractory ICI- associated hepatitis is based on anecdotal evidence, and it's reserved for severe, life- threatening cases **Autoimmune Workup**: Including antinuclear antibody (ANA), and arti- liver/kidney microsomal antibody (asti-LKM) to rule out autoimmune hepatitis **Eliniver - **ALP**: More than 5 times ULN **Tofacitinib**: A Janus kinase held, and high-dose corticosteroids are initiated. A corticosteroids are initiated. A considered for those with concurrent refractory colitis and hepatitis **Weintervice initiated taignosis. In cases where there is no considered for those with concurrent refractory colitis and hepatitis **Abdominal Ultrasound**: Evaluates the liver's size,8. **Vascular Disorders**: - **Buidd-Chiari- **Buidd-ChiariI file i priverymes **Buidd-Chiariif li		prothrombin time (PT) and	statins, acetaminophen, and	improve and approach near-		4. **Antithymocyte Globulin
ratio (INK) to assess liver synthetic function An immunosuppressive agent that targets T-cells.synthetic function **Sichemic Hepatitis (or Shock Liver)**: Caused by decreased blood flow to the liver, often due to hepatitis.3. **Severe liver enzyme elevations (Grade 3 and 4)** . **StT/ALT**: More than 5 times ULN An immunosuppressive agent that targets T-cells.· **Group at the patitides (hepatitis A, B, C, and E) to rule out viral causes of hepatitis.Iver, often due to hypotension or shock.3. **Severe liver enzyme elevations (Grade 3 and 4)** . **StT/ALT**: More than 5 times ULN Its use in refractory ICI- associated hepatitis is based on anecdotal evidence, and it's reserved for severe, life- . **StIFundin*: More than 5 times ULN.Workup**: Including antinuclear antibody (ANA), and sime of the refractory cases bases*: liver/kidney microsomal antibody (ASMA), and anti- liver/kidney microsomal antibody (AstH-LKM) to rule out autoimmune hepatitis **Biliary Distruction*: . **Biliary Distruction*: . **Biliary Distruction*: . **Biliary Distruction*:- **Biliary Distruction*: . comprehensive evaluation, . **Vedoilzumab*: A integrin . **Netialing a liver . **Netialing a liver . **Netialing a liver . **Vedoilzumab*: A integrin . **Vedoilzumab*: A integrin <td></td> <td>international normalized</td> <td>many others.</td> <td>normal values, depending on</td> <td></td> <td>(AIG)**</td>		international normalized	many others.	normal values, depending on		(AIG)**
Synchetter function.that fargets 1-Cells **Serologic Tests**: For common viral hepatitidesShock Liver)**: Caused by dccreased blood flow to the liver, often due to 		ratio (INR) to assess liver	6 **lechomic U	the clinical context.		- An immunosuppressive agent
- Serving common viral hepatities - ins due to prove due to common viral hepatities - ins due to prove due to due to prove due to hepatitis. - ins due to prove due to common viral hepatities is based on associated hepatitis is based on associated hepatitis is based on associated hepatitis. - **Autoimmune - **Autoimmune - **Ailtoprove due to prove due to prove due to the patitis. - **Ailtoprove due to hepatitis. - ***Ailtoprove due to hepatitis. - ***Biliary Diseases**: - ***Biliary Diseases**: - ***Ailtoprove due to hepatitis. - ***One than 3 - ***One than 3 - ***One than 5 - ***One than		synthetic runction.	 Shock Liver 1** Coursed by 			that targets incerns.
Common viral negatitiesCellease block interestCellease block		- **Serologic lests**: For	decreased blood flow to the	3. **Severe liver enzyme		- Its use in refractory ICI-
IntegrationIntegrationIntegrationIntegrationIntegrationIntegrationIntegrationrule out viral causes of hepatitis.+ypotension or shock.+ypotension or shock **Bilirubin**: More than 3reserved for severe, life.·**Autoimmune7. **Biliary Diseases**:times ULN **ALP*: More than 5threatening cases.workup**: Including antinuclear antibody- **Cholestatic Liver Diseases**: Such as primary- **ALP*: More than 55. **Other Potential Agents**(ANA), anti-smooth muscle antibody (ASMA), and anti- liver/kidney microsomal antibody (Asti-LKM) to rule out autoimmune hepatitis **Biliary Obstruction**: orticutes leading to elevated biosy, is undertaken to confirm the diagnosis. In cases where there is no- **Budd-Chiari3. **Imaging**: - **Abdominal Ultrasound**: Evaluates the liver's size,8. **Vascular Disorders**: improvement with stroids or improvement with stroids or <br< td=""><td></td><td>(henatitis A B C and F) to</td><td>liver often due to</td><td>- **AST/AIT**: More than 5</td><td></td><td>anecdotal evidence and it's</td></br<>		(henatitis A B C and F) to	liver often due to	- **AST/AIT**: More than 5		anecdotal evidence and it's
hepatitis**Bilirubir*: More than 3threatening cases**Autoimmune7. **Biliary Diseases**:times ULN.Workup**: Including antinuclear antibody- **cholestatic Liver Diseases**: Such as primary- **ALP**: More than 5(ANA), anti-smooth muscle antibody (ASMA), and anti- liver/kidney microsomal antibody (anti-LKM) to rule out autoimmune hepatitis **Biliary Obstruction**: corticosteroids are initiated. A corticosteroids are initiated. A considered for those with considered for those with concurrent refractory colitis and hepatitis.3. **Imaging**: - **Abdominal Ultrasound**: Evaluates the liver's size,8. **Vascular Disorders**: improvement with steroids or if liver enzymes continue to- ongoing research may identify other effective treatments for		rule out viral causes of	hypotension or shock.	times ULN.		reserved for severe. life-
- **Autoimmune 7. **Biliary Diseases**: times UUN. **Autoimmune Workup*: Including antinuclear antibody **Cholestatic Liver **ALP**: More than 5 5. **Other Potential Agents** (ANA), anti- smooth muscle antibody (ASMA), and anti- liver/kidney microsomal antibody (anti-LKM) to rule out autoimmune hepatitis. Diseases**: Such as primary biliary Oisrhosis (PBC) or - Management: ICIs are held, and high-dose **ALP**: More than 5 **Other Potential Agents** 0.1000 **Diseases**: Such as primary biliary cirrhosis (PBC) or - management: ICIs are held, and high-dose **Talcenter of the primary calcosing cholangitis (PSC). **Biliary Obstruction**: corticosteroids are initiated. A comprehensive evaluation, potentially including a liver **Vedolizumab**: A integrin receptor antagonist, might be considered for those with concurrent refractory colitis and hepatitis. 3. **Imaging**: -**Abdominal Iver enzymes. confirm the diagnosis. In cases where there is no improvement with steroids or if liver enzymes continue to **Budd-Chiari		hepatitis.		- **Bilirubin**: More than 3		threatening cases.
Workup*: Including antinuclear antibody- **Cholestatic Liver Diseases*: Such as primary biliary controls (PBC) or biliary citrosis (PBC) or antibody (ASMA), and anti- liver/kidney microsomal antibody (anti-LKM) to rule ou autoimmune hepatitis **Cholestatic Liver Diseases*: Such as primary biliary collangitis (PSC) **ALP**: More than 5 times ULN.5. **Other Potential Agents** - **Tofacitinib*: A Janus kinase (JAK) inhibitor, has been suggested for refractory cases based on its efficacy in autoimmune hepatitis.antibody (anti-LKM) to rule ou autoimmune hepatitis **Billary Obstruction**: - **Billary Obstruction**: strictures leading to elevated biops, is undertaken to cases where there is no cases where there is no the liver's size,- **Vacuars Disorders**: improvement with steroids or if liver enzymes continue to5. **Other Potential Agents** - **Tofacitinib*: A Janus kinase (JAK) inhibitor, has been suggested for refractory cases based on its efficacy in autoimmune hepatitis. - **Vedolizumab**: An integrin receptor antagonist, might be considered for those with confirm the diagnosis. In cases where there is no improvement with steroids or improvement with steroids or if liver enzymes continue to5. **Other Potential Agents** - **Tofacitinib**: A Janus kinase (JAK) Anus kinase (JAK) Anus kinase considered for those with considered for those with cases where there is no cases where there is no cases where there is no cases where there is no considered for those with considered for those with consing research may identify other effective		- **Autoimmune	7. **Biliary Diseases**:	times ULN.		5
antinuclear antibodyDiseases*: Such as primarytimes ULN **Tofacitinib**: A Janus kinase(ANA), anti-smooth musclebiliary cirrhosis (PBC) or- Management: ICIs are(JAK) inhibitor, has been suggestedantibody (ASMA), and anti-primary sclerosing cholangitisheld, and high-dosefor refractory cases based on itsliver/kidney microsomal(PSC).corticosteroids are initiated. Aefficacy in autoimmune hepatitis.antibody (anti-LKM) to rule- **Biliary Obstruction**:comprehensive evaluation,- **Vedolizumab**: An integrinout autoimmune hepatitis from gallstones, tumors, or strictures leading to elevatedpotentially including a liver biopsy, is undertaken to cases where there is noconcurrent refractory colitis and hepatitis.3. **Imaging**:liver enzymes.confirm the diagnosis. In cases where there is no timprovement with steroids or the liver's size,8. **Vascular Disorders**:improvement with steroids or tif liver enzymes continue to- Ongoing research may identify		Workup**: Including	- **Cholestatic Liver	- **ALP**: More than 5		5. **Other Potential Agents**
(ANA), anti-smooth muscle antibody (ASMA), and anti- liver/kidney microsomal antibody (anti-LKM) to rule out autoimmune hepatitis.biliary cirrhosis (PBC) or primary sclerosing cholangitis (PSC) Management: ICIs are held, and high-dose corticosteroids are initiated. A comprehensive evaluation, potentially including a liver strictures leading to elevated liver size,(JAK) inhibitor, has been suggested for refractory cases based on its efficacy in autoimmune hepatitis. out potentially including a liver biopsy, is undertaken to confirm the diagnosis. In cases where there is no dimervent with steroids or improvement with steroids or improvement with steroids or if liver enzymes continue to(JAK) inhibitor, has been suggested for refractory cases based on its efficacy in autoimmune hepatitis. - **Vedolizumab**: An integrin receptor antagonist, might be considered for those with confirm the diagnosis. In cases where there is no the liver's size,(JAK) inhibitor, has been suggested for refractory cases based on its efficacy in autoimmune hepatitis.8. **Vascular Disorders**: the liver's size,8. **Vascular Disorders**: if liver enzymes continue to- Management: ICIs are held, and high-dose corticosteroids are initiated. A comprehevaluation, cose where there is no cases where there is no cases where there is no cases where there is no considered for those with congoing research may identify ongoing research may identify		antinuclear antibody	Diseases**: Such as primary	times ULN.		- **Tofacitinib**: A Janus kinase
antibody (ASMA), and anti- liver/kidney microsomal antibody (anti-LKM) to rule out autoimmune hepatitis. primary sclerosing cholangitis (PSC). held, and high-dose corticosteroids are initiated. A comprehensive evaluation, potentially including a liver potentially including a liver strictures leading to elevated a.**Imaging**: for refractory cases based on its efficacy in autoimmune hepatitis. 3. **Imaging**: - **Abdominal - **Biliary Obstruction**: biopsy, is undertaken to confirm the diagnosis. In cases where there is no Ultrasound**: Evaluates concurrent refractory colitis and hepatitis. Ultrasound**: Evaluates the liver's size, 8. **Vascular Disorders**: -**Budd-Chiari improvement with steroids or if liver enzymes continue to other effective treatments for		(ANA), anti-smooth muscle	biliary cirrhosis (PBC) or	- Management: ICIs are		(JAK) inhibitor, has been suggested
liver/kidney microsomal antibody (anti-LKM) to rule out autoimmune hepatitis. (PSC). corticosteroids are initiated. A comprehensive evaluation, potentially including a liver efficacy in autoimmune hepatitis. out autoimmune hepatitis. - **Biliary Obstruction**: From gallstones, tumors, or strictures leading to elevated potentially including a liver - **Vedolizumab**: An integrin receptor antagonist, might be 3. **Imaging**: liver enzymes. confirm the diagnosis. In cases where there is no concurrent refractory colitis and hepatitis. Ultrasound**: Evaluates the liver's size, 8. **Vascular Disorders**: -**Budd-Chiari if liver enzymes continue to other effective treatments for		antibody (ASMA), and anti-	primary sclerosing cholangitis	held, and high-dose		for refractory cases based on its
antibody (anti-LKM) to rule - **Billary Obstruction*:: comprehensive evaluation, - **Vedolizumab**: An integrin out autoimmune hepatitis. From gallstones, tumors, or potentially including a liver receptor antagonist, might be 3. **Imaging**: liver enzymes. biopsy, is undertaken to considered for those with - **Abdominal liver enzymes. cases where there is no hepatitis. Ultrasound**: Evaluates 8. **Vascular Disorders*: improvement with steroids or - Ongoing research may identify the liver's size, - **Budd-Chiari if liver enzymes continue to other effective treatments for		liver/kidney microsomal	(PSC).	corticosteroids are initiated. A		efficacy in autoimmune hepatitis.
out autoimmune hepatitis. From gallstones, tumors, or strictures leading to elevated potentially including a liver receptor antagonist, might be 3. **Imaging**: liver enzymes. confirm the diagnosis. In cases where there is no concurrent refractory colitis and hepatitis. Ultrasound**: Evaluates 8. **Vascular Disorders**: improvement with steroids or if liver enzymes continue to - **Budd-Chiari		antibody (anti-LKM) to rule	- **Biliary Obstruction**:	comprehensive evaluation,		- **Vedolizumab**: An integrin
strictures leading to elevated biopsy, is undertaken to considered for those with 3. **Imaging**: liver enzymes. confirm the diagnosis. In concurrent refractory colitis and - **Abdominal cases where there is no hepatitis. Ultrasound**: Evaluates 8. **Vascular Disorders**: improvement with steroids or - Ongoing research may identify the liver's size, - **Budd-Chiari if liver enzymes continue to other effective treatments for		out autoimmune hepatitis.	From gallstones, tumors, or	potentially including a liver		receptor antagonist, might be
3. ***imaging***: iver enzymes. contrm the diagnosis. In cases where there is no concurrent refractory colitis and hepatitis. - **Abdominal cases where there is no hepatitis. Ultrasound**: Evaluates 8. **Vascular Disorders**: improvement with steroids or - Ongoing research may identify the liver's size, - **Budd-Chiari if liver enzymes continue to other effective treatments for		2 **!	strictures leading to elevated	biopsy, is undertaken to		considered for those with
Ultrasound**: Evaluates 8. **Vascular Disorders**: improvement with steroids or - Ongoing research may identify the liver's size, - **Budd-Chiari if liver enzymes continue to other effective treatments for		 a. **Abdominal 	iiver enzymes.	communication the diagnosis. In		benatitis
the liver's size, - **Budd-Chiari if liver enzymes continue to other effective treatments for		- Abuuminidi Liitrasound**: Evaluates	8 **Vascular Disorders**	improvement with steroids or		- Ongoing research may identify
		the liver's size,	- **Budd-Chiari	if liver enzymes continue to		other effective treatments for

echotexture, and to rule	Syndrome**: Obstruction of	rise, additional	refractory ICI-associated hepatitis.
out biliary obstruction as a	the hepatic veins.	immunosuppression (e.g.,	
cause for elevated liver	- **Venous Outflow	mycophenolate mofetil) may	**Supportive Care**
enzymes.	Obstruction**: Such as from	be considered. Resuming ICI	- Ensure close monitoring of liver
 Other Imaging: CT 	hepatic vein thrombosis.	therapy in this situation is	function tests and manage any
or MRI may be utilized if		approached with caution and	complications that arise from liver
further characterization is	**Hepatic Tumor or	may often be permanently	dysfunction.
needed or if there's	Metastasis**: Primary liver	discontinued.	- Consider the potential drug
suspicion of liver masses	cancers or metastatic disease		interactions when initiating new
or biliary complications.	to the liver can cause elevated	It's essential to differentiate	therapies, given liver involvement.
	liver enzymes.	ICI-induced hepatitis from	
 Liver Biopsy: 		other causes, especially when	7. **Monitoring**
- If the diagnosis remains	10. **Toxic Hepatitis**:	considering continuing	- Regularly assess the patient's
uncertain after initial	Resulting from exposure to	therapy. The potential risks	response to treatment, monitor
workup or to differentiate	toxins or chemicals, such as	and benefits of resuming ICIs	liver function, and check for
between ICI hepatitis and	certain mushrooms or	should be weighed carefully.	potential drug side effects.
other causes, a liver biopsv	industrial chemicals.	Collaboration with	
may be performed.		hepatologists or	It's crucial to involve hepatologists
Histology can often show a	11. **Granulomatous Liver	gastroenterologists can be	or gastroenterologists in the care
specific pattern of injury in	Diseases**: Such as	invaluable in such situations.	of these patients, given the
ICI hepatitis, typically	sarcoidosis or granulomatous	Always consult current clinical	complexity of managing refractory
characterized by lobular	infections (e.g. tuberculosis)	guidelines when making	ICI-associated henatitis Decisions
henatitis with a prominent		these decisions	should be based on the most un-
lymphocytic infiltrate	12 **Genetic and Metabolic		to-date clinical guidelines trials
lymphocytic initiate.	Disorders**: Like Wilson's		and the individual natient's clinical
5 **Other	disease hemochromatosis or		scenario
Investigations**	alpha-1 antitrynsin deficiency		scenario.
- Rule out other drug-	alpha i antiti ypsin achelency.		
induced liver injuries	13 **Other**: Other rare		
especially if the patient is	causes such as benatic		
on other medications	amyloidosis or podular		
known to cause	regenerative hyperplasia		
henatotovicity	regenerative hyperplasia.		
- In some situations	Given the broad differential		
metabolic or genetic	diagnosis for benatitis		
tosting may be warranted	comprohensive evaluation		
if there's a sussision of	including history, physical		
in there's a suspicion of	avamination Jaboratory tests		
innenteu iver uiseases.	imaging and possibly liver		
As with all suspected in Fr	hiopsy is crucial Broparty		
As with an suspected IFAES,	identifying the cause will		
management of ICI	guide the appropriate		
management of ICI	guiue the appropriate		
nepatitis are crucial.	treatment strategy and		
	management plan.		
nepatologists or			
gastroenterologists can			
provide valuable insight			
into the workup and			
management of these			
patients.			

	Pneumonitis	Pneumonitis	Pneumonitis	Pneumonitis	Pneumonitis
Question	What is the primary	What are other conditions in	Are there any situations	What are the diagnostic	What are the primary treatments
	diagnostic workup for	the differential diagnosis	where immune checkpoint	criteria for grade 3	for immune checkpoint inhibitor-
	suspected immune	when considering immune	inhibitors can be continued	pneumonitis from immune	associated pneumonitis that does
	checkpoint inhibitor	checkpoint inhibitor	even if pneumonitis is	checkpoint inhibitors?	not respond to high-dose steroids?
	pneumonitis?	associated pneumonitis?	suspected?		
Answer Engine 1	Immune checkpoint	When evaluating a patient for	The decision to continue or	The grading for pneumonitis	For immune checkpoint inhibitor
(ChatGPT)	inhibitor (ICI) pneumonitis	suspected immune	withhold immune checkpoint	due to immune checkpoint	(ICI)-associated pneumonitis that
	is an inflammatory	associated pneumonitis it's	nnibitors (ICIS) when	the Common Terminology	corticosteroids (referred to as
	to ICIs. If suspected, a	important to consider a range	largely depends on the	Criteria for Adverse Events	steroid-refractory pneumonitis).
	thorough diagnostic	of other conditions that can	severity of the pneumonitis	(CTCAE), which provides a	additional immunosuppressive
	workup is essential to	mimic its presentation. Here's	and the overall clinical	standardized classification for	interventions are required. Here
	ensure accurate diagnosis	a list of differential diagnoses	context. Here's a general	reporting adverse events in	are some of the primary
	and timely management.	to consider:	approach based on the	clinical trials. Here's the	treatments for refractory ICI-
	Here's a general approach:	4 **! 5	severity:	specific diagnostic criteria for	associated pneumonitis:
	1 **Clinical	- Bacterial viral (e.g.	1 **Mild Symptoms (Grade 1	to ICIs:	1 **Inflivimah**·
	Assessment**:	influenza, respiratory	Pneumonitis)**:		- A tumor necrosis factor-alpha
	- **History**: Assess for	syncytial virus, COVID-19),	- Symptoms: Mild symptoms	**Grade 3 Pneumonitis**:	(TNF-α) inhibitor.
	symptoms like cough,	fungal (e.g., Pneumocystis	such as a slight cough or	- Severe symptoms that limit	- Dose: Typically 5 mg/kg given as
	dyspnea, chest pain, fever,	jirovecii, Aspergillus), or	dyspnea on exertion, without	self-care activities of daily	an intravenous infusion.
	or fatigue. Evaluate for	mycobacterial infections can	significant changes on	living.	- It's often used for steroid-
	other potential causes, like	all present with symptoms	imaging.	- Severe radiographic	refractory cases, especially if
	nulmonary embolism	similar to ici pneumonitis.	- Management: In some	- May require hospitalization	ICL-associated colitis However it's
	- **Physical	2 **Cardiac Conditions**	with close monitoring	and supplemental oxygen to	crucial to rule out any latent or
	Examination**: Check for	- **Heart Failure**: Can	However, frequent	maintain oxygen saturation.	active infections, particularly
	signs of respiratory	cause dyspnea, fatigue, and	assessment of symptoms and		tuberculosis, before administering
	distress, abnormal lung	bilateral pulmonary edema on	repeated imaging studies are	It's worth noting that while	infliximab.
	sounds, or evidence of	imaging.	essential to ensure there isn't	CTCAE provides specific	
	other etiologies (e.g.,	- **Acute Coronary	progression. If any	grading, the actual clinical	2. **Mycophenolate Mofetil
	cardiac failure).	ischemia or infarction can	imaging findings occurs ICI	interpretation of these	- An immunosuppressive agent
	2. **Imaging**:	sometimes present with	treatment should be halted	criteria in the context of the	that inhibits T and B cell
	- **Chest X-ray**: A	breathlessness without	and appropriate management	individual patient's	proliferation.
	basic initial evaluation that	typical chest pain.	initiated.	presentation. Grade 3	- Dose: 1-1.5 g orally twice daily.
	may show infiltrates,			pneumonitis is a serious	- MMF can be considered for
	consolidations, or	3. **Pulmonary Embolism**:	2. **Moderate Symptoms	condition and demands	patients who are refractory to or
	interstitial changes.	Acute onset dyspnea, chest	(Grade 2 Pneumonitis)**:	prompt intervention,	intolerant of infliximab.
	Computed Tomography	without risk factors for	symptoms that limit daily	the ICI and initiation of	3 **Cvclophosphamide**
	(HRCT)**: Provides	venous thromboembolism.	activities, or more significant	corticosteroids or other	- A cytotoxic agent.
	detailed images and is the		radiographic changes.	immunosuppressive agents.	- Can be used for severe, life-
	imaging modality of choice	4. **Drug-Induced	 Management: Typically, ICI 	Properly identifying the	threatening ICI pneumonitis that
	for ICI pneumonitis. Typical	Pneumonitis**: Other	therapy is temporarily held.	grade of pneumonitis is vital	doesn't respond to other therapies.
	findings include ground-	medications besides ICIs can	Corticosteroids are often	for guiding treatment	4 **Introveneus Immunegiebulin
	glass opacities,	as certain antibiotics	inflammation If symptoms	nations and ensuring	4. (IVIG)**
	interstitial changes. The	amiodarone, methotrexate	resolve and imaging findings	potent surcey.	- High-dose IVIG has been used in
	distribution and pattern of	and some chemotherapy	improve, ICI therapy may be		some severe refractory cases,
	abnormalities can help	agents.	cautiously resumed, but this		although data on its efficacy in ICI
	differentiate ICI	5 **D // // /	depends on the clinical		pneumonitis is limited.
	pneumonitis from other	5. **Radiation	context and a		E **Other Detention Accest
	iung conultions.	with a history of thoracic	manualsciplinary discussion.		 Other Potential Agents**: **Tofacitinib**: A Janus kinase
	3. **Pulmonary Function	radiation, radiation-induced	3. **Severe (Grade 3) or Life-		(JAK) inhibitor, has been suggested
	Tests (PFTs)**:	lung injury can occur weeks to	threatening (Grade 4)		for refractory cases, but its use in
	- Useful for quantifying	months after treatment.	Pneumonitis**:		ICI pneumonitis is not well-
	the extent of lung function		- Symptoms: Severe		established.
	impairment. Decreased	6. **Idiopathic	respiratory symptoms, oxygen		- Ongoing research may identify
	αιπusion capacity (DLCO) is	Pheumonias**: Including	requirement, or extensive		other effective treatments for
	nneumonitis	nulmonary fibrosis or acute	- Management: ICIs are		neumonitis
	pricumonitis.	interstitial pneumonia.	discontinued, and high-dose		pheamonics.
	4. **Laboratory Tests**:	• • • •	corticosteroids are initiated.		6. **Supportive Care**:
	- While there's no	7. **Connective Tissue	In life-threatening cases or if		- Oxygen supplementation for
	specific blood test for ICI	Disease-Associated Lung	there's no improvement with		hypoxemia.
	pneumonitis, it's helpful to	Disease**: Diseases such as	steroids, additional		- Bronchodilators for wheezing or
	rule out intections. Tests	rneumatoid arthritis, systemic	immunosuppressive therapy, like inflivimables		bronchospasm.
	blood count (CBC) blood	systemic sclerosis can have	myconhenolate mofetil might		- symptomatic treatments like
	cultures, and serologies for	lung involvement that mimics	be considered. Given the		- Monitoring in an intensive care
	specific pathogens.	ICI pneumonitis.	potential severity and risks		unit (ICU) may be necessary for
	- **Bronchoalveolar		associated with high-grade	1	nationts with severe respiratory

Lavage (BAL)**: Can be	**Hypersensitivity	pneumonitis, ICIs are typically	compromise.
performed to look for	Pneumonitis**: An allergic	permanently discontinued.	
infectious agents or other	lung reaction to inhaled		7. **Monitoring**:
causes of pneumonitis. It	particles or fumes.	Given the potential risks and	 Regularly assess the patient's
may show increased		benefits of ICIs, the decision	respiratory status and oxygenation.
lymphocytes in ICI	**Cryptogenic Organizing	to continue or discontinue	- Monitor for potential
pneumonitis, but this is	Pneumonia (COP)**: Presents	therapy should be	complications and side effects of
not specific.	with cough, dyspnea, and	individualized and based on a	the medications used.
·	fever with characteristic	thorough assessment of the	
5. **Lung Biopsy**:	patchy infiltrates on imaging.	clinical situation.	It's crucial to work closely with
- Although often not	·····	Collaboration with	pulmonologists when managing
required in ambiguous	10 **Lymphangitic	nulmonologists and	refractory ICI-associated
cases where the diagnosis	Carcinomatosis**: Tumor	oncologists is crucial for	nneumonitis Decisions on
remains uncertain a tissue	spread along the lymphatics	ontimal decision-making	additional therapy should be
hionsy (either via	of the lungs can mimic ICI	Always refer to current	individualized considering the
transbronchial bionsy or	pneumonitis on imaging	clinical guidelines when	national overall health notential
curraical lung bionsy) might	priedmonitis on imaging.	making decisions regarding	drug interactions, and the soverity
be considered	11 **Aguto Docoirotory	the management of	of the province actions, and the sevency
Histopathological findings	Distross Sundrama (ADDS)**	suspected ICL associated	in the pheumonitis. As with all
nistopathological moings	A covere inflammeters but	suspected ici-associated	ITALS, always stay updated with the
can be diverse but offen	A severe inflammatory lung	pheumonitis.	racest clinical guidelines and
snow evidence of	condition that can be		research findings.
interstitial pneumonitis.	triggered by various causes,		
6 ##@.J	such as infections, trauma, or		
6. **Other	aspiration.		
Investigations**:			
 Electrocardiogram 	12. **Sarcoidosis:		
(ECG) and	Granulomatous disease that		
Echocardiogram**: Useful	primarily affects the lungs but		
if there's suspicion of	can involve other organs.		
cardiac involvement or to			
rule out cardiac causes of	 **Pulmonary Alveolar 		
symptoms.	Proteinosis**: A rare		
 **Ventilation-Perfusion 	condition where a		
(VQ) Scan or CT Pulmonary	proteinaceous material		
Angiogram**: If	accumulates in the alveoli.		
pulmonary embolism is			
suspected.	14. **Other Lung		
	Conditions**: Like pulmonary		
7. **Bronchoscopy**:	alveolar hemorrhage,		
- Useful to rule out	pulmonary edema from other		
infections (especially	causes, or eosinophilic		
opportunistic infections)	pneumonia.		
malignancy or	F		
hemorrhage as a cause of	Given the broad differential		
symptoms.	diagnosis for pneumonitis a		
-,	comprehensive evaluation		
When assessing nationts	including history physical		
for ICI pneumonitis it's	evamination laboratory tests		
critical to difforentiate it	imaging and possibly lung		
from other conditions lite	hionsy is crucial Property		
informations drug towards like	identifying the same will		
intections, drug toxicities,	identifying the cause will		
radiation pneumonitis,	guide the appropriate		
neart failure, and	treatment strategy and		
puimonary embolism.	management plan.		
Collaborative evaluation			
with a pulmonologist and			
radiologist can provide			
valuable insight into			
diagnosis and			
management.			

Question White is any provey resource of the provide rank to the super- support of the super- support is the super- support of the support of the super- suppo		Discussion (1915)	December 1915	Descent the	Provide the	
 Subschlufer Subschlu	Quantian	Dermatitis	Dermatitis	Dermatitis	Dermatitis	Dermatitis
 Lisual net met descapelint Lisual net met descapelint Lisual net met descapelint Lisual net met descapelint Lisual net descapelint L	Question	what is the primary	when should systemic	what are life-threatening	Are there situations where	what are treatments for patients
 Lacut nor stars Lacut nor stars Lacut nor stars Answer Fein 1 Localized rain be totologic Answer Fein 1 Localized rain be totologic Locali		treatment for localized	steroids be considered for	immune checkpoint inhibitor	immune cneckpoint	who have prurits without rash
attackprime attackprime attackprime attackprime C(AuGOP7) Control register to the body or other parts of the body to a common immune Control register to the control register		rash on the torso	immune checkpoint inhibitor	skin conditions?	aven if dermatitie is	irom immune checkpoint
Assert Griph 1 Localed Jappo Tarborn 1 for the background induiting Child a common immune (charder) b a common immune (ch		checknoint inhibitors?	associated derifidtitis?		suspected?	
CradBCPT or other parts of the body is a common immediate in basics of the immune the common immediate in basics of the immune in the server of the immune parts in the server of the immune in the server is immune in the serv	Answer Engine 1	Localized rash on the torso	Systemic steroids are	Certain skin reactions	The decision to continue or	Pruritus (itching) without a visible
 Louise of the second and the second of the se	(ChatGPT)	or other parts of the body	considered for immune	associated with immune	withhold immune checknoint	rash is a known side effect of
 relater a denser event (rKA) social denset (rKA) soci	(endeer i)	is a common immune-	checkpoint inhibitor (ICI)-	checkpoint inhibitors (ICIs)	inhibitors (ICIs) when	immune checkpoint inhibitors
(incl.)(incl.)on the surverity of the simu restore is serverity of the simular include cancer serverity of the simular incremention. Include cancer serverity of the simular incremention. Include cancer serverity of incremention. Incremention.		related adverse event	associated dermatitis based	can be life-threatening. While	dermatitis is suspected	(ICIs). Its management is primarily
 immune checkpoint inhibitors (CAR) immune checkpoint		(irAE) associated with	on the severity of the skin	most skin-related immune-	largely depends on the	symptomatic, aiming to alleviate
inhibitors (CG). The primary treatments apprend, in typically lased apprend, in typically lased <br< td=""><td></td><td>immune checkpoint</td><td>reaction. Here's a general</td><td>related adverse events (irAEs)</td><td>severity of the dermatitis and</td><td>the itching and improve the</td></br<>		immune checkpoint	reaction. Here's a general	related adverse events (irAEs)	severity of the dermatitis and	the itching and improve the
primate primate 1***Idd Demattis (Grading 1*** Here's a general approximate in your (the max) Here's a general approximate in your (the max) Image and the your (the your (the your (the your)		inhibitors (ICIs). The	guideline:	from ICIs are mild to	the overall clinical context.	patient's quality of life. Here are
approtech is typically lased is the second of the second		primary treatment		moderate in severity, there	Here's a general approach	some treatments for pruritus
 and the seventhy of the rank 1^{1+*}, The s		approach is typically based	1. **Mild Dermatitis (Grade	are some severe conditions	based on the severity:	without rash associated with ICIs:
 - typically characterized particle of par		on the severity of the rash:	1)**:	that require urgent		
 L min bight (strate shift) Concretence of the shift and eleven and provide and p			- Typically characterized by a	intervention. Here are some	1. **Mild Dermatitis (Grade	1. **Skin Care Measures**:
 1. Constanting by a particular strain of the particular st		1. **Mild Rash (Grade	limited rash, which is not	of the life-threatening skin	1)**: Characterized by a limited	- **Moisturizers**: Regular
 Immediated, non-particle services Immediated services<!--</td--><td></td><td>1)**: Characterized by</td><td>**Management**: Usually</td><td>Conditions associated with</td><td>- Characterized by a limited</td><td>application of emolilents helps</td>		1)**: Characterized by	**Management**: Usually	Conditions associated with	- Characterized by a limited	application of emolilents helps
 **Topolaries - strategies - str		limited pop-painful and	managed with topical	icis.	pruritic	reduce itching. Fragrance-free
 ptical **ptical		non-pruritic erythema	corticosteroids and	1 **Stevens-Johnson	- **Management: ICIs	moisturizers are preferable
Controsteriods**: MikeEpidermal NecroNys (TM**)Controsteriod reams or controsteriod reams or sind reads sind reads sind reads time or twice addition 10% sind reads drivers or scalars - **Moderate Namines**: Oral antinistamines Itic or thereas in an order drivers or scalars - **Moderate Namines**: Oral antinistamines Itic or thereas in an order drivers or scalars - **Moderate Namines**: Oral antinistamines Itic or thereas in an order drivers or scalars - **Moderate Namines**: Oral antinistamines Itic or thereas in an order drivers or scalars - **Moderate Namines**: Oral antinistamines Itic or thereas in an order drivers or scalars - **Moderate Namines**: Contacteriod scalar or driver additional points **. Scalars or specializations **. Scalars or specialization **.<		- **Topical	emollients. Systemic steroids	Syndrome (SJS) and Toxic	can often be continued with	- **Bathing**: Use lukewarm
 moderate potency "-Moderate Demattis for de 31": "-More extensive rash, potencia mole 0.1%, impeting, and pruntus,		Corticosteroids**: Mild-to-	are not typically needed.	Epidermal Necrolysis (TEN)**:	close monitoring. Topical	water and mild, hypoallergenic
cortocotecord creams or intramencible 015%, appled once or twice data ***mailents**: individuality*** ***mailents**: individuality**** ***mailents**: ************************************		moderate potency		- These are severe skin	corticosteroids and	soap. Avoid prolonged hot
ointments, such as hydrocortisous 15 or triameniolise 0.15, applied one or twice daily a "*terment of the indiget papplied one rule daily a "*terment of the indiget the pather of the sale is considered one a "*terment of the indiget the sole of the sale is considered one severe than SS, with a severe than SS, w		corticosteroid creams or	2. **Moderate Dermatitis	reactions characterized by	emollients are typically	showers, which can exacerbate
hydrocortisone 1% applied once or twice darea 'Mranagement*i. Initial i*'Mranagement*i. Initial i*'Mranagement*i. Initial i*'Mranagement*i. Initial i*'Mranagement*i. Initial i*'Mranagement*i. Initial i*'Mranagement*i. i*'Mranagement*i i*''Mranagement*i i*''*''*''*'' i*''*''*''*'' i*''*''*''*'' i*''*''*''*'' i*''*''*''*''*''*''*'' i*''*''*''*''*''*''*''*''*'' i*''.		ointments, such as	(Grade 2)**:	widespread erythema,	sufficient for management.	itching.
triancinolone 0.1%, applied one trivite. applied one trivite. to the affected area. ***Management**: initial disconstructs can help require pracentage of body surface area affected.the epidermis. essential of the rash is nymetrix. severe than SS, with a generation of the rash is uncoseling the epidermis. surface area affected.the epidermis. essential of the rash is nymetrix. a ray consideration of 10 treatment might be of 10 treatment might be or subcass precision for consel or streament the interviewer. the user sing the examplication is subcass. a considered.a consel of the rash is subcass affected.a considered surface area affected. a considered.a consel of the rash is subcass. a consel of the rash is subcass. a consel of the rash is subcass. a consel of the rash is to topical oritocideroids. Interviewer, the rash is undered.a consel of the rash is topical oritocideroids. a consel of the rash is topical oritocideroids. Interviewer, the rash is topical oritocideroids. Interviewer, the rash is topical oritocideroids. Interviewer, the rash is topical oritocideroids. Interviewer, the rash. Interviewer, the rash. Interviewer (the rash. Interviewer, the rash. Interviewer, the rash. Interviewer, the rash. Interviewer (the rash. Interviewer (the rash. Inthe block. Interviewer (the rash. <br< td=""><td></td><td>hydrocortisone 1% or</td><td>- More extensive rash,</td><td>blistering, and detachment of</td><td>However, frequent</td><td> - **Avoid Irritants**: Fragrances, </td></br<>		hydrocortisone 1% or	- More extensive rash,	blistering, and detachment of	However, frequent	 - **Avoid Irritants**: Fragrances,
 applied once or twice daily - "*Mangement":. Initial - "*Tomolients":. - "*Tomolients":.		triamcinolone 0.1%,	potential mild desquamation	the epidermis.	assessment of the rash is	alcohol-based products, and other
 In the affected area. **Management**.inabis ** ** ** ** 		applied once or twice daily	(skin peeling), and pruritus.	- TEN is considered more	essential to ensure there isn't	potential skin irritants should be
 -** moments an height soorthe the skin and reduce differences and height soorthe differences		to the affected area.	- **Management**: Initial	severe than SJS, with a	progression. If any worsening	avoided.
Woldurgets can help soche the skin and reduceSandate area antected.Sandate area ante antected.Sandate area ante antected.Sandate area ante antected.Sandate area ante ante ante ante ante ante ante an		- **Emollients**:	treatment often involves	greater percentage of body	in symptoms or extent of the	2 **Autiliate unin = **.
 b) different shall an leader d'anessaries shalling d'anestaries shalling d'anessaries shalling		Moisturizers can help	topical corticosteroids.	surface area affected.	of ICI treatment might be	2. **Antihistamines**: **Eirct Congration
 d) fire 3 statusting ***Antistamines**: Oral anthistamines**: Oral anthistamines*: Typically, ICI therapy can be continued without interruption for Grade 1 ***Severe (Grade 2)**: ***Getain and Systemic (Grade 2)**: ***Getain and Systemic symptoms (DRESS)**: ***Getain and Systemic (Grade 2)**: ***Getain and Systemic symptoms (DRESS)**: ****Getain and Systemic symptoms (DRESS)**: ***Getain antit and symptoms (DRESS)**: ***Getain and		drypess or scaling	widespread progressively	common especially the eves	needed	Antihistamines**: Such as
Oral antihistamines like cetritine or diphentydramine an be helpful fithere's itching. - Typically, ICI therapy can be continued without interruption for Grad 1 rash The morality rate, especially for TEN, is significant. - More extensive rash, or Grad 2 a formattis involve area, mich there's itching. - Grade 2 a formattis involve area, mich there's itching. - More extensive rash, greating (Grade 2) **. - More extensive rash, or Grade 3 a formattis involve area, mich thereating (Grade 4)- **. - **. <b< td=""><td></td><td>- **Antihistamines**</td><td>worsening or not responding</td><td>mouth and genitals</td><td>needed.</td><td>diphenbydramine (Benadryl) or</td></b<>		- **Antihistamines**	worsening or not responding	mouth and genitals	needed.	diphenbydramine (Benadryl) or
 cettrizine or cettrizine or citrate or the severity characterized by the severity considered. the severity or the severity considered. the severity considered. the severity considered. considered.<		Oral antihistamines like	to topical treatments, short	- The mortality rate.	2. **Moderate Dermatitis	hydroxyzine can help reduce
diphenhydramines can be helpful it bree's itching . Typically, ICI therapy can be continued without interruption for Grade 1 rash.such as predinisone, can be considered.significant More extensive rash, potential mild desquamation (skin peeling), and purutus. . **Management**: ICIs and peeting, and possibly systemic corticosteroids, such as predinison, especially, and purutus. . **Topical- More extensive rash, predinisones and are usually taken at night **Topical . **Severe (Grade 3) or Life . **Severe (Grade 2) or . . **Severe (Grade 2) or . . **Severe (Grade 2) **. . **Severe (Grade 2) ** More extensive rash, potential mild desquamation (skin peeling), and purutus. . **Topical . ***Topical . ***		cetirizine or	courses of systemic steroids,	especially for TEN, is	(Grade 2)**:	itching. However, they may cause
 heipful if there's tching. Typically, ICI there are has be continued without interruption for Grade 1 **Madgement**: ICIs may be temporarily heid depending on the extensive - "*Management*: ICIs may be temporarily heid depending on the extensive and marking stratistics. **Moderate Rash (Grade 2)*: **Moderate Rash (Grade 2)*: **Moderate Rash (Grade 2)*: **Mongement*: Bitsering, and a can signification successful of the severity of the rash. A chroice stratistic score that presentily is considered. **Topical **Topical **Topical **Grade 4 dermattis is a considered. **Wanagement*: Both consider: Store of a rare, life threatening situation is does of the severity of the rash. A stroice roids*: Short **Grade 4 dermattis is a considered. **Wanagement*: Both consider: and may involve extensive and may involve extensive and may involve extensive controsteroids*: Management*: Both consider: and may involve extensive and may		diphenhydramine can be	such as prednisone, can be	significant.	- More extensive rash,	drowsiness and are usually taken at
 -Typically, Ici therapy can be continued without -**Secred (Grade 3) or Life interruption for Grade 1 rash. -?*Moderate Rash (Grade 2)**: -Grade 3 dermattis involves more than 30% body surfae area, may have associally liver, linvolvement, spectrally liver, significantly affect daily activities. -*Topical contisons with as prolonged courses -**Secred Generation -**Generation -**Generation -**Generation -**Generation -**Generation -**		helpful if there's itching.	considered.	-	potential mild desquamation	night.
can be continued without interruption for Grade 13. **Severe (Grade 3) or Life- Treating (Grade 4)Eosinophilia and systemic >- PERSS is A hypersensitivity - ORESS is A hypersensitivity - ORESS is A hypersensitivity - Grade 2)****Management**: ICIs may hew associated area, may have associated area, may have associated area, may have associated systemic, arts, fever, lymphadenopathy, and internal organ activities**Management**: ICIs may hew associated and internal organ and internal organ activities.Anthistamines**: Such as corectan the cause of the costroataline (Claritin) are less sedating and can be used during the day**Topical .**Topical .**TopicalGrade 4 dermattis is a and may involve extensive 		- Typically, ICI therapy		**Drug Rash with	(skin peeling), and pruritus.	 **Second-Generation
Interruption for Grade 1 rash.Threatening (Grade 4) Dermattis**: - Grade 3 dermattis involves area, may have associated area, free tailing, and can bight suspected prime involvement, specially liver, desquamation (skin eeting, and can bight suspected prime in the biod. - ** Topical corticosteroids, such as betamethasone or corticosteroids, such as betamethasone or corticosteroids**: More corticosteroids**: More corticosteroids and a point eigidermal necrolysis. corticosteroids**: More corticosteroids with topical read possible corticosteroids with and synole eigidermal necrolysis. consideration a listarted at a dose conditions like toxic prednisone, especially if the rash is not improving with topical read possible, read-with systemic corticosteroids. to short courses of oral corticosteroids **: consideration and synole equire prompti mitation of systemic corticosteroids. to short courses of oral corticosteroids **: consideration and synole equire prompti mitation of systemic corticosteroids. the rash is not improving with topical transmiser**. To manage itching. - **Mantistamines**. To manage itching. - **Anthistamines**. To manage itching. - **Mantistamines**. To manage itching. - **Grail approxing whee temporarily held**Symptoms (Researce) approxing whee strated at a dose conditions are characterized by the require management in a busing of the severity and extent of the rash, and equir		can be continued without	3. **Severe (Grade 3) or Life-	Eosinophilia and Systemic	 **Management**: ICIs 	Antihistamines**: Such as
rash.Dermattis*: - Grade 3 dermattis involves more than 30% body surface area, may have associated symptoms like pain or bilstering, and can bilstering, and can bilstering, and can significantly affect daily activities ORESS as hypersensitivity areaction that presents with areaction that presents (respecially liver, kineys, and lungs.depending on the extent and through evaluation is done dermattis. If Cl-induced dermattis is confirmed or highly suspected, treatment with topical and possibly systemic corticosteroids may be initiated. ICIs might be may lowe associated area, life-threatening situation of a conditons like toxic corticosteroids, such as to short courses of oral corticosteroids, such as to short courses of oral corticosteroids, such as to short courses of oral prediation effect systemic corticosteroids Weak and the day.3.**Systemic corticosteroids may be initiated. ICIs might be improves, depending on the extent of the ash improves, depending on the extent and to short courses of oral corticosteroids **Management**: Both systemic corticosteroids are induced by ICIs**Corticosteroids are induced by ICIs**Corticosteroids are induced by ICIs**Corticosteroids are induced by ICIs**Corticosteroids are induced by ICIs**Torticosteroids are induced by ICIs**Corticosteroids are intibitors or the skin and measement**: ICIs are tractari		interruption for Grade 1	Threatening (Grade 4)	Symptoms (DRESS)**:	may be temporarily held	cetirizine (Zyrtec) or loratadine
 - Grade 3 dermattis involves methan 30% body surface area, may have associated area, area, may have associated area, may have associated area, area, area, ma		rash.	Dermatitis**:	- DRESS is a hypersensitivity	depending on the extent and	(Claritin) are less sedating and can
2. **Moderate kash (Grade 2)**:more than 30% body surface and internal organ and internal organ and internal organ involvement, especially liver, -**Topical -**Torigi **: More eded.Intoreal means and internal organ involvement, especially liver, -**Sorticosteroids**: Short corticosteroids**:Intoreal means and internal organ involvement, especially liver, -**Sorticosteroids**: Short corticosteroids**: -**Crail ** equire prompt initiation of to short courses of oral corticosteroids**: to short courses of oral corticosteroids**: To manage inching.Intoreal means and internal organ and internal organ involvement, especially liver, -*Sorticosteroids**: Short courses of oral predinsone may be used for severe inhole -**Crail ** systemic corticosteroids**: Stemic corticosteroids**: Topically, predinsone or its predinsone, especially if the rash is not improving with topical treatments alone.Intoreal meal meals and internal organ and may involve extensive and can be fatal if not require prompt initiation of to short courses of oral corticosteroids**: Topically, predinsone or its predinsone, especially if horacterized by the temporarily held** and extent of the rash, not induced by ICIs.Intoreal means topically in the subance topical interval organ induced by ICIs.Intoreal means topical interval topical interval topi			- Grade 3 dermatitis involves	reaction that presents with a	severity of the rash. A	be used during the day.
(triade J) **:arte, iman have associated involvement, sepecially live, involvement, sepecially live, significantly affect daily activities.and may have associated involvement, sepecially live, kinders, and can significantly affect daily activities.and may have associated involvement, sepecially live, kinders, and can : - 5 criophila and a drypical liphy supectes may be present or consider efficience of the systemic corticosteroids **: Nore potent topical conticosteroids such as betamethasone or clobetasol, may be etemporarily held**and real, may have associated involvement, sepecially live, kinders, and can : - 6 criade 4 dermattis is a and may involve extensive and may involve extensive conticosteroids, such as preduce prompt initiation of corticosteroids**: Storal consideration can be given to short courses of oral predinsone, especially if equire prompt initiation of systemic corticosteroids**: Topical treatments alone. - **Anthistramines**: To manage itching. - **Anthistramines**: To manage itching. - **ICI charagy may be temporarily held** ad deemattis is a social considerand may nave associated or induced by ICIs.and may involve extensive and can be fatal f not recognized and treated prompty.and may involve extensive and can be fatal f not recognized and treated prompty**Socientical context and a multicicplinary discussion**Socientical context and a multicicplinary discussion**Socientical context and a multicicplinary discussion**Socientical context and a multicicplinary discussion**Socientical context and a multicicplinary discussion**Oral consider: .***Contal streaments alone***Conticosteroids*: to and can be prom		2. **Moderate Rash	more than 30% body surface	rash, fever, lymphadenopathy,	thorough evaluation is done	2 **C
Note ExerciseSymptonisme pain of peling), and privites, isteries, and any involve extensive activities.Induces isteries, and can significantly affect daily activities.Induces isteries, and can significantly affect daily activities.Induces isteries, and can significantly affect daily activities.Induces isteries, and can significantly affect daily activities.Induces isteries and can significantly affect daily activities.Induces isteries and can significantly affect daily activities.Induces isteries and can total and possible is confirmed or highly suspected, treatment with topical and possible is confirmed or highly suspected, treatment and can be failed in or recognized and treated promptly.Induces demantits is confirmed or highly suspected, treatment with topical and possible on center as bio promocytes and may involve extensive and may involve extensive equivalent is toric of a predication can be previous and can be failed not recognized and treated promptly.Induces demantits is confirmed or highly suspected, treatment with topical measuble on center as bio promocytes systemic corticosteroids systemic corticost		- More extensive	symptoms like pain or	involvement especially liver	dermatitis If ICI-induced	- If pruritus is severe and doesn't
desquamation (skin peling), and puritus. - *Topicalcontrosteroids**: More potent opical corticosteroids**: More potent opical corticosteroids, such as betamethasone or clobetasol, may be - **Oral corticosteroids**:conticosteroids such as skin sloughing, resembling conditions like toxic require prompt initiation of systemic corticosteroids**:conticosteroids such as skin sloughing, resembling conditions like toxic require prompt initiation of systemic corticosteroids**:conticosteroids such as skin sloughing, resembling conditions like toxic require prompt initiation of systemic corticosteroids. Typically, predisone or to short courses of oral corticosteroids**:conticosteroids such as systemic corticosteroids. Typically, predisone or systemic corticosteroids. Typically, predisone or systemic corticosteroids. Typically, predisone or systemic corticosteroids. Typically, predisone or systemic corticosteroids. Typically, predisone or if the rash is not improving manage itching. - **(Antapement*: a dexent of the rash, and clinical judgement.canage itching. ater additional points to consider: - **Anagement is ater additional points to consider: - **Anagement. - **Coticosteroids are unit.canage itching. - **Coticosteroids are of a log apprint and stypically - **Coticosteroids. - **Topical steroids. - **Coticosteroids. - **Coticosteroids. - **Topical steroids. - **Topical steroids. - **Coticosteroids. - **Coticosteroids. - **Topical steroids. - **Coticosteroids. - **Coticosteroids. - **Coticosteroids. - **Coticosteroids. - **Coticosteroids. - **Coticosteroids. - **Coticosteroids. - ***Coticosteroids. - ***Coticosteroids. - ***Coticosteroids. - ***Coticos		ervthema notential mild	blistering and can	kidneys and lungs	dermatitis is confirmed or	respond to antihistamines other
peeling), and pruntus.activities.activities.activities.activities.activities**Torpical- Grade 4 dermattis is a rane, life-threatning situation and may involve extensive corticosteroids Grade 4 dermattis is a rane, life-threatning situation and may involve extensive skin sloughing, resembling conditions like toxic epidermal necrolysis.Imphorytes may be present in the blood.with topical and possibly systemic corticosteroids may be resumed once the rash improves, depending on the conditions like toxic epidermal necrolysis<		desquamation (skin	significantly affect daily	- Eosinophilia and atypical	highly suspected, treatment	systemic treatments can be
 -**Topical - Grade 4 dermatitis is a rare, life-threatening situation and may involve extension corticosteroids**: More corticosteroids**: Management**: Both -**Oral -**Management**: Both corticosteroids**: consideration can be given to short courses of oral corticosteroids**: consideration can be given to short courses of oral corticosteroids**: consideration can be given to short courses of oral corticosteroids**: Consideration can be given to short courses of oral corticosteroids**: To manage inching. -**Anthistamines**: To manage inching. -**Athistamines**: To manage inching. -**Corticosteroids to supplication corticosteroids**: Consider: -**Corticosteroids**: Short corticosteroids**: Short -**Corticosteroids**: Supplication can be given to short courses of oral corticosteroids**: Supplication is usually methodical treatments alone. -**Athistamines**: To manage inching. -**Corticosteroids **: Short -**Corticosteroids**: Midid -**Corticosteroids**: Midid -**Corticosteroids**: Short -***Corticosteroids**: Short -***Corticosteroids**: Short -***Corticosteroids**: Short -***Corticosteroids**: Short -***Corticosteroids**: Short -***Corticosteroids**: Short -***Corticosteroids -**		peeling), and pruritus.	activities.	lymphocytes may be present	with topical and possibly	considered:
Corticosteroids**: More potent topical corticosteroids, such as betamethasone or clobetasol, may be -**Oral -**Cralrare, life-threatening situation and may involve extensive skin sloughing, resembling conditions like toxic epidermal necrolysis. -**Management**: Both to short courses of oral of 1 to 2 mg/kg/day. For the rash is not improving with topical treatments alone. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Cil therapy may be teremorarily held** cervices index.It has a prolonged course and can be fatal if not recognized and treated promptily.be initiated. ICls might be resumed once the rash improves, depending on the conticosteroids. -**Management**: Both to short courses of oral prednisone, especially if the rash is not improving with topical treatments alone. -**Anthistamines**: To manage itching. -**Cl therapy may be termoparily held**It has a prolonged course and can be fatal if not recognized and treated promptily.be initiated. ICls might be resourced and treated promptily.courses of oral prednisone may be used of calce the rash improves, depending on the serveri novement pain, bisering, or other significant serveri novement pain, bisering, or other significant alone. -**Anthistamines**: To manage itching. -**Cl therapy may be teremorarily held**be initiated. ICls might be recognized and treated promptily.be initiated. ICls might be recognized and treated promptily.courses of oral prednisone may be used of calce to the conditions ike toxic Or induced by ICls. - **Glatenetal if not recognized and preanted or induced by IC		- **Topical	- Grade 4 dermatitis is a	in the blood.	systemic corticosteroids may	- **Corticosteroids**: Short
potent topical corticosteroids, such as betamethasone or clobetasol, may be -**Oraland may involve extensive six is loughing, resembling conditions like toxic epidermal necrolysis.and can be fatal if not recognized and treated promptly.resumed once the rash improves, depending on the clinical context and a multidisciplinary discussion.used for severe itching. -**Gabapentin or Pregabalin**: Originally used for neuropathic pain, these medications can help reduce pruritus in some patients**Oral Corticosteroids**: Consideration can be given to short courses of oral corticosteroids, such as prednisone, especially if the rash is not improving with topical treatments alone. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Anthistamines**: To manage itching. -**Coli the rash, and clinical judgement.and can be fatal if not recognized and treated promptly.resumed once the rash improves, depending on the conditions like toxic promptive**Gabapentin or Pregabalin**: Clinical context and a multidisciplinary discussion. -**Secretoint Reuptake -**Secretoins reuptake -***Secretoins reuptake -		Corticosteroids**: More	rare, life-threatening situation	- It has a prolonged course	be initiated. ICIs might be	courses of oral prednisone may be
corticosteroids, such as betamethasone or clobetasol, may be needed.skin sloughing, resembling conditions like toxic epidermal necrolysis.recognized and treated promptly.improves, depending on the clinical context and a multidisciplinary discussion **Gabapentin or Pregabalin**: Originally used for neuropathic pain, these medications can help reduce pruritus in some patients **fOral Corticosteroids**: Consideration can be given to short courses of oral corticosteroids, such as prednisone, especially if diane. - **fCl therapy may be temporarily held**- **fGabapentin or Pregabalin**: prompt initiation of bisorders**: - **Gabapentin or Pregabalin**: S. **Generalized Bullous Disorders**: - Conditions such as bullous pemphigoid or pemphigus conticosteroids, such as prednisone, especially if diane. - **fCl therapy may be temporarily held**- **foral equire management in a orticosteroids are unit **foral ecostare targeneralized pemphigoid or pemphigus consideration can be given produced by ICls. - These conditions are characterized by the steroid or fluid-filled bisters on the skin and least temporarily, and high- initiated. For life-threatening initiated. For life-threatening orticosteroids are unit **foral help reduces provide a cooling Agents*: Products corticosteroids are unit **foral emphigoid or pemphigoid		potent topical	and may involve extensive	and can be fatal if not	resumed once the rash	used for severe itching.
betamethasone or clobetasol, may be needed.conditions like toxic epidermal necrolysis.promptly.clinical context and a multidisciplinary discussion.Originally used for neuropathic pain, these medications can help reduce pruritus in some patients**Oral-**Management**: Both require prompt initiation of systemic corticosteroids**:3.**Generalized Bullous Disorders**:3.**Severe (Grade 3) or Life- threatening (Grade 4)-**Serotonin Reuptake Inhibitors (SSRIs)**: Such as paroxetine or mirtazapine, have be equivalent is started at a dose conticosteroids, such as of 1 to 2 mg/kg/day. For formation equire management in a alone Conditions such as bullous prednisone, especially if the rash is not improving with topical treatments alone.originally used for neuropathic multidisciplinary discussion***Antihistamines**: To manage itching.originally predisone or its to short courses of oral corticosteroid, such as prednisone, especially if the rash is not improving with topical treatments alone.originally used for neuropathic multidisciplinary discussion***Antihistamines**: To manage itching.originally predisone or its to sport courses of oral corticosteroid, such as preduisone, especially if the rash is not improving with topical treatments alone.originally used for neuropathic multidisciplinary discussion***Courice manage itching.originally predisone or its to sport alots and bitsers on the skin and bitsers on the skin and temporarily held**a dese corticosteroid are toricosteroid sere unit.corticosteroid sere toracterized by the consider:-**Topical Steroids**: Mild corticosteroid sere<		corticosteroids, such as	skin sloughing, resembling	recognized and treated	improves, depending on the	 **Gabapentin or Pregabalin**:
clobetasol, may be needed.epidermal necrolysis. - **Management**: Both - **Management**: Both - **Management**: Both Corticosteroids**:multidisciplinary discussion. multidisciplinary discussion.pain, these medications can help reduce pruritus in some patients. - **Serotin Reuptake Inhibitors (SSRIs)*: Such as paroxetine or mirtazapine, have been used off-label to treat pruritus in some settings.Corticosteroids**: Consideration can be given to short courses of oral corticosteroids, such as prednisone, especially if the rash is not improving -**Anthistamines*: To manage itching.Typically, predisone or its equivalent is started at a dose of 10 2 ng/kg/day. For induced by ICIs.S. **Severe (Grade 3) or Life- threatening (Grade 4) Dermattits**: bistering, or other significant symptoms.Inhibitors (SSRIs)*: Such as paroxetine or mirtazapine, have been used off-label to treat pruritus in some settings.Mith topical treatments alone.Grade 4 reactions, hospitalization is usually unuit or intensive care unit These conditions are formation of fluid-filled blisters on the skin and unuit **Management**: ICIs are generally discontinued, at least temporarily, and high- dose corticosteroids are initiated. For life-threatening initiated. For		betamethasone or	conditions like toxic	promptly.	clinical context and a	Originally used for neuropathic
needed**Management**: Isoth3. **Generalized Bullous- reduce pruritus in some patients **Oralrequire prompt initiation of require prompt initiation of Corticosteroids**:S. **Generalized Bullous. **Severe (Grade 3) or Life- threatening (Grade 4)- **Severin ReuptakeConsideration can be given to short courses of oral corticosteroids, such asTypically, prednisone or its equivalent is started at a dose of 1 to 2 mg/kg/day. For induced by ICls *Conditions such as bullous pemphigoid or pemphigus can be exacerbated or induced by ICls *Severe involvement, pain, blistering, or other significant symptoms **Topical Started at a dose (Grade 4 reactions, require management in a blister on the skin and least temporarily, and high- temporarily held**. *Topical Iteratives and extent of the rash, and consider:. **Acute Generalized temporarily held**. **Acute Generalized temporarily held**. **Cooling Agents**: Products consider:. **Cooling Agents**: Products consider:. **Cooling Agents**: Products consider:. **Cooling Agents**: Products contine to rule. **Cooling Agents**: Products contining menthol or camphor can provide a cooling sensation, temporarily relieving itch **Cooling Agents**: Products		clobetasol, may be	epidermal necrolysis.	2 ***	multidisciplinary discussion.	pain, these medications can help
Consideration can be given Consideration can be given to short courses of oral corticosteroids, such as prednisone, especially if the rash is not improving with topical treatments alone.require prompt initiation or systemic corticosteroids Conditions such as bullous pemphigoid or pemphigus can be exacerbated or induced by ICIs **Severe (Grade 4) threatening (Grade 4)Inhibitors (SSRIs)**: Such as Inhibitors (SSRIs)**: Such as pernetlitis**:0 f1 to 2 mg/kg/day. For the rash is not improving with topical treatments alone.of 1 to 2 mg/kg/day. For formation of fluid-filled burn unit or intensive care unit **These conditions are formation of fluid-filled burs on the skin and unit **Management**: ICIs are generally discontinued, at initiated. For life-threatening (an be treat) sublevate4. **Topical Steroids**: Mild corticosteroids are initiated. For life-threatening or the sakin and least temporarily, held**4. **Acute Generalized temporarily held**4. **Acute Generalized temporarily held**4. **Acute Generalized temporarily held**Exanthematous Pusculosis (AGEP)**:Epidermal Necrolysis, ICIs are often permanently discontinued **Cooling Agents**: Products containing menthol or camphor can provide a cooling sensation, temporarily relieving itch.		needed.	- **Management**: Both	3. **Generalized Bullous	2 **Covere (Crada 2) 15	reduce pruritus in some patients.
Consideration can be givensystemic controsteroids Conditions such as builousthreatening (Grade 4)Inhibitors (SSRIS)**: SUch asConsideration can be givenTypically, prednisone or itspemphigid or pemphigusDermattis**:paroxetine or mirtazapine, haveto short courses of oralof 1 to 2 mg/kg/day. Forinduced by ICls.bilstering, or other significantpermattis**:prednisone, especially ifGrade 4 reactions,- These conditions aresymptoms **Management**: ICls4. **Topical Therapies**:with topical treatmentsnecessary, and patients mayformation of fluid-filledare generally discontinued, at- **Topical Steroids**: Mild-**Anthistamines**: Toburn unit or intensive careunit.mucous membranes.dose corticosteroids areof a visible rash, to alleviate-**ICl therapy may beA few additional points toExanthematous PustulosisLohnson Syndrome or Toxic- **Cooling Agents*: Productsdepending on the severityconsider:- Characterized by theoften permanentlyoften permanentlycontaining menthol or camphorand extent of the rash, and- Before starting systemic- Characterized by theoften permanentlydiscontinued.temporarily relieving itch.our infectious causes of thesterides, small unstules on asudden appearance of manydiscontinued.temporarily relieving itch.		- "Ural Corticostoroids**	systemic continent initiation of	Disorders**:	5. Severe (Grade 3) or Life-	- Serotonin Keuptake
to short courses of oral corticosteroids, such as prednisone, especially if the rash is not improving 		Consideration can be given	Typically predpisope or its	- conditions such as buildus	Dermatitis**	nanoutors (Sans): Such as naroxetine or mirtazanine have
Controcateroids, such as prednisone, especially if the rash is not improving with topical treatmentsof 1 to 2 mg/kg/day. For 		to short courses of oral	equivalent is started at a dose	can be exacerbated or	- Severe involvement nain	been used off-label to treat
prednisone, especially if the rash is not improving with topical treatments alone. Grade 4 reactions, hospitalization is usually require management in a blisters on the skin and -**Antihistamines*: To manage itching. Grade 4 reactions, hospitalization is usually require management in a blisters on the skin and unit. - These conditions are characterized by the sterile, skin and blisters on the skin and least temporarily, and high- dose corticosteroids are initiated. For life-threatening reactions, such as Stevens- temporarily held** 4. **Topical Therapies**: -**Topical Steroids**: Mild corticosteroid creams or ointments can be tried, even in the absence of a visible rash, to alleviate itching. - **ICI therapy may be temporarily held** A few additional points to consider: 4. **Acute Generalized Exanthematous Pusulosis (AGEP)**: Findematrian predictions, such as Stevens- temporarily held** - **Cooling Agents**: Products containing menthol or camphor can provide a cooling sensation, temporarily relieving itch.		corticosteroids, such as	of 1 to 2 mg/kg/day. For	induced by ICIs.	blistering, or other significant	pruritus in some settings.
the rash is not improving with topical treatments alone. hospitalization is usually necessary, and patients may require management in a burn unit or intensive care unit. characterized by the formation of fluid-filled blisters on the skin and muccus membranes. - **Management**: ICIs are generally discontinued, at least temporarily, and high- dose corticosteroids are initiated. For life-threatening reactions, such as Stevens- itching. 4. **Topical Therapies**: - **Topical Steroids**: Mild corticosteroid creams or ointments can be tried, even in the absence of a visible rash, to alleviate - **ICI therapy may be temporarily held** A few additional points to consider: 4. **Acute Generalized Exanthematous Pustulosis depending on the severity and extent of the rash, and clinical judgement. A few additional points to steroids, it's essential to rule out infectious causes of the sterile, small pustules on a Johnson Syndrome or Toxic containing menthol or camphor can provide a cooling sensation, temporarily relieving itch. - **Cooling Agents**: Products containing menthol or camphor can provide a cooling sensation, temporarily relieving itch.		prednisone, especially if	Grade 4 reactions,	- These conditions are	symptoms.	
with topical treatments alone. necessary, and patients may require management in a burn unit or intensive care unit. formation of fluid-filled blisters on the skin and mucous membranes. are generally discontinued, at least temporarily, and high- dose corticosteroids are initiated. For life-threatening initiated. For life-threatening -**Topical Steroids**: Mild corticosteroid creams or ointments -**Anthistamines**: To manage itching. burn unit or intensive care unit. mucous membranes. dose corticosteroids are initiated. For life-threatening can be tried, even in the absence of a visible rash, to alleviate -**Cooling Agents**: Products depending on the severity and extent of the rash, and clinical judgement. A few additional points to seroids, it's essential to rule out infectious causes of the sterile, small pustules on a -threatening preactions, such as Stevens- initiated. For life-threatening initiated. For life-threatening initinitiated. For life-threatening initiated. For life-th		the rash is not improving	hospitalization is usually	characterized by the	- **Management**: ICIs	4. **Topical Therapies**:
alone. require management in a blisters on the skin and least temporarily, and high- corticosteroid creams or ointments -**Anthistamines*: To burn unit or intensive care mucous membranes. dose corticosteroids are can be tried, even in the absence -**ICI therapy may be unit. 4. **Acute Generalized reactions, such as Stevens- itching. temporarily held** A few additional points to Exanthematous Pusulosis Johnson Syndrome or Toxic -**Cooling Agents**: Products depending on the severity consider: (AGEP)**: Epidermal Necrolysis, ICIs are containing menthol or camphor and extent of the rash, and - Before starting systemic - Characterized by the often permanently can provide a cooling sensation, out infectious causes of the sterile, small pustules on a sterile, small pustules on a temporarily relieving itch.		with topical treatments	necessary, and patients may	formation of fluid-filled	are generally discontinued, at	- **Topical Steroids**: Mild
-**Antihistamines**: To manage itching. burn unit or intensive care unit. mucous membranes. dose corticosteroids are initiated. For life-threatening of a visible rash, to alleviate of a visible rash, to alleviate -**ICI therapy may be temporarily held** A few additional points to depending on the severity and extent of the rash, and clinical judgement. A few additional points or steroids, it's essential to rule out infectious causes of the sterile, small pustules on a burn unit or intensive care unit. dose corticosteroids are initiated. For life-threatening of a visible rash, to alleviate of a visible rash, to alleviate -**Cooling Agents**: Products Exanthematous Pustulosis Johnson Syndrome or Toxic -**Cooling Agents**: Products clinical judgement. - Before starting systemic out infectious causes of the - Characterized by the sterile, small pustules on a often permanently discontinued. can provide a cooling sensation, temporarily relieving itch.		alone.	require management in a	blisters on the skin and	least temporarily, and high-	corticosteroid creams or ointments
manage itching. unit. initiated. For life-threatening of a visible rash, to alleviate - **ICI therapy may be 4. **Acute Generalized reactions, such as Stevens- itching. temporarily held** A few additional points to Exanthematous Pustulosis Johnson Syndrome or Toxic -**Cooling Agents**: Products depending on the severity consider: (AGEP)**: Epidermal Necrolysis, ICIs are containing menthol or camphor and extent of the rash, and - Before starting systemic - Characterized by the often permanently can provide a cooling sensation, clinical judgement. steroids, it's essential to rule sterlie, small pustules on a discontinued. temporarily relieving itch.		 **Antihistamines**: To 	burn unit or intensive care	mucous membranes.	dose corticosteroids are	can be tried, even in the absence
 -**ICl therapy may be -**ICl therapy may be temporarily held** A few additional points to depending on the severity consider: (AGEP)**: Exanthematous Pustulosis Johnson Syndrome or Toxic -**Cooling Agents**: Products containing menthol or camphor containing menthol or camphor can provide a cooling sensation, steroids, it's essential to rule sudden appearance of many discontinued. temporarily relieving itch. 		manage itching.	unit.		initiated. For life-threatening	ot a visible rash, to alleviate
temporarily neid*** A rew additional points to Exantnematous Pustuliosis Johnson Syndrome or Toxic - **Cooling Agents**: Products depending on the severity consider: (AGEP)**: Epidermal Necrolysis, ICIs are containing menthol or camphor and extent of the rash, and - Before starting systemic - Characterized by the often permanently can provide a cooling sensation, clinical judgement. steroids, it's essential to rule sudden appearance of many discontinued. temporarily relieving itch.		- **ICI therapy may be		4. **Acute Generalized	reactions, such as Stevens-	itching.
oppending on the sevently consider: (AGEP)**: Epidermai Necrolysis, ICIs are containing menthol or camphor and extent of the rash, and - Before starting systemic - Characterized by the often permanently can provide a cooling sensation, clinical judgement. steroids, it's essential to rule sudden appearance of many discontinued. temporarily relieving itch.		temporarily neld**	A rew additional points to	Exanthematous Pustulosis	Jorinson Synarome or Toxic	
clinical judgement before starting systemic - characterized by the otteri permanenty can provide a cooling sensation, steroids, it's essential to rule sudden appearance of many discontinued. temporarily relieving itch.		and extent of the rach and	- Refore starting systemic	(AGEP)**:	often permanently	containing menthol or camphor
out infectious causes of the sterile, small outstudes on a		clinical judgement	- before starting systemic	- characterized by the	discontinued	temporarily relieving itch
		cimical juugement.	out infectious causes of the	sterile, small pustules on a	alscontinueu.	temporarily reneving iten.

For both mild and	rash, especially if the	background of red skin.	A few key points to consider:	5. **Phototherapy**:
moderate rashes, it's also	presentation is atypical.	- Often accompanied by	- It's crucial to differentiate	- Narrowband ultraviolet B (UVB)
essential to:	- Systemic steroids should be	fever and elevated white	ICI-induced dermatitis from	phototherapy can be effective in
- Avoid skin irritants.	tapered gradually over several	blood cell count.	other causes, especially	reducing pruritus, though it's more
- Use gentle,	weeks, monitoring for		infections, before making	commonly used for pruritus
hypoallergenic skin	recurrence or flare of the	While these severe skin	decisions about ICI therapy.	associated with specific skin
cleansers.	dermatitis.	reactions are relatively rare,	- Collaboration with a	conditions.
- Protect the skin from	- In cases of severe or	early recognition and	dermatologist can provide	
excessive sun exposure, as	refractory dermatitis,	intervention are crucial. If any	valuable insights into	**Bile Acid Sequestrants**:
ICIs can make the skin	consultation with a	of these conditions are	diagnosis and management.	- In cases where liver enzymes
more sensitive to the sun.	dermatologist is crucial.	suspected:	- The potential risks and	are elevated and there's suspicion
	 Depending on the severity 		benefits of continuing ICIs	of cholestasis, agents like
If the rash doesn't improve	and persistence of the	- Discontinue the ICI	should be weighed carefully,	cholestyramine can be considered
with the above treatments	dermatitis, ICI therapy may	immediately.	taking into account the	to reduce pruritus, though this
or if it's more severe	need to be withheld	 Initiate high-dose systemic 	severity of the cancer being	scenario is less common with ICIs.
(Grade 3 or 4) involving	temporarily or permanently.	corticosteroids and consider	treated, previous responses	
pain, blistering, or other		other immunosuppressive	to therapy, available	7. **Other Therapies**:
concerning symptoms, a	Lastly, always refer to the	agents as needed.	alternative treatments, and	 Ongoing research might identify
more aggressive approach	most current clinical	 Hospitalize the patient, 	the patient's overall health	other effective treatments for ICI-
is needed, including higher	guidelines when managing	potentially in a burn unit or	and preferences.	associated pruritus.
doses of oral	ICI-associated dermatitis, as	intensive care unit for severe		
corticosteroids and	recommendations may evolve	SJS/TEN.	In all situations, always	It's essential to regularly monitor
consultation with a	with ongoing research and	- Involve a dermatologist	consult current clinical	the patient's symptoms and
dermatologist. In severe	clinical experience.	urgently for assessment and	guidelines and consider the	reassess treatment efficacy.
cases, permanent		management guidance.	most recent evidence when	Collaborating with a dermatologist
discontinuation of ICI		- Consider additional	making decisions regarding	can provide valuable guidance in
therapy may be necessary.		supportive measures, such as	the management of	managing pruritus, especially if it's
		wound care for skin lesions,	suspected ICI-associated	persistent or severely impacting
In any case, proper		eye care for ocular	dermatitis.	the patient's quality of life.
evaluation to rule out		involvement, and monitoring		
other causes of the rash,		and treatment of organ		
such as intections or other		invoivement.		
urug reactions, is crucial.		Quarrell, uchila (Cla have		
		overail, while icis have		
		transformed the landscape of		
		cancer treatment, they come		
		with a unique set of side		
		errects, and vigilance in		
		monitoring and managing		
		IFAES IS ESSENTIAL		

_	Thyroid Toxicity	Thyroid Toxicity	Thyroid Toxicity	Thyroid Toxicity	Thyroid Toxicity
Question	What is the primary	What is the primary	Should immune checkpoint	When should thyroid	How often should thyroid
	treatment for thyroiditis	treatment for hypothyroid	inhibitors be discontinued for	hormone therapy be initiated	laboratory assessment be
	associated with immune	associated with immune	hypothyroidism?	for immune checkpoint	performed in patients receiving
	checkpoint inhibitors?	checkpoint inhibitors?		inhibitor associated	immune checkpoint inhibitors?
				hypothyroid and at what	
				dose?	
Answer Engine 1	Thyroiditis associated with	The primary treatment for	In most cases,	The decision to initiate	Regular monitoring of thyroid
(ChatGPT)	immune checkpoint	hypothyroidism associated	hypothyroidism induced by	thyroid hormone therapy for	function is crucial in patients
	inhibitors (ICIs) can	with immune checkpoint	immune checkpoint inhibitors	immune checkpoint inhibitor	receiving immune checkpoint
	manifest in various ways,	inhibitors (ICIs) is thyroid	(ICIs) is manageable, and	(ICI)-associated	inhibitors (ICIs) due to the risk of
	leading either to	hormone replacement. Here's	discontinuation of ICIs is not	hypothyroidism is based on	thyroid-related immune-related
	hyperthyroidism or	the general approach:	typically required. Here's the	clinical and laboratory	adverse events (irAEs). Here's a
	hypothyroidism,		general approach:	findings. Here's a general	general approach to the frequency
	depending on the phase	1. **Levothyroxine**:		approach:	of thyroid laboratory assessment in
	and severity of the	- This is the standard	1. **Management Over		these patients:
	thyroiditis. The treatment	treatment for	Discontinuation**:	1. **Indications for	
	approach is tailored based	hypothyroidism, regardless of	- Hypothyroidism resulting	Treatment**:	1. **Baseline Assessment**:
	on the specific thyroid	the cause.	from ICIs is generally treated	- Elevated TSH (thyroid-	- Before starting ICIs, a baseline
	dysfunction:	- The initial dose is typically	with thyroid hormone	stimulating hormone) levels	assessment of thyroid function
		based on the patient's weight,	replacement therapy,	with low free T4 levels	should be done to identify any pre-
	1. **Hyperthyroidism	age, cardiac status, and the	specifically levothyroxine.	confirm a diagnosis of overt	existing thyroid disorders. Typically,
	Phase (Initial phase)**:	severity of hypothyroidism.	Once on replacement	hypothyroidism, which	this involves checking the ISH
	- This initial phase results	For most adults, the starting	therapy, patients can usually	warrants treatment.	(thyroid-stimulating hormone) and,
	from the destructive	dose is usually between 50 to	continue ICI treatment	- Symptomatic	if indicated, free 14 levels.
	trivroiditis and release of	100 mcg dally.	without interruption.	hypothyrolaism, even with	2 **D
	preformed thyroid	- Regular monitoring of	2 ****	mildly elevated ISH levels,	2. **Regular Monitoring During
	normone into circulation.	(approved function tests	2. **Severity	may also be an indication for	After initiation (C) the server
	- **Symptomatic	(especially ISH) is essential to	While hunothuroidicm	include fatigue, cold	- After Initiating ICI therapy,
	heatment - Beta-	adjust the dose and ensure	- while hypothyroidism	include fatigue, cold	thyroid function tests should be
	blockers, like propranolol	the patient reaches and	itself is not typically a reason	intolerance, weight gain,	performed at regular intervals. The
	or atendioi, can be used to	maintains euthyroid status.	to discontinue icis, the	constipation, dry skin, and	rrequency can vary based on
	manage symptoms such as	- Once the appropriate dose	seventy of any associated	Cognitive disturbances.	clinical guidelines, institutional
	paipitations, tremors, and	is determined and the TSH is	symptoms and the patient's	- Subclinical hypothyroidism	practices, and the specific ici being
	anxiety.	stabilized within the target	be taken into account. For	(elevated TSH with normal	used. Commonly, TSH and free 14
	- ** Monitoring**:	range, monitoring can be less	be taken into account. For	free 14) In the context of ICI	are checked:
	tests (TETs) should be	menths	sumptoms of musedoma	use may progress to overt	- Every 4-6 weeks during the first
	tests (TFTs) should be	monuis.	some (a life threatening	is accortial and treatment	Thereafter every 6.12 weeks
	performed to monitor the	2 **Sumatam	conna (a me-timeatening	might be considered if TSU is	- Therealter, every 0-12 weeks
	many nation to thyrolatis, as	2. Symptom Management**:	by nothyroidism)	night be considered in TSH is	of at each ici initiasion cycle.
	from the hyporthyroid	Symptoms of	reassassment of ongoing	patient is symptomatic	2 **Monitoring with Clinical
	nom the hyperthyroid	- Symptoms of	treatments including ICIs	patient is symptomatic.	Suspicion**:
	phase to the hypothyroid	fatigue, cold intelerance	would be personally	2 **Starting Doco**	If a patient develops symptoms
	- **Antithyroid Drugs**	weight gain and constinution	would be necessary.	- **Average Adult*** The	suggestive of thyroid dysfunction
	Medications like	should improve as	3 **Multi-gland	typical starting dose of	(either hypo- or hyperthyroidism)
	methimazole or	levothyroxine replacement	Involvement**:	levothyroxine for an	thyroid function tests should be
	propylthiouracil are	therapy normalizes thyroid	- If the patient develops	otherwise healthy adult is	done immediately regardless of
	generally not used because	hormone levels. It's essential	multiple endocrinopathies	about 1.6 mcg/kg/day. For a	the last assessment date
	the hyperthyroidism is	to educate the patient about	due to ICIs (e.g.	70 kg adult, this translates to	
	caused by inflammation	potential side effects of	hypothyroidism along with	a dose of around 100-112	4. **After Detecting Thyroid
	and destruction rather	overtreatment, like	adrenal insufficiency or	mcg/day.	Dysfunction**:
	than overproduction of	palpitations or osteoporosis.	hypophysitis), a more in-	- **Elderly or	- If a patient is found to have
	thyroid hormone.	•	depth evaluation and	Cardiovascular Disease**: In	thyroid dysfunction, more frequent
		3. **Regular Monitoring**:	discussion about the risks and	elderly patients or those with	monitoring might be needed
	**Hypothyroidism	- It's essential to conduct	benefits of continuing ICIs	a history of cardiovascular	initially, especially if interventions
	Phase (Subsequent	regular thyroid function tests	would be warranted.	disease, a lower starting	(like thyroid hormone replacement
	phase)**:	(TSH and free T4) to ensure		dose, such as 25-50 mcg/day,	for hypothyroidism) are initiated.
	- This phase may follow	appropriate dosing of	4. **Individualized	is recommended to avoid	- For example, in the context of
	the initial hyperthyroid	levothyroxine. The frequency	Decision**:	potential cardiac	new-onset hypothyroidism, TSH
	phase or can occur directly	of monitoring depends on	- The decision to continue	complications.	and free T4 might be checked
	without a noticeable	various factors, including the	or discontinue ICIs should	- **Severe	every 4-6 weeks after starting
	hyperthyroid phase.	stability of thyroid function	always be individualized,	Hypothyroidism**: In cases	levothyroxine to adjust the dose
	- **Levothyroxine**: If	and the presence of other	taking into account the type	of severe hypothyroidism, a	appropriately. Once stable, the
	the patient becomes	comorbidities.	and stage of cancer being	full replacement dose might	frequency of monitoring can be
	hypothyroid, they will	- Monitoring for other	treated, the benefits	be initiated right away, but	decreased.
	need thyroid hormone	endocrinopathies is also	previously observed with the	this should be done	
	replacement with	crucial, as ICI use can be	ICI, available alternative	cautiously, considering the	5. **After Completion of ICI
	levothyroxine. The dose is	associated with multiple	treatments, and the patient's	individual's overall health	Therapy**:
	adjusted based on regular	gland involvement.	overall health and	status.	- Even after discontinuation of
	monitoring of TFTs to		preferences.		ICIs, patients are still at risk for the
	maintain thyroid-	4. **Lifelong Treatment and		3. **Dose Adjustments**:	development or progression of
	stimulating hormone (TSH)	Monitoring**:	5. **Multidisciplinary	- Thyroid function tests	thyroid dysfunction. It's
	within the target range.	- In many cases,	Collaboration**:	(primarily TSH) should be	recommended to continue
	- **Lifetime	hypothyroidism resulting from	 Collaboration between 	checked 6-8 weeks after	monitoring thyroid function:

Monitoring**: Even if the	ICI therapy can be permanent.	oncologists, endocrinologists,	initiating therapy or after any	- Every 2-3 months for the first
hypothyroidism is	Patients usually require	and other specialists is crucial	dose adjustment. Based on	year after stopping ICIs.
transient and improves,	lifelong levothyroxine	to making informed decisions	these results, the	- Thereafter, every 6-12 months
these patients should have	replacement and periodic	regarding the continuation of	levothyroxine dose can be	or based on clinical judgment.
lifelong monitoring of	monitoring of thyroid	ICI therapy in the context of	adjusted as necessary to	
thyroid function, as the	function.	immune-related adverse	normalize TSH levels.	6. **Consider Other Endocrine
hypothyroidism can be		events like hypothyroidism.	- Typically, dose	irAEs**:
permanent or recur later.	**ICIs Continuation**:		adjustments are made in	- While monitoring thyroid
	- Generally, ICIs can be	In summary, while	increments of 12.5-25 mcg.	function, it's also essential to be
Monitoring:	continued even if a patient	hypothyroidism alone is not		vigilant about other potential
- Regular thyroid function	develops hypothyroidism, as	usually a reason to	4. **Monitoring**:	endocrine irAEs, such as
tests (TSH, free T4, and	long as the condition is	discontinue ICIs, it's essential	- After achieving a stable	hypophysitis or adrenal
free T3 as needed) are	appropriately managed with	to manage and monitor the	TSH level on a fixed	insufficiency. Appropriate labs
essential to track the	levothyroxine replacement.	condition appropriately. The	levothyroxine dose, TSH can	should be ordered if there's clinical
course of thyroiditis and	However, the decision should	broader clinical context and	be checked every 6-12	suspicion.
adjust treatment as	be individualized based on	potential for other immune-	months or if new symptoms	
necessary.	the overall clinical scenario	related side effects should	suggestive of thyroid	The above recommendations
- Monitoring for other	and discussion between	always be considered when	dysfunction arise.	provide a general guideline.
endocrinopathies is also	oncologists and	making treatment decisions.	- Remember that	Monitoring frequency might need
crucial, as ICI use can be	endocrinologists.		levothyroxine has a long half-	individual adjustment based on the
associated with multiple			life, so changes in dosing can	patient's overall clinical picture,
gland involvement.	It's beneficial for patients with		take several weeks to reflect	presence of other irAEs, and the
	ICI-associated hypothyroidism		in TSH levels.	specific ICI used. Collaboration with
**Symptomatic	to have a consultation with an			an endocrinologist can be
Treatment**:	endocrinologist to guide		**Administration Tips**:	invaluable in guiding the
- Whether in the	management, optimize		 Levothyroxine should be 	monitoring and management of
hyperthyroid or	treatment, and monitor for		taken on an empty stomach,	ICI-associated endocrine
hypothyroid phase, it's	potential complications or		usually 30 minutes to an hour	complications.
essential to address	other endocrinopathies.		before breakfast, for optimal	
symptoms. For example,			absorption.	
beta-blockers for			- Certain medications and	
hyperthyroid symptoms or			supplements, such as	
appropriate dosing of			calcium, iron, proton pump	
levothyroxine for			inhibitors, and certain	
hypothyroid symptoms.			antacids, can interfere with	
			levothyroxine absorption and	
ICIs Continuation:			should be taken several hours	
- The decision to			apart from levothyroxine.	
continue or withhold ICIs				
in the context of thyroiditis			In all cases, individualized	
depends on the clinical			treatment decisions in	
scenario, severity of			collaboration with an	
thyroid dysfunction,			endocrinologist will ensure	
presence of other irAEs,			optimal management of ICI-	
and oncological			associated hypothyroidism.	
considerations. Often, ICIs				
can be continued with			1	
close monitoring and				
appropriate management				
of thyroid dysfunction.			1	
Leath, callebra (1977) - 197				
Lastly, collaboration with			1	
an endocrinologist can				
provide valuable expertise				
in managing ICI-associated			1	
thyroiditis, ensuring				
optimal treatment				
decisions and patient			1	
outcomes.			1	1

Question What are symptoms What are the main diagnostic Should immune checkpoint What is the primary Can corticosteroi	d hormone
concerning for immune tests to assess for immune inhibitors be discontinued for treatment for hypophysitis replacement typi	cally be
checkpoint inhibitor checkpoint inhibitor hypopituitarism? associated with immune discontinued in p	atients with
associated hypophysitis or associated hypophysitis? checkpoint inhibitors? Please immune checkpo	int inhibitor
hypopituitarism? Isst the dose of any associated hypop	hysitis?
Answer Engine 1 Immune checkpoint The diagnosis of immune The decision to discontinue The primary treatment for In patients with i	mmune
(ChatGPT) inhibitor (ICI)-associated checkpoint inhibitor (ICI)- immune checkpoint inhibitors immune checkpoint inhibitor checkpoint inhibitor	tor (ICI)-
hypophysitis refers to associated hypophysitis (ICIs) in the setting of (ICI)-associated hypophysitis associated hypophysitis	hysitis, the
inflammation of the involves a combination of hypopituitarism is is directed at replacing the inflammation affe	ects the pituitary
pituitary gland and can clinical assessment, individualized based on the deficient hormones and gland, leading to	potential
which is a decreased studies Here's an overview of specific initiatize hormone complications. The specific servers on the specific initiatize hormone complications. The specific servers of the speci	the most
secretion of one or more the main diagnostic tests: deficiences, the clinical treatment depends on the commonly affect	ed hormones is
of the pituitary hormones. context, and the underlying hormones that are affected. ACTH, which stim	ulates the adrenal
This condition can have a 1. **Clinical Assessment**: cancer's nature and Here's a general approach: glands to product	e cortisol, a vital
variety of symptoms, - A thorough clinical progression. Here's a general 1. **Glucocorticoid glucocorticoid ho	rmone.
depending on which evaluation of symptoms and approach: Replacement for ACTH production of symptoms and approach: Deficiency:** If ACTH production	n is impaired due
affected Here are critical. The presence of 1. **Mild to Moderate -**Hydrocortisone**: to hydrophysitis.	results in
symptoms concerning for headaches, visual Hypopituitarism**: Typical starting doses are 15- secondary adren.	al insufficiency,
ICI-associated hypophysitis disturbances, and symptoms - In cases of mild to 20 mg in the morning and 5- necessitating glur	cocorticoid
or hypopituitarism: related to hormone moderate hypopituitarism, 10 mg in the late afternoon. (corticosteroid) re	eplacement, such
a enciencies can provide initial where normone denciencies inte dose can be adjusted as hydrocortisoni	e or prednisone.
Hypophysits**: [e.g., with levothyroxine for and side effects. Here's the gener:	l approach
- Headache: Often 2. **Laboratory Tests**: central hypothyroidism or - **Prednisone**: An regarding discont	inuation of
described as a dull, - **Pituitary Hormone with glucocorticoids for ACTH alternative to hydrocortisone. glucocorticoid re-	placement in this
persistent pain, localized Assessment**: deficiency), ICIs can often be A typical starting dose is 3-5 context:	
or arrused)eficiency**· In
Such as bitemporal **Free T4**: To assess - Concurrent hormone patients about "sick day" many cases of IC	-associated
hemianopsia due to thyroid function. A low TSH in replacement therapy is rules, which involve hypophysitis, the	ACTH deficiency
compression of the optic conjunction with a low free T4 initiated and adjusted based increasing the glucocorticoid is irreversible, an	d patients require
chiasm. can indicate central on regular monitoring. dose during periods of stress, lifelong glucocort	icoid
- Naused of vomiting. hypothypolaism. IIIness, or surgery. replacement.	
(Adrenocorticotropic or Complications**: 2. **Thyroid Hormone 2. **Monitoring	and Testing**: In
2. **Adrenocorticotropic Hormone)** and **Serum - In more severe cases, Replacement for TSH some patients, the	ere might be a
Hormone (ACTH) Cortisol**: To assess adrenal especially if there are Deficiency**: partial recovery of	f pituitary
Deficiency**: function. Morning cortisol complications like visual - **Levothyroxine**: The function over tim	e. If there's
- Weakness or rangue. - Weekness or rangue. - Weekness or rangue. - Weight loss - an unitial	OF desire to assess
- Anorexia. assessment, with low levels inability to stabilize the mcg/kg/day. The dose may - A stimulation	est (like the
- Nausea, vomiting, or being concerning. An ACTH patient with hormone be adjusted based on TSH cosyntropin or Sy	nacthen test) can
abdominal pain. stimulation test may be replacement therapy, and free T4 levels and the be performed. The	is test evaluates
- Hypotension. required for a definitive temporary discontinuation of clinical response. Elderly the adrenal glanc	s' response to
- hyponatremia (low alignosis or adrena) ILIS may be considered. patients or those with synthetic ACTR.	response is
- Hyperkalemia (elevated - **IH (Luteinizing ICI (potential progression of start at a lower dose (e.g.,	indicate that the
potassium levels). Hormone)**, **FSH (Follicle- cancer) versus the benefits 25-50 mcg/day). pituitary gland is	producing enough
- Lightheadedness or Stimulating Hormone)**, (managing and potentially ACTH, and a trial	reduction or
dizziness. **Estradiol** (in women), reversing the immune-related 3. **Sex Hormone discontinuation of advance work) must be produced for LV(CU conclosured for LV(CU)	t glucocorticoid
3.**Thyroid-Stimulating mei): To evaluate gonadal weizhed. Deficiency*:	it be considered.
Hormone (TSH) function**Men**: 3. **Cautious Dis	continuation**: If
Deficiency**: - **GH (Growth 3. **Other Immune-related - **Testosterone a decision is mad	e to reduce or
- Fatigue or lethargy. Hormone)** and **IGF-1 Adverse Events**: Replacement**: Options discontinue gluco	corticoid
Cold intolerance. Insuin-Like Growth actor- Weipht gain Unit actor- Weipht gain Unit actor- Weipht gain Unit actor- Weipht gain Unit actor- Unit actor actor- Unit actor-	one cautiously and
Constigation bromone function. This is related adverse events, the pellets. Dosage and gradually to more	tor for symptoms
- Dry skin. especially relevant in pediatric cumulative impact on the frequency vary based on the of adrenal insuffi	ciency.
- Bradycardia (slow heart patients or those with patient's health might lead to preparation Patients shoul	d be educated
rate). symptoms suggestive of GH discontinuation or a pause in -**Women**: about symptoms	of adrenal crisis
aenciency. IU therapy**tstrogen and and the need for +*trollactin**: Though Progesterone divergence -	emergency ministration in
Luteining Hormone [LH] prolactin deficiency is rare, 4. **Individualized Decision Replacement**: For structures full situation	is, illness, or
and Follicle-Stimulating levels can be checked, Making**: premenopausal women. This surgery.	
Hormone (FSH]) especially if there's concern - The decision to continue can be achieved using	
Deficiency**: about breastfeeding in or discontinue ICIs should combined oral contraceptives 4. **High Likelihh	od of Lifelong
- in women: postpartum women. always be individualized, or hormone replacement Replacement**: - Amenorrhea (absence - **Antidiurefit Hormone taking into account the	e recovery a
of menstruation) or Assessment**: expected benefits of the ICI in - Postmenopausal women significant portion	n of patients with
irregular menstruation **Serum Osmolality** treating cancer versus the might not require hormone ICI-associated hy	oophysitis will

- Infertility.	and **Urine Osmolality**: To	potential risks and challenges	replacement unless they	require lifelong glucocorticoid
 Vaginal dryness. 	evaluate for diabetes	of managing hypopituitarism.	have significant symptoms of	replacement due to persistent
- Loss of libido.	insipidus. In central diabetes	- The patient's preferences	estrogen deficiency.	ACTH deficiency.
- In men:	insipidus, one would expect	and quality of life	4 **Growth Hormono	It's crucial to approach the desire
- Erectile dystunction.	(indicative of debydration)	considerations also play a	4. Growth Hormone Replacement** (Jess	of reducing or discontinuing
- Beduced body and	and inappropriately dilute	making process	commonly affected):	glucocorticoid replacement with
facial hair.	urine.	making process.	- **Somatropin**: Dosage	caution. Regular monitoring and
- Infertility.	- **Autoantibodies**: Some	5. **Multidisciplinary	is individualized, typically	collaboration with an
	studies suggest checking	Collaboration**:	starting low and titrating up	endocrinologist are vital to ensure
5. **Growth Hormone	pituitary autoantibodies,	- Collaboration between	based on IGF-1 levels and	patient safety and optimal
(GH) Deficiency** (less	though their role in ICI-	oncologists and	side effects.	hormone management.
commonly affected by ICI-	associated hypophysitis is not	endocrinologists is crucial in		
associated hypophysitis):	well-defined.	these scenarios to make	5. **Desmopressin for	
- In children.	3 **Imaging Studies**·	the continuation or	- If there is a deficiency of	
failure to thrive.	- **MRI of the Pituitary**:	discontinuation of ICI therapy	antidiuretic hormone (ADH)	
- In adults:	This is the imaging modality	in the context of	or vasopressin, leading to	
- Muscle weakness.	of choice.	hypopituitarism.	central diabetes insipidus.	
- Fatigue.	- Findings consistent with		- **Desmopressin	
- Reduced bone density	hypophysitis might include	It's essential to highlight that	(DDAVP)**: It can be	
or osteoporosis.	enlargement of the pituitary	ICI-associated	administered as a nasal spray,	
- Increased adipose	giand, thickening of the	nypopituitarism can be	oral tablet, or injection.	
tissue, especially around	picultary stark, or loss of the bright signal of the posterior	discontinuation of the ICI	depend on the formulation	
the waist.	pituitary. Enhancement nost-	Thus, the primary goal is	and the severity of the	
6. **Prolactin Deficiencv**	gadolinium can also be seen.	stabilizing the patient and	condition.	
(rare):	- MRI can also help rule out	ensuring appropriate		
- In women: Inability to	other pathologies like	hormone replacement rather	6. **High-dose Steroids for	
produce milk postpartum.	pituitary adenomas,	than reversing the condition.	Acute Management**:	
	metastases, or other sellar		- In cases with severe	
7. **Antidiuretic Hormone	and parasellar masses.		symptoms or complications	
(ADH) Denciency** leading	4 **\/icual Eigld Testing**		(like visual symptoms due to	
insinidus:	- If there's concern about		dose corticosteroids such as	
- Polyuria (excessive	compression of the optic		methylprednisolone, might	
urination).	chiasm due to pituitary		be administered initially.	
- Polydipsia (excessive	enlargement (as in cases of		- The specific dose can vary,	
thirst).	significant headache or visual		but a common regimen is	
- Nocturia (frequent	symptoms), a formal visual		**methylprednisolone 1	
urination at night).	field test can be done to		g/day intravenously for 3-5	
9 **Enlargement of the	assess for bitemporal		days**.	
8. **Enlargement of the Pituitary Gland**:	field defects		7 **Monitoring and	
- Can lead to symptoms	field defects.		Adjustment**:	
related to compression,	Prompt and comprehensive		- Regular clinical	
like headaches and visual	evaluation is crucial for timely		assessment and hormone	
disturbances.	diagnosis and management.		level monitoring are crucial.	
	Collaboration with an		The dosages of the	
It's important to note that	endocrinologist and, if		replacement hormones will	
these symptoms can be	necessary, a neuro-		be adjusted based on clinical	
with other conditions or	the diagnostic process and		values	
side effects of cancer	ensure comprehensive		vuides.	
treatments. If hypophysitis	assessment and care.		8. **Education**:	
or hypopituitarism is			- Patients should be	
suspected, a thorough			educated about the	
endocrinological			symptoms of hormone excess	
evaluation, including			or insufficiency, especially for	
specific hormonal assays			glucocorticoids, and should	
and imaging studies, is			on dose adjustments during	
management			illness or stress	
Collaboration with an				
endocrinologist can guide			Management of ICI-	
appropriate assessment			associated hypophysitis often	
and treatment.			requires a collaborative	
			approach involving	
			oncologists and	
			endocrinologists. Early	
			treatment are crucial to	
		1	minimize complications and	

Question What is the initial restormer What is the initial restormer What is the initial restormer Question More informer		Rheumatologic Toxicity	Rheumatologic Toxicity	Rheumatologic Toxicity	Rheumatologic Toxicity	Rheumatologic Toxicity
diguozita in muna diguozita in	Question	What is the initial	What is the initial treatment	What adjunctive	What is the treatment for	If a natient has immune checknoint
 subscription subsc	Question	diagnostic workun for	for moderate (grade 2)	immunosuppressive	xerostomia associated with	inhibitor associated myositis what
Detergene instance sexucated arthrite (ClatGP7) Immune checkpoint instance arthrite no minume checkpoint instance arthrite no minume checkpoint instance (ClatGP7) Immune checkpoint instance arthrite no minume checkpoint instance arthrite no minume checkpoint instance arthr		suspected immune	arthritis associated with	treatments can be used for	immune checknoint	are life threatening complications
stoccted antrothery Inhobory drockspace inhibitors drockspace inhibitors drockspace inhibitors Accesser fight 1 Inhibitors Inhibitors Inhibitors Inhibitors Inhibitors Accesser fight 1 Inhibitors I		checkpoint inhibitor	immune checkpoint	arthritis from immune	inhibitors?	that can occur?
Answer Legion 1 Answer Legion 1 Instruce Chipped Answer Legion 1 Instruce Chipped Answer Legion 1 Instruce Chipped Instruce C		associated arthritis?	inhibitors?	checkpoint inhibitors as		
Accessent English (1) websites (1) (2) w				alternatives to		
Arease Immune cleckpoint The transmotion of the instruction of the instrution of the instruction of the instruction of the inst				corticosteroids?		
(Dat677)Imitter (C)-associated where the joints become where the joints become where the joints become symptoms like jaint, where the joints becomes the symptoms like jaint, where the like the symptoms like jaint, where the like the symptom	Answer Engine 1	Immune checkpoint	The treatment for moderate	When arthritis from immune	Xerostomia, or dry mouth,	Immune checkpoint inhibitor (ICI)-
articles is a information indicade priority (solutions on the set is an information description information descri	(ChatGPT)	inhibitor (ICI)-associated	(grade 2) arthritis associated	checkpoint inhibitors (ICIs)	associated with immune	associated myositis is a rare but
relited adverse event with result adverse ev		arthritis is an immune-	with immune checkpoint	doesn't respond adequately	checkpoint inhibitors (ICIs)	potentially severe immune-related
weiter für glands sectoring symptomic like produktion skol symptomic like produktion skol sym		related adverse event	inhibitors (ICIs) focuses on	to corticosteroids or when	can be bothersome and	adverse event. While myositis
 sergions the pain of seven pain of the instruction of the		where the joints become	alleviating symptoms and	there's a need to minimize	life Management focuses on	refers to muscle inflammation that
swelling, and stifting. I characterized structures in the second structures is the second struc		symptoms like pain	Horo's a general approach to	controsteroid exposure,	symptom relief, provention of	call cause muscle weakness and
 I. "Souscieled attritis is superied, heldowing at the instance instance		swelling and stiffness If	initial treatment.	immunosuppressive	complications and	complications can arise.
 1.**Condered Arch- initiated: 1.**Condered		ICI-associated arthritis is		treatments can be	preserving oral health. Here	complications can anser
diagoste workup cam be initiated:inflammation yourge inflammation and parameter is inflammation with a resummation in the parameter is inflammation with a moundwafter is schematic inflamma		suspected, the following	1. **Nonsteroidal Anti-	considered. These agents aim	are some therapeutic	 **Cardiac Involvement**:
Initiate:(MSADD)**: there are offen find include laperston including the some postation and including the order labels and each the individual postation including the order labels and the individual postation including the some postation including the associated synthesis and the individual postation including the postation		diagnostic workup can be	inflammatory Drugs	to control inflammation and	approaches to consider:	- **Myocarditis**: This is one of
 1.**Chincial Assessment**. 1.**Chincin Assessment**. 1.**Chincin Assessment**.		initiated:	(NSAIDs)**:	are usually administered in		the most severe and life-
 1. "Cinical Assessment": Detailed history of pint Assessment ": Detailed history of pint Assessment ": Detailed history of pint Assessment Charge Towards Toward Towards T			- These are often the first-	collaboration with a	1. **Saliva Substitutes and	threatening complications of ICI-
Assessment**, commonity used for Kabba symptometrical, molyda assess prior therefore, speak, other protection and any associated systemic symptometrical, molyda assess prior therefore, speak, other comorbidiles, and potential spratements, and any associated systemic symptometrical, molyda assess prior therefore, speak, other comorbidiles, and potential spratements, and sprate spratements, and spratements symptometrical, molyda protection and any associated systemic symptometrical, molyda assess prior therefore, spratements symptometrical, molyda protection and any associated systemic symptometrical, molyda protection and associated systemic symptometrical, molyda assess prior therefore, spratements symptometrical, molyda protection spratements symptometrical, molyda protection spratements symptometrical, molyda protection spratements symptometrical, molyda protection spratements symptometrical, molyda protection spratements symptometrical, molyda protection spratements symptometrical, molyda protection spratements symptometrical, molyda protection spratements symptometrical, molyda protection spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical spratements symptometrical symptometrical spratements symptometrical symptometric		1. **Clinical	line agents to control pain	rheumatologist. Here are	Stimulants**:	associated myositis. Inflammation
 - Detailed Notry of Detailed Notry Notry Of Detailed		Assessment**:	and inflammation.	some potential treatments:	- **Artificial Saliva**: Over-	of the heart muscle can lead to
 Symptoms, Includie gines particulation (see, and potents) and include langlorder, hispitation, and any associated systemic spectra fractione biodiverse can also be used to more substantiations, and any associated systemic spectra fractione biodiverse can also be used to more substantiations, and any associated systemic spectra fractione biodiverse can also be used to more substantiations, and any associated systemic spectra fractione biodiverse can also be used to more substantiations, and any associated systemic spectra fractione biodiverse can also be used to more substantiations, and any associated systemic spectra fractione biodiverse can also be used to more a week, effect or raily or assess joint refarmation fraction is assess joint refarmation. Figure assess joint efficience assess and associated systemic spectra fractione biodiverse can also be used to more assess joint efficience assess and associated systemic spectra fractione biodiverse can also be used to more assess joint efficience assess and associated systemic spectra fractione biodiverse can also be used to more assess, possible present with refar to more assess, possible present with respect associated with system or attempt of considered associated with system or attempt of considered associated with system or attempt of the diverse spectra fractione biodiverse trans and and any associated with system or attempt of the diverse spectra fractione biodiverse trans associated with system or attempt of the diverse spectra fractione biodiverse trans associated with system associated with system or attempt of the diverse spectra fractione biodiverse trans associated with system system associated with system syste		- Detailed history of joint	- Commonly used NSAIDs	4 ** 0	the-counter products like	arrhythmias, heart failure, and
 Antimized at the second second		symptoms, including the	include ibuproten, naproxen,	1. ** Disease-Modifying	mouthwasnes, sprays, or gels	sudden cardiac death. Patients
 Horner the composition of a program control to to program control to program control to program		symmetrical vs	NSAID and dosage should be	(DMARDs)**·	oral mucosa	shortness of breath palpitations
 pionts, duration, and any associated systemic symptons. 		asymmetrical) involved	based on the individual	- **Methotrexate**: Often	- **Pilocarnine (Salagen)**	or fatigue
 sociated systemic systemic		joints, duration, and any	patient's needs, other	considered a first-line DMARD	and **Cevimeline	- **Pericarditis**: Inflammation
symptoms. • Physical large administor in swelling, warmthr, range of motion, and possible presence of point effusions.drug interactions. • Regular motioning for potential side effects, such as parationitiest and presence of point effusions.drug interactions. • Regular motioning for potential side effects, such as a an intration or biddle dydfunction is sessential.denotes the such as component effects, such as a an intration or the concurrent conditions.denotes the such as component effects, such as the such as the such as severing or gastrointestinal prediction.denotes the such as component effects, such as the such as the such as severing or gastrointestinal uper efficience.denotes the such as component efficience.denotes		associated systemic	comorbidities, and potential	for rheumatoid arthritis,	(Evoxac)**: These are	of the lining around the heart can
 - Physical examination to assess joint nedwerses, swelling, warmth, nage of motion, and possible presence of joint effusions. The server factors is an injection. 2. "*Laboratory Tests": - "Court (CGC)": To evaluate of or system: inflammation or other conditions. - "#Typical and "Creative affitting aff		symptoms.	drug interactions.	methotrexate can also be	cholinergic agonists that	lead to fluid accumulation, causing
 assess joint tendeness, swelling, warmth, range of gatrointestinal side effects, such as manifector. they are prescription motion, and possible presence of joint effusions. they are prescription motion, and possible presence of joint effusions. they are prescription motion, and possible presence of joint effusions. they are prescription motion, and possible presence of joint effusions. they are prescription motion, and possible presence of joint effusions. they are prescription motion, and possible presence of joint effusions. they are prescription motion, and possible presence of joint effusions. they are prescription motion, and possible monitore of or side scale presence of joint effusions. the are prescription motion or other concurrent conditions. the are prescription motion and acquetely controlled with NSAIDs or if there are considered. the are prescription motion and acquetely controlled with NSAIDs or if there are considered. the considered. the are prescription motion. the are prescription motion. the area motion. the a		- Physical examination to	- Regular monitoring for	used for ICI-associated	stimulate saliva production.	pericardial effusion. In severe
swelling, warmt, nage of motion, and possible presence of joint effusions.once a week, either orally of sa an injections, a san injections, a san injections, effects like excessive antimilarial drug that has anti-inflammatory propertial.medications, and patients diffect (Site excessive diffect (Site excessive diffect (Site excessive antimilarial drug that has antimilarial drug that has and eccessive and and increased risk of dental potentially leading to aspiration protentially leading to aspiration protentially leading to aspiration protentially leading to aspiration modera, such as predisional or the respiratory muscles can cause thypowentiation and cause thypowentiation and cause thypowentiation and cause thypowentiation and cause thypowentiation and protential side effects or there are associated arthritis, analyzing the fuid can. therwator and indictinguishing (CL- associated arthritis, analyzing the fuid can. therwator and the advection drug that has, adalimumab, adalimumab, adalimumab, athomation and and her target drinks and keykumab. therwator and her advection drug that has and her and that has advection drug that has antimilarial pint mobility, athabitos***. t		assess joint tenderness,	potential side effects, such as	arthritis. It's typically given	They are prescription	cases, it can progress to cardiac
motion, and possible presence of joint effusionskinder ydyfunction, is essential.as an injection.should be monitored for side where the heart's function is commissid.2. **Lobratory Tests**: - **Complete Blood for signs of systemic infiammation or other concurrent conditions. ***Lord contrained carbon so NSAD concurrent conditions. ***Lord contrained carbon so NSAD predinione, can be contrained carbon so NSAD predinione, carbon so NSAD pre		swelling, warmth, range of	gastrointestinal irritation or	once a week, either orally or	medications, and patients	tamponade, a medical emergency
presence of joint effusions.estemal		motion, and possible	kidney dysfunction, is	as an injection.	should be monitored for side	where the heart's function is
 2.**Corticosteroids**: -**Complete Blood Court (CB(*)*: to evaluate for rinflammation or other inflammation or other concurrent conditions. -**Fylinsalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis and upus. -**Sufasalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis and upus. -**Sufasalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis and upus. -**Sufasalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis and upus. -**Sufasalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis and upus. -**Sufasalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis and upus. -**Sufasalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis and upus. -**Sufasalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis and upus. -**Sufasalzane**: An antimulariad urg unpertuss, it's used in theumatoid arthritis any unpertuss, seedim anterves of sufastion, preumonia. -**telepriatory Muscle Weakness**: Seever involvement dental health. 2.**flabolagic DMARDs**: -**telepriatory faits and non-alcohol-based monthwashes. -**thereautoid arthritis. -**toruciat ob eavared inflammatory and inflammatory and inflammat		presence of joint emusions.	essential.	- **Hydroxychloroquine**:	effects like excessive	compromised.
 L. Contocol 1. L. Contocol 1.<td></td><td>2 **Laboratory Tests**</td><td>2 **Corticosteroids**</td><td>An antimalarial drug that has</td><td>sweating or gastrointestinal</td><td>2 **Respiratory Compromise**</td>		2 **Laboratory Tests**	2 **Corticosteroids**	An antimalarial drug that has	sweating or gastrointestinal	2 **Respiratory Compromise**
Court (CBC)**: To evaluate for signs of systemic inflamation or other ***intradiations to XSALDS or if there are contraindications to XSALDS or if there are considered in a set, and **-creating the low to perdisions and **-creating the low to moderate (grade 2)2. **Corl Hygiene and Dental Care**: Due to the reduced salwary flow, there's an inflamatory arthrits, a typical latring dose might be low to moderate (grade 2)2. **Corl Hygiene and Dental Care**: **Unthomode**: An inflamatory arthrits, a typical latring dose might be low to moderate (grade 2)2. **Corl Hygiene and Dental Care**: **Unthomode**: An inflamatory arthrits, a typical latring dose might be low to moderate (grade 2)2. **Corl Hygiene and Dental Care**: **Unthomode**: An inflamatory arthrits, a typical latring dose might be low to moderate (grade 2)2. **Corl Hygiene and Dental Care**: An and esophagus, can led to theres can caresed risk of dental caresed risk of factor **Biologic DMARDs*: These are drugs that target *Thure Necrossis Factor **Thure Necrossis Factor **Thure Necrossis Factor **Thure Necrossis Factor **Thure Necrossis risk of dental caresed risk of dental caresed risk of dental caresed risk of dental caresed risk of dental		- **Complete Blood	- If arthritis symptoms are	it's used in rheumatoid	upset.	 - **Aspiration**: Muscle
 for signs of systemic inflammation or other contraindications to NSAID sort if there are considered. For moderate (grade 2) arthitis, a typical starting, stypical starting, stypical starting, stypical starting, and therease drisk of dental cauties. Regular dental cleanings, and fluoride treatments. For moderate (grade 2) arthitis, a typical starting, stypical starting, stypical starting, stypical starting, and therease drisk of dental cauties. Regular dental cleanings, and fluoride toothpast for the respiratory muscles can cause hypoexploration and respiratory muscles can cause hypoexploration and respiratory muscles can and non-alcohob-based and non-alcohob-based and non-alcohob-based and production. CPP softwein ICL associated arthritis from analty in the are an considered arthritis from subtrastific torts. -**Interleukin-10(1-10) inflammatory conditions. -**Interleukin-10(1-10) inflammatory architics*: Such as predominantion, and optimize functions. -**Interleukin-10(1-10) inflammatory architics*: Such as individing capitoring intervision, mood changes, and increase drisk of therapy: -**Interleukin-10(1-10) inflammatory architics*: Such as individing capitoring intervision, mood changes, and approxe. -**Interleukin-10(1-10) inflammatory architics*: Such as individing capitoring intervision, mood changes, and increase drisk of therapy. -**Interleukin-10(1-10) inflammatory architics*: Such as increased risk of therapy. -**Interleukin-10(1-10) inflammatory architics*: Such as increased risk of therapy. -**Interleukin-10(1-10) intervision; and optimize inflammatory architics*: Such as increased risk of therapy. -**Interleukin		Count (CBC)**: To evaluate	not adequately controlled	arthritis and lupus.	2. **Oral Hygiene and Dental	weakness, especially involving the
Inflammation or other concurrent conditions.DMARD useful in salivary flow, there's an increased risk of dental consideredDue to the reduced salivary flow, there's an increased risk of dental check-ups, professional check-ups, professional <br< td=""><td></td><td>for signs of systemic</td><td>with NSAIDs or if there are</td><td>- **Sulfasalazine**: Another</td><td>Care**:</td><td>throat and esophagus, can lead to</td></br<>		for signs of systemic	with NSAIDs or if there are	- **Sulfasalazine**: Another	Care**:	throat and esophagus, can lead to
concurrent conditions. •*"Erythrocyte Sedimentation Rate (ESR)** and **C-reactive Protein (CRP)**: Nor inflammator.use, oral corticosteroids, like orsidered.inflammatory anthits. •*"Leflumomide**: An increased risk of dental can be considered in cases theat such as prediation does might be low to and match.and **Creactive or moderate (grade 2) artificits, a typical strating or moderate, such as prediation to to ther treatments.and increase the risk of aspiration, potentially leading to aspiration potentially leading to aspiration potentially leading to aspiration and increase the risk of aspiration, potentially leading to aspiration potentially leading to aspiration art*Rheumatoli Factor (RF)** and **Anti-Cycle Curulinated Peptide (anti- CCP) Antibodies**: Useful in distinguishing (LC) potential side effects attinucies artubiogene the undown and atthough it's worth noting that these can occasionally be positive in ICI- associated arthrits.use, oral corticosteroid, like inflammatory and infections.and increase the risk of aspiration, potentially leading to aspiration potentially leading to aspiration potentially leading to aspiration potentially leading to aspiration potential ly deficits treatments**The proved indication entries attration deficits**: Useful attration deficits**: Useful attration deficits**: Useful the use can occasionally other work aspirate for other autoimmune conditions. -***Indin Ration potential ide effects associated arthrits.and increase therisk of aspiration, potentially deficits**: An inflammatory conditions. -***Indin Ration grant be positive in ICI- inflammatory and infections **: -***Interleukin-1(LC) and analysing the foint an analysing the fluid ca		inflammation or other	contraindications to NSAID	DMARD useful in	- Due to the reduced	difficulty swallowing (dysphagia)
-**Erythrocyte Sedimentation Rate (ESR)** and **C-reactive Protein (CRP)**: Non- specific markers of (Markers)**: Non- <		concurrent conditions.	use, oral corticosteroids, like	inflammatory arthritis.	salivary flow, there's an	and increase the risk of aspiration,
Sedimentation Rate (ESP)**: And **C-reactive Protein (CRP)**: Non- specific markers of inflammation.considered in cases of moderate (grade 2) arthritis, a typical starting dose might be low to dose might be low to moderate, such as predisione 10-20 mg daily. The dose can teatments.can be considered in cases refactory to other treatments.cavities. Regular dental cleanings, and fluoride treatments.pneumonia. -**Reparatory Muscle Weakness**: Severe involvement of the respiratory muscles can cause hypoventilation and respiratory failure, necessitating mouthwashes**Thouthoute refactory failure, such as breakness in distinguishing ICL- in distinguishing ICL- attreat attritis**Tespiratory Muscle treatments**Tespiratory Muscle Weakness**: Severe involvement 		 **Erythrocyte 	prednisone, can be	- **Leflunomide**: An	increased risk of dental	potentially leading to aspiration
(ESR)** and **C-reactive Protein (CRP)**: Non- specific markers of inflammation For moderate (grade 2) inflammation.can be considered in cases refractory to other treatments Ceahige, and fluoride treatments Check-ups, professional cleanings, and fluoride treatments **Respiratory Muscle- ***Respiratory Muscle (RF)** and **Anti-Cyclic Citruilinated Peptide (anti- induced arthritis, although it's worth noting that these can occasionally other autoimmune conditions **Tor moderate (grade 2) moderate such as predisional moderate such as predisional be positive in ICI- associated with contig the swollen joint mouther analysis *: In patients with ha swollen joint manual analysing the loint an analysing the loint as the considered in the inflections **Tormolegenia in cases refractory to other treatments check-ups, professional treatments **Respiratory Muscle Weakness*: Escere involvement of the respiratory muscles can cause threation **Tormole (RF)** in distinguishing ICI- in distinguishing ICI- astrict at these can occasionally that these can occasionally other autoimmune conditions **Internewin-F(IL-6) inflections.**: -**Physical Therapy**:- **Internewin-F(IL-6) inflections**:- **Internewin-F(IL-6) inflections**: -**Internewin-F(IL-17) inhibitor**: Such as inflections.**:- **Internewin-F(IL-6) inflections**: -**Internewin-F(IL-17) inhibitor**: Such as inflections and the kaize analysing the fluid can help distinguish between inflections are treix inflammatory and inflections are treix inflammatory and inflections a		Sedimentation Rate	considered.	immunomodulatory drug that	cavities. Regular dental	pneumonia.
Protein (CRP)**: Non- specific markers of inflammation.arthritis, a typical starting treatments of moderate, such as predinisone 10-20 mg daily. The dose can be tapered down once SCP) Antibodies**: Useful indistinguishing (C1- indistinguishing (C1- indistinguishing (C1- indistinguishing (C1- indistinguishing (C1- induced arthritis, tramatiot arthritis, atthough it's worth noting that these can occasionally indistinguishing (C1- induced arthritis from associated with corticosteroid atthough it's worth noting that these can occasionally indistinguishing (C1- induced arthritis, tramation and infections. -**Town Necrosis Factor (ANA)**: To evaluate for conditions.arthritis, a typical fareapy**: constraints of the tapered down once specific markers. -**Town Necrosis Factor (INA)**: To evaluate for conditions.arthritis, a typical fareapy**: constraints of the tapered down once specific markers. -**Town Necrosis Factor (INA)**: To evaluate for conditions.arthritis, a typical fareapy**: constraints of the tapered down once specific markers. -**Town Necrosis Factor (INA)**: To evaluate for conditions.arthritis, a typical fareapy**: constraints of the tapered down once specific markers. -**Hourist fuid analysis**: In patients with a swollen joint, aspirating the joint ad analysis between help distinguish between help distinguish between inflectious arthritis.arthritis, a typical starting transtraints of the town once specific markers. -**Iont relevers muscle framation can teapserd down core specific markers.arthritis, a typical starting transtraints or the tapered down core specific markers.arthritis, a typical start transtraints or the tapered down core specific markers.arthritis, a typical start		(ESR)** and **C-reactive	- For moderate (grade 2)	can be considered in cases	check-ups, professional	 **Respiratory Muscle
specine markers of inflammation.does mign be low to moderate, such as predisions (RF)** and **Anti-Cyclic Citrulinated Peptide (anti- CCP) Antibodies**: Useful induced arthritis from although it's worth noting that these can occasionally although it's worth noting that these can occasionally although it's worth noting that these can occasionally although it's worth noting that these can occasionally a positive in ICI- associated arthritis. -**Antinuclear Antibody -**Tolint Fluid Analysis**: in patientsOsce mign be low to the autoris factor indicat arthritis. -**Physical Therapy**: - Physical Therapy**: - Physical and occupational therapy to in indication.Treatments can neip maintain dental health. - Use of fluoride toothpaste and non-alcohol-based mouthwashes. - Chew sugar-free gum of stude save preduction.Cause hypopentilation and respiratory muscles can cause hypopentilation - **Intimamatory process. - **Twitter vertice information and respiratory fluides can the information and neal the specific molecules involved in the information and canbe although it's worth noting that these can occasionally and increased risk of infortons. - **Physical Therapy**: - Physical Therapy**: - Physical and occupational therapy can be beneficial to rinflammatory and infections. - **Interleukin-16 (IL-6) in infammatory conditions. - **Interleukin-16 (IL-6) in infammatory conditions. - **Interleukin-16 (IL-6) in infammatory conditions. - **Interleukin-17 (IL-17) alpha, a pro-inflammatory conditions. - **Interleukin-17 (IL-17) alpha, a pro-inflammatory conditions. - **Interleukin-17 (IL-17) alpha, a pro-inflammatory conditions. - **Interleukin-17 (IL-17) alpha and alpha inget stree symptoms. - **Interleukin-17 (IL-17) alpha		Protein (CRP)**: Non-	arthritis, a typical starting	refractory to other	cleanings, and fluoride	Weakness**: Severe involvement
InitializationInitializationCase methodsCase metho		specific markers of	dose might be low to	treatments.	treatments can neip maintain	of the respiratory muscles can
Iteration		- **Rheumatoid Factor	10-20 mg daily. The dose can	2 **Biologic DMARDs**	- Use of fluoride toothpaste	respiratory failure peressitating
Citrulinated PartiqueCitrulinated PartiqueCitrulinate		(RE)** and **Anti-Cyclic	be tapered down once	- These are drugs that target	and non-alcohol-based	mechanical ventilation
CCP) Antibodies**: Useful in distinguishing IC1- induced arthritis from theumatoid arthritis, although it's worth noting that these can occasionally be positive in IC1- associated arthritis it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects and increased risk of infections it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects and increased risk of infections it's crucial to be aware of potential side effects associated arthritis it's crucial to be aware of potential side effects and increased risk of infections it's crucial to be aware of potential side effects and increased risk of infections it's crucial to be aware of crucial and occupational therapy can be beneficial to maintain joint mobility, alleviate pain, and optimize fwi point and analyzing the fluid can help distinguish between infections arthrits it's crucial not consistered in some secukinumab and ixekizumab. -**Interleukin-12/23 (IL- 12/23) inhibitors**: Such as suckinumab and ixekizumab. -**Interleukin-12/23 (IL- 12/23) linbibiors**: Such as suckinumab and ixekizumab. -**Interleukin-12/23 (IL- 1		Citrullinated Pentide (anti-	symptoms improve.	specific molecules involved in	mouthwashes.	
in distinguishing ICI- induced arthritis, although it's worth noting that these can occasionally be positive in ICI- associated arthritis, -**Antinuclear Antibody (ANA)**: To evaluate for other autoimmune conditions, -**Notin I ploint, aspirating the joint a analyzing the fluid can help distinguish between infleximaping Studies**: -**Plain Radiographs (X-potential side effects associated with corticosteroid associated with corticosteroid and increased risk of and increased risk of infections**Tumor Necrosis Factor (TNF) inhibitors**: Such as associated with corticosteroid inficitoms -**Physical Therapy**: -**Notinuclear Antibody -**Notinuclear Antibody -**Notinuclear Antibody -**Notine, -**Noting the joint as help distinguish between inflammatory and infectious arthritis betefical to maintain joint mobility, alleviate pain, and optimize fruction **Tumor Necrosis Factor (TNF) inhibitors**: Such as associated with corticosteroid and increased risk of infections. -**Notine line and alleviate pain, and optimize fruction **Tumor Necrosis Factor (TNF) inhibitors**: Such as adalimumab, etamercept, certolizumab, and optimume. -**Interleukin-6 (IL-6) inhibitors**: Such as -**Interleukin-17 (IL-17) inhibitors**: Such as infectious arthritis Severe muscle inflammation can lead to the breakdown of muscle tissue, releasing myoglobin into the biodostream. This - Nooiding caffeine and alleviate pain, and optimize fruction **Tumor Necrosis Factor (TNF) inhibitors**: Such as colocotame Severe muscle inflammation can suble to acute kidney injury. Signs include dark or tea- colored urine, muscle pain, and weakness.1*********************************		CCP) Antibodies**: Useful	- It's crucial to be aware of	the inflammatory process.	- Chew sugar-free gum or	3. **Rhabdomyolysis**:
induced arthritis rheumatoid arthritis, although it's worth noting that these can occasionally be positive in ICI- associated arthritis. -**Antinuclear Antibody (ANA)*: To evaluate for other autoimmune conditions. -**1Ntinuclear Antibody (ANA)*: To evaluate for other autoimmune conditions. -**1Ntinuting the joint and analyzing the fluid can help distinguish between infactious arthritis.associated with corticosteroid infactions**: -**Interleukin-12/23 (IL- 12/23) inhibitors**: Such as targeted in some infactions. -**Interleukin-12/23 (IL- 12/23) inhibitors**: Such as secutinumab and inkeizumab. -**Interleukin-12/23 (IL- 12/23) inhibitors**: Such as secutinumab.stimulate saliva production. stimulate saliva production.lead to the breakdown of muscle tissue targeted in some infactions**: - Nowiding cafferine and alcohol, as they can exacerbate dryness.stimulate saliva production**Interleukin-12/23 (IL- targeted in some infactions repredominantly infectious arthritis.stimulate saliva production. infactions. - Nowiding cafferine and alcohol, as they can exacerbate dryness.stimulate		in distinguishing ICI-	potential side effects	- **Tumor Necrosis Factor	suck on sugar-free candies to	- Severe muscle inflammation can
rheumatoid arthritis, although it's worth noting that these can occasionally be positive in ICI- associated arthritis.use, such as hyperglycemia, hypertension, mood changes, and increased risk of infections.infliximab, adalimumab, etanercept, certolizumab, and golimumab. They target TNF- alpha, a pro-inflammatory alpha, a pro-inflammatory cytokine.3. **Hydration**: bloddstream. This can damage the bloddstream. This can damage the colored urue, acute kidney injury. Signs include dark or tea- colored urue, muscle pain, and weakness ***Interleukin-6 (IL-6) other autoimmune ther apy can be beneficial to ther apy can be beneficial to the apy can be beneficial to inflammatory conditions. - **Interleukin-12/21 (IL-17) especially at night, can help alleviate symptoms **Overlap Syndromes**: - 'In some cases, ICI-associated myositis might occur in conjunction with other immune-related adverse events, such as analyzing the fluid can help distinguish between inflammatory and inflections directly into the joint can be considered to infjections directly into the joint can be considered to infjections directly into		induced arthritis from	associated with corticosteroid	(TNF) inhibitors**: Such as	stimulate saliva production.	lead to the breakdown of muscle
although it's worth noting that these can occasionally be positive in ICI- associated arthritis.hypertension, mood changes, and increased risk of infections.etanercept, certolizumab, and golimumab. They target TNF- cytokine.3. **Hydration**: - Regular sips of waterbloodstream. This can damage the kidneys and lead to acute kidney injury. Signs include dark or tea- colored urine, muscle pain, and weakness **Antinuclear Antibody (ANA)**: To evaluate for other autoimmune therapy can be beneficial to conditions.3. **Physical Therapy*: - Physical and occupational tocilizumab. IL-6 plays a role inflammation and can be targeted in some inflammatory conditions **oiding caffeine and alcohol, as they can exacerbate dryness.4. **Overlap Syndromes**: - In some cases, ICI-associated myositis might cocur in conjunction with a swollen joint, analyzing the fluid can help distinguish between inflammatory and inflections arthritis.4. **Joint Injections**: - **Interleukin-12/23 (IL- 12/23) inhibitors**: Such as secukinumab.3. **Humaging Studies**: - **Interleukin-12/23 (IL- 12/23) inhibitors**: - Severe muscle beakdown can5. **Lip Care**: - Severe muscle beakdown can		rheumatoid arthritis,	use, such as hyperglycemia,	infliximab, adalimumab,		tissue, releasing myoglobin into the
That these can occasionally be positive in ICI- associated arthritis. -**Antinuclear Antibodyand increased risk of infections.goinnumab. They target TNF- alpha, a pro-inflammatory alpha, a pro-inflammatory ovtokie Regular sips of water throughout the day can help alleviate dryness.kidneys and lead to acute kidney injury. Signs include dark or tea- colored urine, muscle pain, and weakness**Antinuclear Antibody (ANA)**: To evaluate for other autoimmune therapy can be beneficial to antatin joint mobility, -**Joint Fluid3. **Physical Therapy**: - Physical and occupational therapy can be beneficial to maintain joint mobility, alleviate pain, and optimize inflammatory conditions**Interleukin-6 (IL-6) - Avoiding caffeine and alcohol, as they can exacerbate dryness.4. **Overlap Syndromes**: - In some cases, ICI-associated myositis might occur in conjunction with a swollen joint, analyzing the fluid can help distinguish between inflammatory and infectious arthritis **Joint Fluid alleviate pain, and optimize inflammatory conditions. - **Interleukin-17 (IL-17) inflammatory conditions. - **Interleukin-17/28 (IL- - **Interleukin-17/28 (IL- - *Regular use of lip balms or moisturizers can prevent chaping and discomfort. **Inaging Studies**: - Severe muscle brandities**: - Severe muscle brakdown can		although it's worth noting	hypertension, mood changes,	etanercept, certolizumab, and	3. **Hydration**:	bloodstream. This can damage the
De positive in ici- associated arthritis.innections.aipna, a pro-initianmatory cytokine.throughout the day can heip alleviate dryness.injury. Signs include dark or tea- colored urine, muscle pain, and weakness**Antinuclear Antibody (ANA)**: To evaluate for other autoimmune3. **Physical Therapy**: - Physical and occupational therapy can be beneficial to maintain joint mobility, alleviate pain, and optimize-**interleukin-6 (IL-6) inhibitors**: Such as inflammation and can be targeted in some-Avoiding caffeine and alcohol, as they can exacerbate dryness.4. **Overlap Syndromes**: - In some cases, ICI-associated myositis might occur in conjunction with other immune-related adverse events, such as myositis might occur in conjunction with other immune-related analyzing the fluid can - In cases where one or a inflammatory and inflaction stare predominantly inflammatory and inflectious arthritis.4. **Joint Injections**: injections directly into the joint can be considered to joint can be considered to inflaction**:. **Interleukin-17 (IL-17) especially at night, can help alleviate symptoms.invoits might occur in conjunction myosits might occur in conjunction with other immune-related adverse events, such as myocarditis, pneumonitis, or hepatitis. These can compound the torease the risk of life-threatening outcomes.analyzing the fluid can inflammatory and inflammatory and inflectious arthritis.4. **Joint Injections directly into the joint can be considered to injections directly into the joint can be considered to relieve symptoms.5. **Lip Care**: can be considered to charbal associated with dry lips.5. **Electrolyte Abnormalities**: colored uri		that these can occasionally	and increased risk of	goilmumab. They target TNF-	- Regular sips of water	kioneys and lead to acute kidney
-**Antinuclear Antibody (ANA)**: To evaluate for other autoimmune3. **Physical Therapy**: - Physical and occupational therapy can be beneficial to maintain joint mobility, -**Interleukin-6 (IL-6)-Avoiding caffeine and alcohol, as they can exacerbate dryness.weakness**Interleukin-6 (IL-6) other autoimmune- Physical and occupational therapy can be beneficial to maintain joint mobility, alleviate pain, and optimizeinhibitors**: Such as tocilizumab. IL-6 plays a role targeted in somealcohol, as they can exacerbate dryness.4. **Overlap Syndromes**: - In some cases, ICI-associated myositis might occur in conjunction with a swollen joint, analyzing the fluid can help distinguish between hifilammatory and inflectious arthritis.4. **Joint Injections**: inflammatory and affected, corticosteroid injections directly into the joint can be considered to joint can be considered to relieve symptoms.alleviate pain, and optimize tocilizumab. IL-6 plays a role targeted in some argeted in some4. **Overlap Syndromes**: - Using a room humidifier, with a swollen joint, aspirating the joint and analyzing the fluid can inflammatory and inflections directly into the joint can be considered to joint can be considered to inflections directly into the joint can be considered to inflections**: inhibitors**: Such as strutumeb.S. **Lip Care**: associated with dry lips.cultered there the clinical picture and increase the risk of life-threatening outcomes**That diverses-**Interleukin-12/23 (IL- inflammatory and inflections directly into the joint can be considered to joint can be considered to inflections**: inhibitors**: S. **Janus Kinase (JAK)S. **Lip		associated arthritic	intections.	aipila, a pro-inflammatory	alleviate drugess	colored uring musclo pain and
Interfection </td <td></td> <td>- **Antinuclear Antihody</td> <td>3 **Physical Therany**</td> <td>- **Interleukin-6 (II-6)</td> <td>- Avoiding caffeine and</td> <td>weakness</td>		- **Antinuclear Antihody	3 **Physical Therany**	- **Interleukin-6 (II-6)	- Avoiding caffeine and	weakness
other autoimmune conditions.therapy can be beneficial to maintain joint mobility, alleviate pain, and optimize function.tocilizumab. IL-6 plays a role in inflammation and can be targeted in someexacerbate dryness.4. **Overlap Syndromes**: - In some cases, ICI-associated myositis might occur in conjunction with a swollen joint, aspirating the joint and analyzing the fluid can help distinguish between inflammatory and inflections aftered, corticosteroid inflections aftered, corticosteroid inflections aftered, corticosteroid inflections aftered to the joint can be considered to relieve symptoms.4. **Joint Injections **: inflections **: inhibitors**: Such as secukinumab and ixekizumab. - **Interleukin-12/23 (IL- inflections aftered, corticosteroid injections directly into the joint can be considered to relieve symptoms.4. **Joint Injections **: inflections **: inhibitors**: Such as secukinumab and ixekizumab. - **Interleukin-12/23 (IL- inflections aftered, corticosteroid injections directly into the joint can be considered to relieve symptoms.5. **Lip Care**: severity of the clinical picture and increase the risk of life-threatening outcomes.3. **Janus Kinase (JAK) Inhibitors**:3. **Janus Kinase (JAK) associated with dry lips.5. **Electrolyte Abnormalities**: - Severe muscle breakdown can		(ANA)**: To evaluate for	- Physical and occupational	inhibitors**: Such as	alcohol, as they can	
conditions.maintain joint mobility, alleviate pain, and optimize function.in inflammation and can be targeted in some- In some cases, ICI-associated myositis might occur in conjunction with aswollen joint, aspirating the joint and help distinguish between inflammatory and infectious arthritis In some cases, ICI-associated myositis might occur in conjunction **Interleukin-17 (IL-17) inhibitors**: Such as secukinumab and ixekizumab. -**Interleukin-12/23 (IL- 12/23) inhibitor**: Such as secukinumab and ixekizumab. -**Interleukin-12/23 (IL- 12/23) inhibitor**: Such as secukinumab. -**Interleukin-12/23 (IL- 12/23) inhibitor**: Such as secukinumab. -**Interleukin-12/23 (IL- 12/23) inhibitor**: Such as moisturizers can prevent chapping and discomfort associated with dry lips In some cases, ICI-associated myositis might occur in conjunction with other immune-related adverse evertes, such as myocarditis, pneumonitis, or hepatitis. These can compound the severity of the clinical picture and increase the risk of life-threatening outcomes.3. **Inmaging Studies**: - **Plain Radiographs (X-relieve symptoms. relieve symptoms.3. **Janus Kinase (JAK) Inhibitor**:S. **Electrolyte Abnormalities**: - Severe muscle breakdown can		other autoimmune	therapy can be beneficial to	tocilizumab. IL-6 plays a role	exacerbate dryness.	4. **Overlap Syndromes**:
- **Joint Fluid alleviate pain, and optimize targeted in some 4. **Humidification**: myositis might occur in conjunction Analysis**: In patients function. inflammatory conditions. - Using a room humidifier, with other immune-related aspirating the joint an 4. **Joint Injections**: inhibitors**: Such as alleviate symptoms. myocarditis, or analyzing the fluid can - In cases where one or a secukinumab and ixekizumab. secukinumab and ixekizumab. hepatitis. These can compound the inflammatory and affected, corticosteroid 12/23) inhibitor**: Such as - Regular use of lip balms or increase the risk of life-threatening joint can be considered to joint can be considered to a.**Janus Kinase (JAK) associated with dry lips. 5.**Electrolyte Abnormalities**: . **Plain Radiographs (X- relive symptoms. 3.**Janus Kinase (JAK) sociated with dry lips. 5.*ever muscle breakdown can		conditions.	maintain joint mobility,	in inflammation and can be		- In some cases, ICI-associated
Analysis**: In patients function. inflammatory conditions. - Using a room humidifier, with other immune-related with a swollen joint, aspirating the joint and 4. **Joint Injections**: inhibitors**: Such as alleviate symptoms. adverse events, such as analyzing the fluid can - In cases where one or a secukinumab and ixekizumab. alleviate symptoms. myocarditis, preumonult, or help distinguish between few joints are predominantly -**Interleukin-12/23 (IL- 5. **Lip Care**: severity of the clinical picture and inflammatory and affected, corticosteroid 12/23) inhibitor**: Such as - Regular use of lip balms or increase the risk of life-threatening joint can be considered joint can be considered S. **Janus Kinase (JAK) associated with dry lips. 5. **Electrolyte Abnormalities**: - **Plain Radiographs (X- relive symptoms. 3. **Janus Kinase (JAK) associated with dry lips. 5. evere muscle breakdown can		- **Joint Fluid	alleviate pain, and optimize	targeted in some	4. **Humidification**:	myositis might occur in conjunction
with a swollen joint, aspirating the joint and analyzing the fluid can help distinguish between inflammatory and infectious arthritis. 4. **Joint lipections**: - **loint are predominantly affected, corticosteroid joint can be considered to - **Interleukin-17 (IL-17) especially at night, can help alleviate symptoms. adverse events, such as myocarditis, pneumonits, or hepatitis. These can compound the secukinumab. - In cases where one or a nelp distinguish between inflammatory and infectious arthritis. - In cases where one or a few joints are predominantly affected, corticosteroid injections directly into the joint can be considered to int can be considered to int can be considered to inhibitors**: 5. **Lip Care**: - **Plain Radiographs (X- 5. **Lip Care**: - **Plain Radiographs (X- 6. **Lip Care**: - **Inageing Studies**: - **Inageing Studies**: 6. **Lip Care**: - **Inageing Studies**: - **Plain Radiographs (X- 6. **Lip Care**: - **Inageing Studies**: - **Inageing Studies**: 6. **Lip Care**: - **Inageing Studies**: - **Plain Radiographs (X- 6. **Lip Care**: - **Inageing Studies**: - Severe muscle breakdown can		Analysis**: In patients	function.	inflammatory conditions.	- Using a room humidifier,	with other immune-related
aspirating the joint and analyzing the fluid can help distinguish between inflammatory and infectious arthritis. 4. **Joint Injections**: - In cases where one or a wight of the divide symptoms. alleviate symptoms. myocarditis, pneumonitis, or hepatitis. These can compound the secukinumab and ixekizumab. help distinguish between inflammatory and infectious arthritis. filected, corticosteroid injections directly into the joint can be considered to relieve symptoms. 12/23 (IL- 12/23) inhibitor**: Such as 12/23 (IL- 12/23) (IL- inhibitor**: Such as - **Lip Care**: - Regular use of lip balms or moisturizers can prevent chapping and discomfort associated with dry lips. s.**Let clinical picture and increase the risk of life-threatening outcomes. 3. **Inwaging Studies**: - **Plain Radiographs (X- relieve symptoms. 3. **Janus Kinase (JAK) Inhibitor**: associated with dry lips. 5. **Electrolyte Abnormalities**: - Severe muscle breakdown can		with a swollen joint,		- **Interleukin-17 (IL-17)	especially at night, can help	adverse events, such as
analyzing the tuid can - in cases where one or a secukinumab and ixekizumab. hepatits. These can compound the help distinguish between few joints are predominantly -**Interleukin-12/23 (IL- 5. **Lip Care**: severity of the clinical picture and inflammatory and affected, corticosteroid 12/23) inhibitor**: noisturizers can prevent outcomes. inflectious arthritis. injections directly into the ustekinumab. moisturizers can prevent outcomes. joint can be considered to relive symptoms. 3. **Janus Kinase (JAK) associated with dry lips. 5. **Electrolyte Abnormalities**: - **Plain Radiographs (X- Inhibitor**: Inhibitors**: - Severe muscle breakdown can		aspirating the joint and	 **Joint Injections**: 	inhibitors**: Such as	alleviate symptoms.	myocarditis, pneumonitis, or
Interpretatinguisan between inflammatory and inflammatory and infectious arthritis. rew joints are precommanantly affected, corticosteroid - ··· interleukin-1//23 (IL- 12/23) inhibitor**: Such as ustekinumab. 5. **Lip Care**: - Regular use of lip balms or moisturizers can prevent chapping and discomfort seventy of the clinical picture and increase the risk of life-threatening outcomes. 3. **Imaging Studies**: - **Plain Radiographs (X- relieve symptoms. 3. **Janus Kinase (JAK) Inhibitors**: sexcited with dry lips. 5. **Electrolyte Abnormalities**: - Severe muscle breakdown can		analyzing the fluid can	- in cases where one or a	secukinumap and ixekizumab.	5 **Lin Coro**-	nepatitis. These can compound the
infectious arthritis. injected, condecisional 12723/infinition * Such as regular use on in balans of increase the fisk of infe-threatening infectious arthritis. injections directly into the joint can be considered to joint can be considered to relieve symptoms. 3. **Janus Kinase (JAK) associated with dry lips. 5. **Electrolyte Abnormalities**: - **Plain Radiographs (X-		inflammatory and	affected corticostoroid	- ATINTERIEUKIN-12/23 (IL- 12/23) inhibitor**: Such ac	 Elp Carent: Regular use of lip balms or 	severity of the clinical picture and
incention and the sector and the pion can be considered in the can be considere		infectious arthritic	injections directly into the	ustekinumah	- negular use of the ballins of	outcomes
3. **Imaging Studies**: relieve symptoms. 3. **Janus Kinase (JAK) associated with dry lips. 5. **Electrolyte Abnormalities**: - **Plain Radiographs (X- Inhibitors**: - Severe muscle breakdown can		cedous ur cillitus.	joint can be considered to	ascentitution.	chapping and discomfort	cateomes.
- **Plain Radiographs (X- Inhibitors**: - Severe muscle breakdown can		**Imaging Studies**:	relieve symptoms.	3. **Janus Kinase (JAK)	associated with dry lips.	5. **Electrolyte Abnormalities**:
		- **Plain Radiographs (X-		Inhibitors**:	<i>,</i> .	- Severe muscle breakdown can

rays)**: Useful to assess	5. **Immune Checkpoint	- Drugs like tofacitinib,	6. **Avoid Irritants**:	lead to electrolyte disturbances,
joint erosions, joint space	Inhibitor Management**:	baricitinib, and upadacitinib	 Reduce intake of spicy or 	including hyperkalemia (elevated
narrowing, and other	- For grade 2 arthritis, it	inhibit JAK enzymes, which	acidic foods that can irritate a	potassium levels), which can cause
structural changes.	might be possible to continue	play a role in the signaling	dry mouth.	cardiac arrhythmias.
- **Ultrasound** or	ICI therapy with close	pathways of various pro-	- Avoid tobacco products	
MRI: These can detect	monitoring. However,	inflammatory cytokines.	and limit alcohol and caffeine	Due to these potential life-
joint inflammation,	temporary interruption of the		intake, as they can	threatening complications, it's
synovitis, tenosynovitis,	ICI might be considered based	4. **Nonsteroidal Anti-	exacerbate dryness.	crucial to have a high index of
and erosions, even if not	on the severity of symptoms,	Inflammatory Drugs	- ***	suspicion for ICI-associated
apparent on physical	the extent of joint	(NSAIDS)**:	7. ** Management of	myositis in patients presenting with
examination or plain	involvement, and the	- while not	Potential Underlying	disease along monitoring and
radiographs.	situation	immunosuppressive, NSAIDs	Lifthe verestemia is	diagnosis, close monitoring, and
4 **D:#=====	situation.	can be used alongside other	- If the xerostomia is	aggressive intervention can
4. ***Differential	6 **Phoumatology	treatments to control	suspected to be related to an	mitigate these risks. Collaborative
Diagnosis .	Consultation**	symptoms. However, they	gland inflammation (like	care involving oncologists,
- it's essential to consider		may not be adequate as	gianu initiatination (like	intensive care specialists may be
arthritic such as:	- A relefidi to a	associated arthritis	of corticostoroids might be	ossential in managing these
- Osteoarthritis	valuable for confirming the	associated artificits.	considered after consulting	essential III IIIdiidgiiig tileSe
- Osteoartinitis	diagnosis guiding treatment	5 **Physical and	with a specialist	patients.
or other inflammatory	and monitoring response to	Occupational Therapy**:	- Review other medications	
arthritides	therapy They can also	- Not immunosuppressive	that the nationt might be	
- Infectious arthritis	provide expertise if there's a	ner se hut adjunctive therany	taking as many drugs	
- Reactive arthritis	need for more advanced	with physical or occupational	(outside of ICIs) can cause	
- Gout or pseudogout	therapeutic interventions or if	therapy can belo with	xerostomia as a side effect	
- The clinical	there are concerns about	symptom management joint	xerostorina as a side erreta	
presentation, lab findings.	differential diagnoses.	function, and mobility.	8. **Regular Follow-up**:	
and imaging studies can		·,	- Monitoring and regular	
help distinguish ICI-	7. **Disease-modifying	6. **Joint Injections**:	follow-up are essential to	
associated arthritis from	Antirheumatic Drugs	- For patients with	assess the efficacy of	
these other conditions.	(DMARDs)**:	predominant symptoms in	interventions, adjust	
	- Although typically reserved	one or a few joints,	treatments as needed, and	
5. **Consultation**:	for more severe cases or	corticosteroid injections	check for complications	
- Consider a referral to a	chronic ICI-associated	directly into the joints can	related to xerostomia.	
rheumatologist for a	arthritis, DMARDs like	provide relief.		
comprehensive evaluation,	methotrexate or	1	9. **Collaboration**:	
especially if the diagnosis	hydroxychloroquine might be	When considering these	- Consider consulting or	
is unclear or if there's a	considered in some	treatments, it's essential to	collaborating with dental	
need for advanced	situations, especially if there's	evaluate potential	specialists, rheumatologists,	
therapeutic interventions.	inadequate response to the	interactions with cancer	or otolaryngologists for	
	above treatments. Decisions	treatments, the underlying	comprehensive care,	
Prompt diagnosis and	regarding DMARD use are	malignancy, and potential	especially if xerostomia is	
management of ICI-	usually made in collaboration	side effects. Close	severe or if there are signs of	
associated arthritis are	with a rheumatologist.	collaboration between	salivary gland inflammation.	
crucial to relieve		oncologists and		
symptoms, prevent joint	Regular monitoring of	rheumatologists is vital to	The primary goal is to	
damage, and ensure the	response to treatment,	optimize treatment and	alleviate symptoms, prevent	
continuity of cancer	potential drug side effects,	monitor for side effects.	complications, and enhance	
therapy with minimal	and overall patient well-being	1	the patient's quality of life.	
interruptions or	is crucial. Adjustments to	1	Individualized care and	
complications.	therapy might be required	1	regular follow-up can ensure	
	based on the evolving clinical	1	optimal management and	
	picture.		patient well-being.	

					1
	Neuromuscular Toxicity	Neuromuscular Toxicity	Neuromuscular Toxicity	Neuromuscular Toxicity	Neuromuscular Toxicity
Question	What are the primary	What is the primary	What supportive care	What is the differential diagnosis	What are indications associated
	treatments for immune	treatment for immune	treatments should patients	for immune checkpoint inhibitor	with neurologic toxicities to
	checkpoint inhibitor	checkpoint inhibitor	treated with immune	associated meningitis?	permanently discontinue immune
	associated myasthenia	associated encephalitis?	checkpoint inhibitors who		checkpoint inhibitors?
	gravis?		develop myasthenia gravis or		
			Guillain Barre syndrome		
			receive?		
Answer Engine 1	Immune checkpoint	Immune checkpoint inhibitor	Patients treated with	Immune checkpoint inhibitor	Neurologic toxicities associated
(ChatGPT)	musthania gravis (MC) is	(ICI)-associated encephalitis	inhibitors (ICIs) who dovelop	(ICI)-associated meningitis is a	inhibitors (ICIs) can yory in
	myastnenia gravis (IVIG) is	is a rare but serious	musthopia gravis (MG) or	it's crucial to consider a broad	inhibitors (ICIs) can vary in
	a rate but potentially	requires prompt recognition	Cuillain Barra sundrama	differential diagnosis when feed	sevency. While some minu
	adverse event When	and intervention as it can be	(GBS) often require both	with symptoms suggestive of	warrant only close observation or
	associated with ICIs MG	life-threatening Here's a	specific immunosuppressive	meningitis in patients treated	temporary treatment
	can present more acutely	general approach to the	treatments and supportive	with ICIs Here's a breakdown of	interruption severe or life-
	and severely than classic	primary treatment:	care measures to address the	potential differential diagnoses:	threatening events typically
	MG. Given its potential for		symptoms and potential	P	require permanent
	life-threatening	1. **Discontinuation of ICI**:	complications. Here's a	1. **Infectious Causes**:	discontinuation of the ICI. Here
	complications, such as	- As with other severe	breakdown of supportive	- **Bacterial Meningitis**:	are some indications associated
	myasthenic crisis, prompt	immune-related adverse	care treatments for these	Caused by bacteria like Neisseria	with neurologic toxicities that
	diagnosis and aggressive	events, the first step is to	conditions:	meningitidis, Streptococcus	might lead to permanent
	management are crucial.	immediately discontinue the		pneumoniae, or Haemophilus	discontinuation:
	Here's a general approach	ICI.	**For Myasthenia Gravis	influenzae.	
	to the primary treatments:		(MG):**	 **Viral Meningitis**: 	 **Severe or Life-Threatening
		2. **High-Dose		Common culprits include	Encephalitis**: Encephalitis or
	1. **Discontinuation of	Corticosteroids**:	1. **Respiratory Support**:	enteroviruses, herpes simplex	inflammation of the brain can
		- Given the inflammatory	- Patients with MG can	virus (HSV), varicella-zoster virus	present with altered mental
	- The first and foremost	nature of the condition, high-	develop myasthenic crisis,	(VZV), and others.	status, seizures, focal neurologic
	step is to stop the ICI	dose corticosteroids are the	where the respiratory	- **Fungal Meningitis**:	dencits, or even coma.
	MG is suspected or	**Mothylprodpicolopo**	maintain adoquato	others, especially in	2 **Muasthonia Gravis with
	diagnosed	is often used with typical	breathing Such patients may	immunocompromised patients	Respiratory Compromise**: If a
	ulagnoseu.	doses ranging from 1 to 2	require **mechanical	- **Tuberculous (TB)	natient develops myasthenia
	2. **Corticosteroids**:	g/day intravenously for 3-5	ventilation**.	Meningitis**: Especially in	gravis with symptoms of
	- High-dose	days, followed by a tapering	- Regular monitoring with	endemic areas or high-risk	respiratory muscle weakness or if
	corticosteroids, like	dose of oral prednisone over	**pulmonary function	populations.	they experience a myasthenic
	prednisone or	several weeks.	tests** can help assess	 **Neurosyphilis**: Syphilis 	crisis, it often necessitates
	methylprednisolone, are	 The duration and tapering 	respiratory muscle strength	affecting the central nervous	discontinuation of the ICI.
	the mainstay of treatment	schedule of corticosteroids	and guide decisions about	system.	
	for ICI-associated MG.	can be adjusted based on the	respiratory support.		3. **Guillain-Barre Syndrome
	- The specific dose can	severity of symptoms and the		2. **Neoplastic Meningitis	(GBS)**: This autoimmune
	vary, but initial treatments	clinical response.	2. **Swallowing and	(Leptomeningeal	disorder can lead to rapidly
	often involve nigh doses,	2 ** Diasma Evehanda (DLEV)	Nutritional Support**:	Carcinomatosis)**:	progressive limb weakness and
	such as	or Intravenous	- Buibar weakness can lead	- Spread of manghancy to the	even respiratory paralysis.
	g/day intravenously for 3-	Immunoglobulin (IVIG)**	(dysphagia) This can	overlap with meningitis and CSE	4 **Meningitis**: Inflammation
	5 days followed by oral	- In cases that are refractory	increase the risk of aspiration	analysis can show elevated white	of the meninges if associated
	prednisone, with a gradual	to corticosteroids or exhibit	and malnutrition.	blood cells and protein.	with significant symptoms or
	taper based on clinical	severe symptoms, PLEX or	- Speech therapy and a		complications, can be an
	response.	IVIG can be considered.	dietary consultation can help	3.	indication for discontinuation.
		These modalities help	with swallowing techniques	**Autoimmune/Inflammatory**:	
	Plasma Exchange	modulate the immune	and dietary modifications.	- **Sarcoidosis: Can involve	5. **Severe Neuropathies**: This
	(PLEX) or Intravenous	response and have been	- In severe cases, a	the central nervous system and	includes conditions such as severe
	Immunoglobulin (IVIG)**:	beneficial in other	**feeding tube** may be	mimic meningitis.	peripheral neuropathy, cranial
	- In severe cases,	autoimmune neurological	needed temporarily.	- **Behçet's Disease**: Can	neuropathy, or autonomic
	especially if there's	conditions.		nave neurologic manifestations.	neuropatny leading to significant
	if symptoms don't	4 **Othor	5. Thorapy**:	- Systemic Lupus	associated complications
	respond promotivito		- Physical therapy can belo	Neuronsychiatric lunus can	associated complications.
	corticosteroids PLFX or	Agents**:	maintain muscle strength	present with a variety of	6. **Neurologic Conditions with
	IVIG can be used.	- If there's an inadequate	and mobility.	neurological symptoms.	Cardiac Involvement**:
	- PLEX involves removing	response to the above	- Occupational therapy can	- **Vogt-Koyanagi-Harada	Conditions such as myasthenia
	and replacing the patient's	treatments, or for patients	provide strategies and	Disease**: A multisystem	gravis or other autoimmune
	plasma to remove	who cannot tolerate	assistive devices to help with	inflammatory disorder that can	disorders that also manifest with
	circulating antibodies that	corticosteroids, other	daily activities.	involve the meninges.	cardiac involvement, like
	contribute to MG.	immunosuppressive agents			myocarditis, would typically
	- IVIG provides a	may be considered.	4. **Medications**:	4. **Drug-induced Meningitis**:	require discontinuation due to the
	transient modulation of	- Agents such as	- **Pyridostigmine** can	- Certain drugs, apart from ICIs,	high risk of mortality.
	the immune system and	**rituximab** (a monocional	be used to improve	can induce aseptic meningitis.	7 **Doourront Colours Chat
	MG ovacorbations	antibody against CD20 on B	and alloviate sumptoms	storoidal anti inflammatory	7. ** Recurrent Seizures or Status
	wid exacerbations.	**cvclophosphamide** (ap	and alleviate symptoms.	drugs (NSAIDs) intravenous	develops recurrent upprovoked
	4. **Other	alkylating agent) have been	**For Guillain-Barre	immunoglobulin (IVIG) and	seizures or goes into status
	Immunosuppressive	used in refractory cases of	Syndrome (GBS):**	some antibiotics.	epilepticus (prolonged seizures)

Agents**:	autoimmune encephalitis,			related to the ICI, this might be an
- In cases refractory to	though data specific to ICI-	 **Respiratory Support**: 	5. **Vascular**:	indication for permanent
corticosteroids or for	associated encephalitis are	- Respiratory failure is a	- **Cerebral Venous Sinus	discontinuation.
steroid-sparing purposes,	limited.	potential complication due to	Thrombosis (CVST)**: Can	0 **0
modications can be	E **Supportive Caro**	muscles. Patients might need	intracranial prossure and mimic	8. ** Presumed Immune-Mediated
considered. Commonly	- Symptomatic treatments	**mechanical ventilation**	some meningitis symptoms	Standard Interventions**: If a
used agents include	for seizures, agitation, or	- **Pulmonary function	- **Subarachnoid	patient develops a neurologic
azathioprine,	other neurological symptoms	tests** are used to monitor	Hemorrhage**: Acute bleeding	condition believed to be immune-
mycophenolate mofetil,	may be required.	respiratory muscle function.	into the subarachnoid space can	mediated and it doesn't improve
and cyclosporine.	- For patients with altered		present with a sudden, severe	or stabilize with corticosteroids or
- It's essential to monitor	consciousness, maintaining	2. **Mobility and Physical	headache and neck stiffness.	other immunosuppressive
for potential side effects	the airway and avoiding	Therapy**:		therapies, discontinuation of the
and drug interactions with	complications like aspiration	- Given the muscle	6. **Other**:	ICI might be warranted.
these agents.	are crucial. Some patients	weakness and paralysis	- **Migraine**: Some	
5 **D	might require admission to an	associated with GBS, physical	migraines can present with neck	9. **Conditions with Severe
5. **Pyridostigmine**:	monitoring or support	therapy is essential to	for moningitie	Functional impairment**: Any
- All acetylcholinesterase	monitoring of support.	joint contractures	- **Post-infectious/Post-	in severe disability or functional
neuromuscular	6. **Diagnostic Workup**:	- As patients recover.	vaccination**: A reaction	impairment, impacting the
transmission and alleviate	- While this is more of a	rehabilitation can help regain	following an infection or	patient's quality of life or ability to
symptoms.	diagnostic than a treatment	strength and function.	vaccination, causing	perform activities of daily living,
- It's mainly used for	measure, it's essential to rule		inflammation of the meninges.	could be considered an indication
symptomatic relief and	out other potential causes of	3. **Pain Management**:		for discontinuation.
does not address the	encephalitis. This might	- Many GBS patients	When evaluating a patient with	
underlying autoimmune	include lumbar puncture for	experience significant	suspected ICI-associated	The decision to permanently
process.	cerebrospinal fluid analysis,	neuropathic pain. Pain	meningitis, it's essential to	discontinue an ICI due to
6 **Supportivo	IVIKI OF THE BRAIN, and tests for	management with	optain a detailed history,	neurologic toxicities should be
Measures**	- Screening for other		evamination and use	collaboratively. It involves
- For patients with	concurrent immune-related	gabapentin or pregabalin	appropriate diagnostic tests	weighing the notential risks and
bulbar symptoms	adverse events, especially	can be helpful.	including lumbar puncture with	benefits of continued therapy.
(affecting speech or	those that can be associated	- Occasionally, more potent	cerebrospinal fluid (CSF) analysis,	considering the severity of the
swallowing), speech	with neurological symptoms	analgesics or specific	to distinguish between these	neurologic event, the overall
therapy and dietary	(like myasthenia gravis or	interventions might be	possibilities. The correct	prognosis, available alternative
modifications can be	myocarditis), is crucial.	required.	identification of the underlying	treatments, and the patient's
beneficial.			cause is crucial to guide	preferences. Collaboration
- Mechanical ventilation	7. **Consultation**:	4. **Nutritional Support**:	appropriate treatment.	between oncologists,
might be required for	- Given the complexity of	- Swallowing difficulties or		neurologists, and other relevant
crisis with respiratory	the potential severity of	might interfere with eating		optimal care
failure	encential sevency of	Nutritional support		optimarcare.
landrei	with a neurologist is crucial.	potentially including a		
7. **Monitor for	Involvement of other	feeding tube, might be		
Associated	specialists, such as a	required.		
Complications**:	rheumatologist or infectious			
Complications**: - Patients with ICI-	rheumatologist or infectious disease specialist, might also	5. **Bladder and Bowel		
Complications**: - Patients with ICI- associated MG can have	rheumatologist or infectious disease specialist, might also be beneficial, depending on	5. **Bladder and Bowel Care**:		
Complications**: - Patients with ICI- associated MG can have concurrent myocarditis or other immung calculated	rheumatologist or infectious disease specialist, might also be beneficial, depending on the clinical scenario.	5. **Bladder and Bowel Care**: - Some GBS patients may		
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comprehensive	compression stockings can	
management.	be used based on the	
	individual patient's risk.	
It's worth noting that ICI-		
associated MG can be	**For Both Conditions:**	
more aggressive than		
idiopathic MG, and the	- **Monitor for Medication	
risk of complications like	Side Effects**: Both	
myasthenic crisis is higher.	conditions often require	
As such aggressive	treatments with potential	
treatment and close	side effects like	
monitoring are	corticosteroids Regular	
naramount	monitoring for	
paramount.	hyperglycomia	
	hypergrycering,	
	hypercension, intections, and	
	Street Education** It's	
	- Patient Education - It's	
	vital to educate patients and	
	caregivers about the	
	conditions, potential	
	complications, and warning	
	signs to look for, such as	
	worsening weakness or	
	breathing difficulties.	
	Given the complexity and	
	potential severity of these	
	conditions, multidisciplinary	
	care involving neurologists,	
	physical therapists,	
	respiratory therapists, and	
	other specialists is often	
	required.	

	Cardiac Toxicity	Cardiac Toxicity	Cardiac Toxicity	Cardiac Toxicity	Cardiac Toxicity
Question	What initial screening tests	What are the life threatening	What are the primary	What supportive	What are other potential
	should be ordered if	consequences of immune	treatments for immune	management strategies	cardiovascular toxicities from
	immune checkpoint	checkpoint inhibitor	checkpoint inhibitor	should be undertaken when	immune checkpoint inhibitors
	inhibitor associated	associated myocarditis?	associated myocarditis?	immune checkpoint inhibitor	other than myocarditis?
	myocarditis is suspected?			associated myocarditis is suspected?	
Answer Engine 1	If immune checkpoint	Immune checkpoint inhibitor	Immune checkpoint inhibitor	When immune checkpoint	Immune checkpoint inhibitors (ICIs)
(ChatGPT)	inhibitor (ICI)-associated	(ICI)-associated myocarditis is	(ICI)-associated myocarditis is	inhibitor (ICI)-associated	have revolutionized the treatment
	myocarditis is suspected,	a particularly concerning	a severe and potentially life-	myocarditis is suspected, it's	of several cancers, but they can
	prompt evaluation is	adverse event due to its	threatening condition that	essential to act quickly given	also induce a range of immune-
	crucial given the potential	potential for rapid	requires immediate and	the potential for rapid	related adverse events, including
	high mortality associated	threatening consequences	are the primary treatments	threatening complications	myocarditis is one of the most
	with this condition. Here	The mortality rate can be high	for ICI-associated myocarditis:	Alongside specific	recognized and serious
	are the initial screening	if not recognized and treated		treatments, several	cardiovascular complications, ICIs
	tests that should be	promptly. Here are the life-	1. **Discontinuation of ICI**:	supportive management	can lead to other cardiovascular
	ordered:	threatening consequences of	- The first step is to	strategies should be	toxicities as well:
	1 **Cardiac	ICI-associated myocarditis:	immediately discontinue the	undertaken:	1 **Pericarditis**
	Biomarkers**:	1. **Heart Failure**:	initiale electronic initiation.	1. **Hospitalization**:	- Inflammation of the
	- **Troponin T or I**:	- Acute myocardial	2. **High-Dose	- Patients should be	pericardium, which can present
	Elevated levels indicate	inflammation can lead to both	Corticosteroids**:	admitted to the hospital for	with chest pain, pericardial
	myocardial injury and are	systolic and diastolic	- High-dose corticosteroids	close monitoring, preferably	effusion, and, in severe cases,
	orten significantly raised in myocarditis	congestive heart failure. This	are the mainstay of treatment	in a unit with telemetry canabilities due to the risk of	cardiac tamponade.
	- **Brain Natriuretic	can manifest as shortness of	response.	arrhythmias.	2. **Vasculitis**:
	Peptide (BNP) or N-	breath, edema, fatigue, and	- **Methylprednisolone**	,	- Inflammation of the blood
	terminal pro B-type	fluid overload.	is commonly used at doses of	2. **Hemodynamic	vessels. This can affect any size
	Natriuretic Peptide (NT-		1 to 2 g/day intravenously,	Monitoring**:	vessel and can lead to
	proBNP)**: These can be	2. **Arrhythmias**:	depending on the severity of	- Monitor vital signs closely,	complications based on the vessels
	stress and are markers for	various arrhythmias both	followed by a tapering dose	pressure and oxygen	vasculitis can cause symptoms like
	heart failure.	benign and life-threatening.	of oral prednisone over	saturation.	claudication, while small vessel
		- **Ventricular	several weeks.	- In some cases, invasive	vasculitis might manifest with skin
	2. **Electrocardiogram	arrhythmias**, such as	- Close monitoring is	monitoring, like a Swan-Ganz	rashes or renal involvement.
	(ECG)**:	ventricular tachycardia or	required, as corticosteroids	catheter, might be necessary	2 ***
	- Io evaluate for	fibrillation, are particularly	can exacerbate heart failure	to guide therapy, especially in	3. **Arrhythmias**:
	changes, or other electrical	sudden cardiac death.	in some cases.	cases of cardiogenic shock.	arrhythmias, both benign and life-
	abnormalities that might	- Atrioventricular (AV) block	3. **Additional	3. **Electrocardiogram	threatening. The mechanisms can
	be suggestive of	or other conduction	Immunosuppressive	(ECG)**:	be multifactorial, ranging from
	myocarditis or ischemia.	abnormalities can occur,	Agents**:	- Regular ECG monitoring	direct myocardial involvement to
	2 **Echocardiogram**	tomporary or pormanont	- For patients who don't	can help detect arrnythmias,	electrolyte imbalances from
	- To assess left and right	pacemaker placement.	have contraindications to	ischemic changes.	associated conditions.
	ventricular function, wall		their use, additional		4. **Heart Failure**:
	motion abnormalities, and	**Cardiogenic Shock**:	immunosuppressive agents	4. **Serial Biomarker	- Can occur as a direct result of
	other structural heart	- Severe myocarditis can	might be required.	Testing**:	myocarditis or due to other
	changes.	lead to a significant drop in	- **Infliximab**, a TNF-	- Repeated measurements	mechanisms like stress
	reduced ejection fraction	cardiogenic shock. This is a	used, especially if there's	troponin and BNP or NT-	сагаютнуорасту.
	diastolic dysfunction, or	critical condition where the	concurrent colitis. However,	proBNP can help assess the	5. **Ischemic Heart Disease**:
	pericardial effusions, all of	heart can't pump enough	there's a concern about	progression of myocardial	- There are reports of ICIs leading
	which can be seen in	blood to meet the body's	potential worsening of heart	injury and the response to	to acute coronary syndromes,
	myocarditis.	rieeds, leading to organ	- Other agents like	treatment.	though the exact mochanism is not
	4. **Cardiac Magnetic	iandle.	**mycophenolate mofetil**	5. **Echocardiographic	well understood.
	Resonance Imaging	4. **Cardiac Tamponade**:	**azathioprine**, or	Assessment**:	
	(CMR)**:	- Inflammation of the heart	**cyclosporine** can be	- Regular echocardiograms	6. **Hypertension**:
	- If the above tests are	can extend to the	considered, though data	can monitor cardiac function,	- Some patients on ICIs can
	suggestive of myocarditis,	pericardium, leading to	specific to ICI-associated	assess for wall motion	develop new-onset hypertension
	valuable	pericarditis. Fiuld Can accumulate in the pericardial	- **Intravenous	notential complications like	or worsening or pre-existing hypertension. This can be related
	- It can detect myocardial	space, leading to cardiac	immunoglobulin (IVIG)** has	pericardial effusion.	to the ICI itself or secondary to
	inflammation, edema,	tamponade, a condition	also been used in some cases.		other complications like kidney
	necrosis, or fibrosis,	where the heart is		6. **Management of	injury.
	making it a crucial tool for	compressed, impairing its	4. **Supportive Measures**:	Arrhythmias**:	an a a a a a a a a a a a a a a a a a a
	the diagnosis of	ability to pump blood	- **Heart Failure	- Initiate appropriate	7. ** Thromboembolic Events**:
	- Late gadolinium	enectively.	the use of diuretics ACF	arrhythmias.	 mere's an increased risk of both venous and arterial
	enhancement (LGE) can be	5. **Sudden Cardiac Death**:	inhibitors or ARBs, beta-	- Temporary or permanent	thromboembolic events in patients
	particularly indicative of	- Patients with myocarditis	blockers, and other standard	pacemaker insertion might	on ICIs, including deep vein
	myocardial injury or	are at risk for sudden cardiac	heart failure treatments.	be necessary for high-grade	thrombosis, pulmonary embolism,
	inflammation.	death, especially if they	- **Arrhythmia	heart block.	and strokes.

	develop dangerous	Management**:		
**Laboratory	arrhythmias or severe heart	Antiarrhythmic medications	**Fluid and Volume	**Takotsubo Cardiomyopathy
Workup**:	failure.	or procedures might be	Management**:	(Stress Cardiomyopathy)**:
 **Complete Blood 		required, depending on the	 Carefully manage fluid 	 A transient heart condition that
Count (CBC)**: To evaluate	**Myocardial Fibrosis**:	type of arrhythmia. Patients	status, as patients may be at	can mimic a heart attack, with
for other causes of illness,	- While not acutely life-	with high-grade heart block	risk for both fluid overload	symptoms including chest pain and
like infection.	threatening, persistent	may require a temporary or	(due to heart failure) and	shortness of breath, but without
 **Basic Metabolic Panel 	inflammation can lead to	permanent pacemaker.	hypoperfusion (due to	the coronary artery blockages seen
(BMP)**: To assess kidney	fibrosis or scarring of the	 **Cardiogenic Shock**: In 	decreased cardiac output).	in heart attacks.
function and electrolytes.	cardiac muscle. This can result	severe cases, mechanical	- Diuretics can be used to	
 Inflammatory 	in long-term cardiac	circulatory support, such as	manage fluid overload.	9. **Conduction Abnormalities:
Markers**: Such as	dysfunction and increase the	an intra-aortic balloon pump		- ICIs can cause abnormalities in
erythrocyte sedimentation	risk of heart failure and	(IABP) or extracorporeal	8. **Oxygen and Respiratory	the electrical conduction system of
rate (ESR) and C-reactive	arrhythmias in the future.	membrane oxygenation	Support**:	the heart, leading to conditions like
protein (CRP), which can		(ECMO), might be needed.	- Provide supplemental	heart block.
be elevated in	7. **Co-occurrence with		oxygen as needed. In cases of	
inflammatory conditions.	Other Immune-related	**Monitoring**:	severe heart failure or	10. **Endocarditis**:
 Viral Serologies: To 	Adverse Events**:	- Hospitalization with	cardiogenic shock, more	- While rare, there have been
rule out viral etiologies of	- ICI-associated myocarditis	telemetry monitoring is	advanced respiratory	reports of ICIs being associated
myocarditis such as	can occur alongside other	typically required due to the	support including intubation	with endocarditis an inflammation
coxsackievirus adenovirus	immune-related	risk of arrhythmias	and mechanical ventilation	of the inner lining of the heart
and others	complications such as	- Serial measurements of	might be necessary	chambers and heart values
anu outers.	muositis or procumonitis. The	- senai measurements of	might be necessary.	champers and neart valves.
6 **Endom	apphingtion of a second second	troponin) and	0 **Cardiagaria Charl	It's accordial for -linisians to
b. TEIdomyocardial	compination can compound	uoponin) and	9. **Cardiogenic Shock	it s essential for clinicians to
Biopsy**:	the severity of the clinical	ecnocardiographic	ivianagement**:	maintain a nign index of suspicion
- While it's not typically	picture and increase the risk	assessments are crucial to	- Mechanical circulatory	tor cardiovascular toxicities in
part of the initial	of life-threatening outcomes.	monitor disease progression	support devices, such as	patients treated with ICIs. Regular
screening, it's the gold		and treatment response.	intra-aortic balloon pumps	monitoring, including blood
standard for the diagnosis	Given these serious		(IABP) or extracorporeal	pressure checks, ECGs, and blood
of myocarditis. It involves	consequences, any suspicion	**Endomyocardial	membrane oxygenation	tests, can help detect these
taking small tissue samples	of ICI-associated myocarditis	Biopsy**:	(ECMO), might be required	complications early. Early detection
of the heart muscle for	should lead to prompt	 While it's primarily a 	for patients in cardiogenic	and intervention can optimize
histological analysis.	hospitalization,	diagnostic tool,	shock.	outcomes and reduce morbidity
 It might be considered 	comprehensive evaluation,	endomyocardial biopsy can		and mortality associated with
if the diagnosis is	and aggressive management.	provide definitive evidence of	10. **Avoidance of Potential	these conditions. Collaboration
uncertain and can provide	Early detection and	myocarditis and might guide	Triggers**:	between oncologists and
definitive evidence of	intervention are crucial for	therapy by identifying specific	- Discontinue or avoid	cardiologists can be beneficial in
myocarditis including	improving outcomes and	histological and	medications that could	managing these natients
specific histological and	reducing mortality	immunohistochemical	exacerbate myocarditis heart	managing these patients.
immunohistochomical	Collaboration with a	nattorns	failura ar induca	
nattorns	control of a control for	patterns.	arrhythmias	
patterns.		7 ** Ausidence of Determini	arriytiinids.	
	optimal care.	7. **Avoidance of Potential		
7. **Other Imaging**:		Iriggers**:	11. **Consultations**:	
- **Chest X-ray**: To rule		- Any medications that	 Engage a multidisciplinary 	
out other causes of		might exacerbate heart	team involving cardiologists,	
symptoms, such as		failure or arrhythmias should	oncologists, and possibly	
pneumonia or heart failure		be avoided or used with	heart failure or cardiac	
(manifested by		caution.	intensive care specialists to	
cardiomegaly or	1		guide management.	
pulmonary edema).	1	Given the seriousness of ICI-		
	1	associated myocarditis. a	12. **Patient and Family	
Patients suspected of	1	multidisciplinary approach	Education**:	
having ICI-associated	1	involving oncologists.	- Keep the patient and their	
myocarditis should be	1	cardiologists, and possibly	family informed about the	
admitted to the hospital	1	other specialists is essential	condition, the potential risks	
for close monitoring	1	for optimal patient	and the interventions being	
osposially given the risk of	1	management Farly	undortakon	
especially given the risk of	1	management. Early	undertaken.	
armythmias and heart	1	recognition and aggressive	12 **	
railure. Collaboration with	1	treatment can improve	13. Erriotional and	
a cardiologist is essential	1	outcomes and reduce	Psychological Support**:	
for guiding further	1	mortality.	- Offer support to patients	
diagnostic evaluation,	1		and families, as the diagnosis	
monitoring, and	1		and potential complications	
management.	1		can be emotionally	
	1		distressing.	
	1			
	1		14. **Planning for Future	
	1		Therapies**:	
	1		- If myocarditis is confirmed	
	1		and linked to the ICL future	
	1		use of that ICI or other ICIs	
		1		1
			should be carefully	
			should be carefully	
			should be carefully reconsidered, keeping in mind the notential ricks	

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		Early recognition and	
		aggressive supportive	
		management of suspected	
		ICI-associated myocarditis are	
		crucial for optimizing	
		outcomes and reducing the	
		risk of life-threatening	
		complications.	

			Engine 2		
	ICI - general	ICI - general	ICI - general	ICI - general	ICI - general
Question	Which patient populations	What are the main	What are the major	What surveillance labs	What are the risks of using
	should not receive	treatments for grade 3 or	complications of high dose	should be obtained in all	combination immune checkpoint
	immune checkpoint	higher immune checkpoint	steroids?	patients treated with	inhibition compared with anti-PD-1
	inhibitors?	include dose and duration of		inhibitors?	monotherapy?
		any medications		minorors	
Answer Engine 2	Immune checkpoint	The main treatments for	High-dose steroids are used	All patients treated with	Combination immune checkpoint
(Bard)	inhibitors (ICIs) are a type	grade 3 or higher immune	to treat a variety of	immune checkpoint	inhibition (ICI) therapy has been
	of cancer immunotherapy	checkpoint inhibitor (ICI)	conditions, including	inhibitors (ICIs) should have	shown to be more effective than
	that work by unleashing	toxicities are corticosteroids	autoimmune diseases, cancer,	the following surveillance	anti-PD-1 monotherapy in some
	the body's own immune	and other	and severe allergic reactions.	labs obtained:	types of cancer, but it also comes
	system to attack cancer	immunosuppressive drugs.	offective, high doce storeds	* **Complete blood count	with increased risks.
	revolutionized cancer	**Corticosteroids** are the	can also cause a number of	(CBC)**· This test can identify	The main risks of combination ICI
	treatment, but they are	first-line treatment for most	serious complications.	anemia, leukopenia, and	therapy are:
	not suitable for all	grade 3 or higher ICI toxicities.	· · · · · ·	thrombocytopenia, which	
	patients.	They are typically given at a	The major complications of	can all be side effects of ICIs.	* **Increased risk of immune-
		high dose, such as prednisone	high-dose steroids include:	* **Comprehensive	related adverse events (irAEs)**:
	Patient populations that	1-2 mg/kg/day or		metabolic panel (CMP):	irAEs are side effects that occur
	should not receive ICIs	methylprednisolone 1-2	* **Adrenal suppression:**	This test can identify liver	when the immune system
	include.	treatment depends on the	production of cortisol by the	electrolyte abnormalities	tissues irAFs can be mild or severe
	* **Pregnant or	type and severity of the	adrenal glands. This can lead	which can also be side effects	and they can affect any part of the
	breastfeeding women.**	toxicity, but it is typically 4-6	to a number of problems,	of ICIs.	body. The most common irAEs
	The safety and efficacy of	weeks.	including fatigue, weakness,	* **Thyroid function tests	from combination ICI therapy
	ICIs in pregnant women		low blood sugar, and difficulty	(TFTs)**: ICIs can cause	include colitis, hepatitis,
	have not been fully	**Other immunosuppressive	responding to stress.	thyroid dysfunction, so it is	pneumonitis, and skin toxicity.
	established. ICIs may cross	drugs** may be used if	* ** Osteoporosis:** Steroids	function in patients on ICIs	* **Increased risk of death**:
	notentially barm the	effective or if the toxicity is	them more likely to break	* **Urinalycis**: This test	associated with a slightly increased
	developing fetus. They	severe. Some examples of	* **Cushing's syndrome:**	can identify kidney toxicity	risk of death compared to anti-PD-
	may also be excreted in	other immunosuppressive	This is a condition caused by	and other problems, such as	1 monotherapy. This is likely due to
	breast milk and could	drugs that may be used for ICI	high levels of cortisol in the	proteinuria and hematuria.	the increased risk of irAEs.
	potentially harm the	toxicities include:	body. Symptoms of Cushing's		
	nursing infant.		syndrome include weight gain	The frequency of surveillance	Other risks of combination ICI
	* **Patients with active	* Infliximab (Remicade)	around the face and neck, a	labs will vary depending on	therapy include:
	autoimmune diseases.**	* Mycophenolate mofetil (CollCopt)	round face (moon face), a	the type of ICI and the	* **Eatiqua**
	autoimmune diseases	* Tacrolimus (Prograf)	(buffalo hump) thinning skin	factors For example natients	* **Nausea and vomiting**
	Patients with active	* Cyclosporine (Sandimmune)	and stretch marks.	on anti-PD-1 therapy may	* **Hair loss**
	autoimmune diseases are	* Anti-thymocyte globulin	* **Muscle weakness:**	need to have labs more	* **Decreased appetite**
	at increased risk for	(ATG)	Steroids can weaken the	frequently than patients on	* **Muscle and joint pain**
	serious immune-related		muscles, making it difficult to	anti-CTLA-4 therapy.	* **Skin rash**
	adverse events (irAEs)	The dose and duration of	perform everyday activities.		* **Itching**
	from ICIs.	treatment with other	* **Increased risk of	In addition to the routine	* **Constipation**
	uncontrolled infections.**	vary depending on the type of	the immune system, making	other labs may be ordered if	Diarritea
	ICIs can suppress the	drug and the severity of the	people more susceptible to	the patient develops	The risks of combination ICI
	immune system, making	toxicity.	infections.	symptoms of an immune-	therapy should be carefully
	patients more susceptible		* **Hyperglycemia:**	related adverse event (irAE).	weighed against the potential
	to infections. Patients with	**Additional treatments**	Steroids can increase blood	For example, if a patient	benefits before starting treatment.
	uncontrolled intections	may also be needed	sugar levels, which can lead	develops diarrhea, the doctor	It is important to talk to your
	until the infections are	toxicity For example nations	diabetes or worsen existing	out infection If a nationt	of combination ICI therapy to see if
	under control.	with ICI-related colitis may	* **Hypertension:** Steroids	develops skin rash, the	it is right for you.
	* **Patients with organ	need to be hospitalized for	can increase blood pressure.	doctor may order a skin	0 ,
	dysfunction.** ICIs can	intravenous fluids and	* **Mood changes:**	biopsy to rule out other	Here is a table that summarizes the
	cause damage to healthy	electrolytes. Patients with ICI-	Steroids can cause mood	causes of the rash.	risks of combination ICI therapy
	organs, including the liver,	related pneumonitis may	changes, such as anxiety,		compared with anti-PD-1
	kidneys, lungs, and heart.	need to be treated with	depression, and irritability.	It is important to note that	monotherapy:
	Patients with severe organ	antibiotics or oxygen therapy.	Glaucoma and	surveillance labs are not	Pick factor Combination ICI
	receive ICIs unless the	It is important to note that all	increase the risk of	all irAEs, and some irAEs may	therapy Anti-PD-1 monotherapy
	potential benefits	of these treatments can have	developing glaucoma and	develop even if the	
	outweigh the risks.	side effects, so it is important	cataracts.	surveillance labs are normal.	Risk of irAEs Higher Lower
		to weigh the risks and		However, surveillance labs	Risk of death Slightly higher
	Other patient populations	benefits of treatment	The risk of complications from	can help to identify irAEs	Lower
	that may not be suitable	carefully.	high-dose steroids depends	early so that they can be	Other risks Fatigue, nausea and
	tor ICIS Include:	Horo is a table that	on the dose of steroids, the	tréated promptly.	vomiting, hair loss, decreased
	* Patients with a history of	nere is a table that	individual's underlying health	If you have any questions	appetite, muscle and joint pain, skin rash, itching, constinution
	severe allergic reactions to	treatments for grade 3 or	conditions.	about surveillance labs for	diarrhea Same as combination ICI
	ICIs or other medications.	higher ICI toxicities. including			therapy
		o let tet tetter deby meraaning			· · · · · · · · · · · · · · · · · · ·

* Patients who are taking	dose and duration:	It is important to talk to your	ICIs, be sure to talk to your	
other medications that can		doctor about the risks and	doctor.	It is important to note that these
suppress the immune	Medication Dose	benefits of high-dose steroids		are just general risks. The specific
system, such as	Duration	before starting treatment.		risks of combination ICI therapy
corticosteroids or other	Prednisone 1-2 mg/kg/day	Your doctor will monitor you		will vary depending on the type of
immunosuppressants.	4-6 weeks	closely for complications and		cancer being treated, the specific
* Patients with poor	Methylprednisolone 1-2	will adjust the dose of		ICI drugs being used, and the
performance status (i.e.,	mg/kg/day 4-6 weeks	steroids as needed.		patient's individual health
patients who are very	Infliximab 5 mg/kg Every			conditions.
weak or have a lot of other	6-8 weeks l	If you are experiencing any of		
medical problems).	Mycophenolate mofetil 1-	the complications listed		
,	3 grams/day 4-6 weeks or	above, be sure to talk to your		
It is important to note that	longer l	doctor right away.		
the decision of whether or	Tacrolimus 0.03-0.05	5 ,		
not to give ICIs to a patient	mg/kg/day 4-6 weeks or			
should be made on a case-	longer l			
by-case basis, considering	Cvclosporine 3-5			
the patient's individual	mg/kg/day 4-6 weeks or			
risks and benefits.	longer			
Oncologists will carefully	Anti-thymocyte globulin 1-			
weigh the potential	2 mg/kg/day 3-5 days			
benefits of ICIs against the	0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,			
potential risks before	**Other treatments** may			
making a	also be needed depending on			
recommendation.	the type of ICI toxicity. For			
	example, patients with ICI-			
If you are considering ICIs	related colitis may need to be			
for cancer treatment, be	hospitalized for intravenous			
sure to discuss your risks	fluids and electrolytes.			
and benefits with your	Patients with ICI-related			
oncologist.	pneumonitis may need to be			
	treated with antibiotics or			
	oxygen therapy.			
	, <u>,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
	Please note that this is just a			
	general overview of the main			
	treatments for grade 3 or			
	higher ICI toxicities. For more			
	specific information, please			
	talk to your oncologist.			

	Colitic	Colitic	Colitic	Colitic	Colitis
Question	What is the primary	What are other conditions in	Are there any situations	What are the diagnostic	What are the primary treatments
question	diagnostic workup for	the differential diagnosis	where immune checknoint	criteria for grade 3 colitis or	for immune checkpoint inhibitor
	suspected immune	when considering immune	inhibitors can be continued	diarrhea from immune	associated colitis that does not
	checkpoint inhibitor	checkpoint inhibitor	even if colitis is suspected?	checkpoint inhibitors?	respond to high-dose steroids?
	colitis?	associated colitis?			
Answer Engine 2	The primary diagnostic	The differential diagnosis for	Yes, there are some situations	The diagnostic criteria for	The primary treatments for
(Bard)	workup for suspected	immune checkpoint inhibitor	where immune checkpoint	grade 3 colitis or diarrhea	immune checkpoint inhibitor-
	immune checkpoint	(ICI)-associated colitis	inhibitors (ICIs) can be	from immune checkpoint	associated colitis (ICI-colitis) that
	inhibitor (ICI) colitis	includes a wide range of	continued even if colitis is	inhibitors (ICIs) are as	does not respond to high-dose
	includes:	conditions that can cause	suspected. These situations	follows:	steroids include:
		inflammation of the colon.	include:	****	
	* **History and physical	These conditions include:	* *** *! !!	**Colitis:**	* **Infliximab (Remicade)**:
	examination: ** The doctor	* **Infontious coliticu** This is	colitis is mild with symptoms	* Increase in steal fraguency	highly the effects of tumor percess
	symptoms medical history	the most common cause of	such as occasional diarrhea	of > 7 stools per day above	factor-alpha (TNE-alpha) a
	and medications. They will	colitis and it can be caused by	and abdominal cramps the	haseline	cytokine that plays a role in
	also perform a physical	a variety of bacteria, viruses.	doctor may recommend	* Presence of abdominal pain	inflammation. Infliximab is often
	examination to look for	and parasites.	continuing ICIs with close	* Presence of rectal bleeding	used to treat ICI-colitis that does
	signs of colitis, such as	* **Inflammatory bowel	monitoring.	* Presence of peritoneal	not respond to high-dose steroids.
	abdominal tenderness,	disease (IBD)**: This is a	* **Colitis that is responding	signs with ileus and fever	* **Vedolizumab (Entyvio)**:
	distention, and fever.	chronic autoimmune disease	to treatment:** If the colitis	consistent with bowel	Vedolizumab is another biologic
	* **Laboratory tests:**	that can cause inflammation	is responding to treatment	perforation	drug that is used to treat ICI-colitis.
	The doctor may order the	of the digestive tract,	with corticosteroids or other		It works by blocking the migration
	tollowing laboratory tests:	including the colon.	immunosuppressive drugs,	**Diarrhea:**	of alpha-4 beta-7 integrin-
	* Complete blood count	* **Celiac disease:** This is	the doctor may recommend	** ***	expressing T cells to the gut, which
	(CBC) to check for anemia,	an autoimmune disorder that	continuing ICIs.	 Increase in stool frequency 	reduces inflammation.
	thrombooutopopio	is triggered by gluten, a	good prognosis:** Patients	of 27 stools per day above	Tofacitinib is an oral IAK inhibitor
	* Comprehensive	barley and rye	with a good prognosis for	* Presence of abdominal	that is used to treat a variety of
	metabolic panel (CMP) to	* **Microscopic colitis·** This	their cancer such as those	cramps	inflammatory conditions including
	check for liver toxicity.	is a condition that causes	with early-stage disease, may	* Presence of dehydration	ICI-colitis. It works by blocking the
	kidney toxicity, and	inflammation of the colon,	be more likely to benefit from	* Presence of electrolyte	activity of Janus kinases, which are
	electrolyte abnormalities	but it is not visible on	continuing ICIs, even if they	imbalances	proteins that play a role in
	* Inflammatory markers,	colonoscopy.	have colitis.		inflammation.
	such as C-reactive protein	* **Ischemic colitis:** This is	* **Colitis in patients with	If a patient meets any of the	* **Fecal microbiota
	(CRP) and erythrocyte	a condition that occurs when	few other treatment	above criteria, they are	transplantation (FMT)**: FMT is a
	sedimentation rate (ESR)	there is a decrease in blood	options:** Patients with few	considered to have grade 3	procedure in which stool from a
	* Stool culture and ova	flow to the colon.	other treatment options, such	colitis or diarrhea from ICIs.	healthy donor is transplanted into
	and parasite (O&P) exam	* **Radiation colitis:** This is	as those with advanced	Treatment for grade 3 colitis	the colon of a patient with ICI-
	to rule out infection	a condition that occurs as a	cancer or cancer that has not	or diarrhea from ICIs typically	colitis. FMT has been shown to be
	Findoscopy:**	side effect of radiation	responded to other	involves high-dose	effective in treating some cases of
	standard for diagnosing ICI	* **Drug-induced colitis:**	likely to benefit from	immunosuppressive drugs	other treatments
	colitis It involves inserting	This is a condition that is	continuing ICIs even if they	initialiosuppressive drugs.	other treatments.
	a thin flexible tube with a	caused by certain	have colitis	It is important to note that	The choice of treatment for ICI-
	camera on the end into the	medications, such as		the diagnostic criteria for	colitis that does not respond to
	rectum and colon. The	antibiotics and nonsteroidal	The decision of whether or	grade 3 colitis or diarrhea	high-dose steroids will depend on
	doctor can then look for	anti-inflammatory drugs	not to continue ICIs in a	from ICIs are based on	the patient's individual
	signs of inflammation,	(NSAIDs).	patient with suspected colitis	symptoms and clinical signs.	circumstances and preferences.
	such as redness, swelling,		should be made on a case-by-	There is no specific	The doctor will discuss the risks
	and ulcers. Biopsies of the	Other conditions that may be	case basis, considering the	laboratory test that can be	and benefits of each treatment
	colon may be taken to	considered in the differential	patient's individual risks and	used to diagnose ICI colitis or	option with the patient before
	confirm the diagnosis.	alagnosis of ICI-associated	penents. The doctor will	alarmea.	making a decision.
	Other tests that may be		of continuing ICIs against the	If you have any questions or	Other treatments that may be
	ordered depending on the	* **Graft-versus-host disease	potential risks of exacerbating	concerns about the	considered for ICI-colitis that does
	patient's presentation	(GVHD)**: This is a condition	the colitis or developing other	diagnostic criteria for grade 3	not respond to high-dose steroids
	include:	that can develop after a stem	immune-related adverse	colitis or diarrhea from ICIs,	include:
		cell transplant, when the	events (irAEs).	please talk to your doctor.	
	* **Imaging tests:** Such	donor's immune cells attack			* **Cyclosporine**
	as CT or MRI scans, may be	the recipient's body.	If you have any questions or		* **Azathioprine**
	ordered to look for	* **Diverticulitis:** This is a	concerns about whether or		* **Methotrexate**
	complications of ICI colitis,	condition that occurs when	not to continue ICIs if you		* **Cytomegalovirus (CMV)
	such as perforation or	inflammation develops in	have suspected colitis, please		prophylaxis**
	abscess.	small pouches (diverticula)	taik to your doctor.		It is important to get that all of
	testing ** Such as Charl	that form in the lining of the	Hore are come fasters that		It is important to note that all of
	PCR or cultures may be	tulull.	the doctor may consider		effects. The doctor will monitor the
	ordered to rule out	colon or rectum can also	when making the decision of		natient closely for side effects and
	infectious causes of colitis	cause colitis.	whether or not to continue		adjust the treatment plan as
	in patients with		ICIs in a patient with		needed.
	immunosuppression.	It is important to note that	suspected colitis:		
	* **Autoimmune	some of these conditions can			If you have any questions or
	testing:** Such as	coexist with ICI-associated	* The severity of the colitis		concerns about the treatment

antinuclear antibody (ANA)	colitis. For example, a patient	* The patient's response to	options for ICI-colitis that does not
or anti-neutrophil	with ICI-associated colitis may	treatment for the colitis	respond to high-dose steroids,
cytoplasmic antibody	also have an infection.	* The patient's prognosis for	please talk to your doctor.
(ANCA) testing, may be		their cancer	
ordered to rule out other	The doctor will carefully	* The patient's other	
causes of colitis.	consider the patient's medical	treatment options	
	history, symptoms, and	* The patient's preferences	
It is important to note that	physical examination to		
the diagnostic workup for	determine the most likely	It is important to note that	
ICI colitis may vary	diagnosis. If necessary, they	there is no right or wrong	
depending on the patient's	may order additional tests,	answer to this question. The	
individual presentation	such as colonoscopy, biopsy,	best decision for each patient	
and risk factors.	and stool cultures, to confirm	will vary depending on their	
	the diagnosis and rule out	individual circumstances.	
If you have any questions	other causes of colitis.		
or concerns about the			
diagnostic workup for ICI	If you have any questions or		
colitis, please talk to your	concerns about the		
doctor.	differential diagnosis of ICI-		
	associated colitis, please talk		
	to your doctor.		

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Question	What is the primary	What are other conditions in	Are there any situations	What are the diagnostic	What are the primary treatments
	diagnostic workup for	the differential diagnosis	where immune checkpoint	criteria for grade 3 hepatitis	for immune checkpoint inhibitor-
	suspected immune	when considering immune	innibitors can be continued	from immune checkpoint	associated nepatitis that does not
	checkpoint inhibitor	checkpoint inhibitor	even if nepatitis is suspected?	Inhibitors?	respond to high-dose steroids?
Answer Engine 2	The primary diagnostic	The differential diagnosis for	Ves there are some situations	The diagnostic criteria for	The primary treatments for
(Bard)	workup for suspected	immune checknoint inhibitor	where immune checkpoint	grade 3 henatitis from	immune checknoint inhibitor-
(50.0)	immune checkpoint	(ICI)-associated hepatitis	inhibitors (ICIs) can be	immune checkpoint	associated hepatitis (ICI-hepatitis)
	inhibitor (ICI) hepatitis	includes a wide range of	continued even if hepatitis is	inhibitors (ICIs) are as	that does not respond to high-dose
	includes:	conditions that can cause	suspected. These situations	follows:	steroids include:
		inflammation of the liver.	include:		
	* **History and physical	These conditions include:		* **Total bilirubin ≥ 2.5 ×	* **Infliximab (Remicade)**:
	examination:** The doctor		* **Mild hepatitis:** If the	upper limit of normal	Infliximab is a biologic drug that
	will ask about the patient's	* **Drug-induced liver injury	hepatitis is mild, with	(ULN)**	blocks the effects of tumor necrosis
	symptoms, medical history,	(DILI)**: This is the most	symptoms such as elevated	* **Aspartate	factor-alpha (TNF-alpha), a
	and medications. They will	common cause of liver injury,	liver enzymes but no other	aminotransferase (ASI) or	cytokine that plays a role in
	also perform a physical	and it can be caused by a	dester may recommend	(ALT) > E x LU N**	inflammation. Infliximab is often
	signs of liver disease such	including ICIs	continuing ICIs with close	(ALI) 2 3 × OLIN	not respond to high-dose steroids
	as jaundice, hepatomegaly.	* **Viral hepatitis:** This is	monitoring.	If a patient meets both of the	* **Vedolizumab (Entyvio)**:
	and splenomegaly.	inflammation of the liver	* **Hepatitis that is	above criteria, they are	Vedolizumab is another biologic
	* **Laboratory tests:**	caused by a virus, such as	responding to treatment:** If	considered to have grade 3	drug that is used to treat ICI-
	The doctor may order the	hepatitis A, B, or C.	the hepatitis is responding to	hepatitis from ICIs.	hepatitis. It works by blocking the
	following laboratory tests:	* **Autoimmune hepatitis:**	treatment with		migration of alpha-4 beta-7
	* Liver function tests	This is a chronic inflammatory	corticosteroids or other	It is important to note that	integrin-expressing T cells to the
	(LFTs) to check for liver	liver disease that is caused by	immunosuppressive drugs,	the diagnostic criteria for	gut, which reduces inflammation.
	damage	the body's own immune	the doctor may recommend	grade 3 hepatitis from ICIs	* **Tofacitinib (Xeljanz)**:
	* Comprehensive	system attacking the liver	continuing ICIs.	are based on laboratory	Tofacitinib is an oral JAK inhibitor
	check for kidney toxicity	Cells.	a good prognosis:** Patients	clinical procentation that is	inflammatory conditions, including
	electrolyte abnormalities	is inflammation of the liver	with a good prognosis for	associated with grade 3	ICI-hepatitis It works by blocking
	and other metabolic	caused by excessive alcohol	their cancer such as those	henatitis from ICIs	the activity of Janus kinases, which
	problems	consumption.	with early-stage disease, may	nepatitis nom telsi	are proteins that play a role in
	* Viral serologies to rule	* **Nonalcoholic	be more likely to benefit from	Patients with grade 3	inflammation.
	out viral hepatitis	steatohepatitis (NASH)**:	continuing ICIs, even if they	hepatitis from ICIs typically	* **Baricitinib (Olumiant)**:
	* Autoimmune markers,	This is a type of fatty liver	have hepatitis.	require hospitalization for	Baricitinib is another oral JAK
	such as antinuclear	disease that is not caused by	* **Hepatitis in patients with	intravenous fluids,	inhibitor that is used to treat ICI-
	antibody (ANA) and anti-	alcohol consumption.	few other treatment	electrolytes, and monitoring.	hepatitis. It works by blocking the
	smooth muscle antibody	* **Wilson's disease:** This	options:** Patients with few	Treatment also typically	activity of Janus kinases, which are
	(ASMA), to rule out	is a rare genetic disorder that	other treatment options, such	includes corticosteroids or	proteins that play a role in
	* Liver imaging such as	the liver	as those with advanced	drugs	inflammation.
	ultrasound CT scan or	* **Alpha_1 antitrypsin	responded to other	urugs.	The choice of treatment for ICL
	MRI, to look for structural	deficiency:** This is a rare	treatments, may also be more	If you have any questions or	hepatitis that does not respond to
	abnormalities of the liver	genetic disorder that can	likely to benefit from	concerns about the	high-dose steroids will depend on
		cause liver damage and	continuing ICIs, even if they	diagnostic criteria for grade 3	the patient's individual
	Other tests that may be	emphysema.	have hepatitis.	hepatitis from ICIs, please	circumstances and preferences.
	ordered depending on the			talk to your doctor.	The doctor will discuss the risks
	patient's presentation	Other conditions that may be	The decision of whether or		and benefits of each treatment
	include:	considered in the differential	not to continue ICIs in a		option with the patient before
	* **Iron studies**• To rulo	uidgriusis of ICI-associated	patient with suspected benatitis should be made on a		making a decision.
	out iron-overload henatitis	nepatris menue.	case-by-case basis		Other treatments that may be
	* **Ceruloplasmin and	* **Biliary obstruction:** This	considering the patient's		considered for ICI-hepatitis that
	copper levels**: To rule	is a blockage of the bile ducts,	individual risks and benefits.		does not respond to high-dose
	out Wilson's disease	which prevents bile from	The doctor will weigh the		steroids include:
	* **Alpha-1 antitrypsin**:	flowing from the liver to the	potential benefits of		
	To rule out alpha-1	intestines.	continuing ICIs against the		* **Cyclosporine**
	antitrypsin deficiency	* **Heart failure:** This can	potential risks of exacerbating		* **Tacrolimus (Prograf)**
	If the material second second	cause congestion of the liver,	the hepatitis or developing		* **Azathioprine**
	If the patient has a high	which can lead to	other immune-related		* **Methotrexate**
	henatitis a liver biopsy	* **Shock:** This can cause	auverse events (IFAES).		(CellCent)**
	may be recommended to	decreased blood flow to the	If you have any questions or		* **Fecal microbiota
	confirm the diagnosis and	liver, which can lead to	concerns about whether or		transplantation (FMT)**
	assess the severity of the	inflammation and damage.	not to continue ICIs if you		· · · · ·
	liver damage.	* **Cancer:** Cancer of the	have suspected hepatitis,		It is important to note that all of
		liver or other organs can	please talk to your doctor.		these treatments can have side
	The doctor will carefully	spread to the liver and cause			effects. The doctor will monitor the
	consider the patient's	inflammation.	Here are some factors that		patient closely for side effects and
	medical history, symptoms,		the doctor may consider		adjust the treatment plan as
	physical examination, and	It is important to note that	when making the decision of		needed.
	laboratory findings to	some of these conditions can	whether or not to continue		If you have any guardiana an
	determine the most likely	COEXIST WITH ICI-ASSOCIATED	icis III a patient With		if you have any questions or

diagnosis. If necessary,	hepatitis. For example, a	suspected hepatitis:	concerns about the treatment
they may order additional	patient with ICI-associated		options for ICI-hepatitis that does
tests, such as liver biopsy,	hepatitis may also have DILI	* The severity of the hepatitis	not respond to high-dose steroids,
to confirm the diagnosis	from another medication.	* The patient's response to	please talk to your doctor.
and rule out other causes		treatment for the hepatitis	
of hepatitis.	The doctor will carefully	* The patient's prognosis for	**Additional notes:**
	consider the patient's medical	their cancer	
If you have any questions	history, symptoms, physical	* The patient's other	* **Fecal microbiota
or concerns about the	examination, and laboratory	treatment options	transplantation (FMT)** is a
diagnostic workup for	findings to determine the	* The patient's preferences	procedure in which stool from a
suspected ICI hepatitis,	most likely diagnosis. If		healthy donor is transplanted into
please talk to your doctor.	necessary, they may order	It is important to note that	the colon of a patient with ICI-
	additional tests, such as liver	there is no right or wrong	hepatitis. FMT has been shown to
	biopsy, to confirm the	answer to this question. The	be effective in treating some cases
	diagnosis and rule out other	best decision for each patient	of ICI-hepatitis that do not respond
	causes of hepatitis.	will vary depending on their	to other treatments.
		individual circumstances.	* **Liver biopsy** may be
	If you have any questions or		recommended to confirm the
	concerns about the		diagnosis of ICI-hepatitis and
	differential diagnosis of ICI-		assess the severity of the liver
	associated hepatitis, please		damage.
	talk to your doctor.		* **Close monitoring** is
			important for patients with ICI-
			hepatitis, even if they are
			responding to treatment. This is
1			because ICI-hepatitis can worsen
			suddenly, even in patients who are
1			doing well.
1			
1			I hope this information is helpful.
1			Please let me know if you have any
			other questions.

	Pneumonitis	Pneumonitis	Pneumonitis	Pneumonitis	Pneumonitis
Question	What is the primary	What are other conditions in	Are there any situations	What are the diagnostic	What are the primary treatments
	diagnostic workup for	the differential diagnosis	where immune checkpoint	criteria for grade 3	for immune checkpoint inhibitor-
	suspected immune	when considering immune	inhibitors can be continued	pneumonitis from immune	associated pneumonitis that does
	checkpoint inhibitor pneumonitis?	checkpoint inhibitor associated pneumonitis?	even if pneumonitis is suspected?	checkpoint inhibitors?	not respond to high-dose steroids?
Answer Engine 2	The primary diagnostic	The differential diagnosis for	Yes, there are some situations	The diagnostic criteria for	The primary treatments for
(Bard)	workup for suspected	immune checkpoint inhibitor	where immune checkpoint	grade 3 pneumonitis from	immune checkpoint inhibitor (ICI)-
	immune checkpoint	(ICI)-associated pneumonitis	inhibitors (ICIs) can be	immune checkpoint	associated pneumonitis that does
	inhibitor (ICI) pneumonitis	includes a wide range of	continued even if	inhibitors (ICIs) are as	not respond to high-dose steroids
	includes:	conditions that can cause	pneumonitis is suspected.	follows:	include:
		inflammation of the lungs.	These situations include:		
	* ** History and physical	These conditions include:	* **Mild prouponition** If	* **New or worsening	<pre>* **Infliximab (Remicade)**: Infliximab is a biologic drug that</pre>
	will ask about the nationt's	* **Infectious pneumonitis·**	the pneumonitis is mild with	* **Ovvgen saturation < 90%	blocks the effects of tumor pecrosis
	symptoms medical history	This is the most common	symptoms such as occasional	on room air**	factor-alpha (TNF-alpha) a
	and medications. They will	cause of pneumonitis, and it	cough and shortness of	* **Requirement for	cytokine that plays a role in
	also perform a physical	can be caused by a variety of	breath, and there are no signs	supplemental oxygen**	inflammation. Infliximab is often
	examination to look for	bacteria, viruses, and fungi.	of hypoxia or respiratory		used to treat ICI-associated
	signs of pneumonitis, such	* **Other immune-related	failure, the doctor may	If a patient meets all three of	pneumonitis that does not respond
	as tachypnea, hypoxia, and	adverse events (irAEs)**: ICIs	recommend continuing ICIs	the above criteria, they are	to high-dose steroids.
	crackles in the lungs.	can cause a variety of irAEs,	with close monitoring.	considered to have grade 3	* **Vedolizumab (Entyvio)**:
	The dester may add the	including other types of	* **Pneumonitis that is	pneumonitis from ICIs.	vedolizumab is another biologic
	following laboratory tosts:	prieumonitis, such as	the preumonitic is	Other criteria that may be	urug triat is used to treat ICI-
	* Complete blood count	hypersensitivity pneumonitic	responding to treatment with	used to diagnose grade 3	hy blocking the migration of alpha-
	(CBC) to check for anemia	* **Radiation pneumonitis:**	corticosteroids or other	nneumonitis from ICIs	4 beta-7 integrin-expressing T cells
	and leukocytosis	This is inflammation of the	immunosuppressive drugs,	include:	to the lungs, which reduces
	* Comprehensive	lungs that can occur as a side	the doctor may recommend		inflammation.
	metabolic panel (CMP) to	effect of radiation therapy.	continuing ICIs.	* **New or worsening	* **Tocilizumab (Actemra)**:
	check for kidney toxicity,	* **Heart failure:** This can	* **Pneumonitis in patients	infiltrates on chest X-ray or	Tocilizumab is a biologic drug that
	electrolyte abnormalities,	cause congestion of the lungs,	with a good prognosis:**	CT scan**	blocks the effects of interleukin-6
	and other metabolic	which can lead to	Patients with a good	* **New or worsening	(IL-6), a cytokine that plays a role in
	problems	inflammation.	prognosis for their cancer,	restrictive or obstructive	inflammation. Tocilizumab is often
	* Arterial blood gas	This is a blood clot that lodges	such as those with early-stage	defects on pulmonary	used to treat ICI-associated
	levels in the blood	in the lungs, which can cause	henefit from continuing ICIs	* **New or worsening	to other treatments
	* Coagulation studies to	inflammation and damage.	even if they have	hypoxemia on arterial blood	* **Baricitinib (Olumiant)**:
	check for bleeding	* **Acute respiratory distress	pneumonitis.	gas (ABG)**	Baricitinib is an oral JAK inhibitor
	problems	syndrome (ARDS)**:** This is	* **Pneumonitis in patients	0	that is used to treat a variety of
	* **Imaging tests:** The	a severe form of respiratory	with few other treatment	The doctor will use the	inflammatory conditions, including
	doctor may order a chest	failure that can be caused by	options:** Patients with few	patient's symptoms, physical	ICI-associated pneumonitis. It
	X-ray or chest CT scan to	a variety of factors, including	other treatment options, such	examination, laboratory	works by blocking the activity of
	look for signs of	infection, inflammation, and	as those with advanced	findings, and imaging results	Janus kinases, which are proteins
	pneumonia, such as	trauma.	cancer or cancer that has not	to determine the severity of	that play a role in inflammation.
	inflitrates or ground-glass	+ ++ Cancer:++ Cancer of the	responded to other	the pheumonitis and make a	* ** Fecal microbiota
	* **Pulmonary function	spread to the lungs and cause	likely to benefit from	nneumonitis	procedure in which stool from a
	tests (PETs):** PETs can be	inflammation.	continuing ICIs, even if they	pricumonition	healthy donor is transplanted into
	used to assess the severity		have pneumonitis.	Patients with grade 3	the colon of a patient with ICI-
	of lung damage.	Other conditions that may be		pneumonitis from ICIs	associated pneumonitis. FMT has
	* **Bronchoscopy with	considered in the differential	The decision of whether or	typically require	been shown to be effective in
	bronchoalveolar lavage	diagnosis of ICI-associated	not to continue ICIs in a	hospitalization for close	treating some cases of ICI-
	(BAL)**: Bronchoscopy is a	pneumonitis include:	patient with suspected	monitoring and treatment.	associated pneumonitis that do not
	procedure in which a thin,	* **Drug induced lung inium	on a case by case basis	high does corticastoroids and	respond to other treatments.
	on the end is inserted into	(DILI)**: This is inflammation	considering the nationt's	other immunosuppressive	The choice of treatment for ICI-
	the lungs to look for signs	of the lungs caused by a	individual risks and benefits	drugs.	associated pneumonitis that does
	of inflammation. BAL is a	medication, such as ICIs.	The doctor will weigh the		not respond to high-dose steroids
	procedure in which fluid is	* **Connective tissue	potential benefits of	If you have any questions or	will depend on the patient's
	washed into and out of the	disease:** Connective tissue	continuing ICIs against the	concerns about the	individual circumstances and
	lungs to collect samples of	diseases, such as rheumatoid	potential risks of exacerbating	diagnostic criteria for grade 3	preferences. The doctor will discuss
	cells and other material.	arthritis and systemic lupus	the pneumonitis or	pneumonitis from ICIs, please	the risks and benefits of each
	BAL fluid can be analyzed	erythematosus, can cause	developing other immune-	taik to your doctor.	treatment option with the patient
	infection and	* **Sarcoidosis:** This is a	(irAFc)		before making a decision.
	inflammation	chronic inflammatory disease	(11712).		Other treatments that may be
		that can affect the lungs.	If you have any questions or		considered for ICI-associated
	Other tests that may be	lymph nodes, and other	concerns about whether or		pneumonitis that does not respond
	ordered depending on the	organs.	not to continue ICIs if you		to high-dose steroids include:
	patient's presentation	* **Occupational lung	have suspected pneumonitis,		-
	include:	diseases:** Exposure to	please talk to your doctor.		* **Cyclosporine**
	1	certain substances at work,			* **Tacrolimus (Prograf)**
	* **Cultures of BAL fluid	such as asbestos and silica,	Here are some factors that		* **Azathioprine**
	and sputum**: To rule out	can cause lung diseases that	the doctor may consider	1	* **Methotrexate**

infection	can mimic ICI-associated	when making the decision of	* **Mycophenolate mofetil
* **Autoimmune	pneumonitis.	whether or not to continue	(CellCept)**
markers**: To rule or	ut	ICIs in a patient with	
autoimmune pneum	onitis It is important to note that	suspected pneumonitis:	It is important to note that all of
* **Transbronchial lu	ing some of these conditions can		these treatments can have side
biopsy (TBLB)**: To	coexist with ICI-associated	* The severity of the	effects. The doctor will monitor the
confirm the diagnosis	s of ICI pneumonitis. For example, a	pneumonitis	patient closely for side effects and
pneumonitis and ass	ess patient with ICI-associated	* The patient's response to	adjust the treatment plan as
the severity of the lu	ng pneumonitis may also have	treatment for the	needed.
damage	infectious pneumonitis.	pneumonitis	
		* The patient's prognosis for	If you have any questions or
The doctor will caref	ully The doctor will carefully	their cancer	concerns about the treatment
consider the patient'	s consider the patient's medical	* The patient's other	options for ICI-associated
medical history, symp	ptoms, history, symptoms, physical	treatment options	pneumonitis that does not respond
physical examination	, examination, laboratory	* The patient's preferences	to high-dose steroids, please talk to
laboratory findings, a	and findings, and imaging results		your doctor.
imaging results to	to determine the most likely	It is important to note that	
determine the most	likely diagnosis. If necessary, they	there is no right or wrong	
diagnosis. If necessar	ry, may order additional tests,	answer to this question. The	
they may order addit	tional such as bronchoscopy with	best decision for each patient	
tests, such as TBLB, t	o BAL or transbronchial lung	will vary depending on their	
confirm the diagnosis	s and biopsy, to confirm the	individual circumstances.	
rule out other causes	s of diagnosis and rule out other		
pneumonitis.	causes of pneumonitis.		
If you have any quest	tions If you have any questions or		
or concerns about th	e concerns about the		
diagnostic workup fo	r differential diagnosis of ICI-		
suspected ICI pneum	onitis, associated pneumonitis,		
please talk to your do	octor. please talk to your doctor.		

Duebbon What is the parameter for location of the instance of the parameter for parameter is p		Dermatitis	Dermatitis	Dermatitis	Dermatitis	Dermatitis
 Learner to fur sources Learner to fur so	Question	What is the primary	When should systemic	What are life-threatening	Are there situations where	What are treatments for patients
rath or the torus exclusted with immune delegation itability: star continuem star continuem instances instances Atoms Protects Control		treatment for localized	steroids be considered for	immune checkpoint inhibitor	immune checkpoint	who have pruritis without rash
associated derivative secolated derivative excelated derivative excelated derivative (Isod) constructions sanotated derivative declarative inside i		rash on the torso	immune checkpoint inhibitor	skin conditions?	inhibitors can be continued	from immune checkpoint
Access Figure 2 The primary transmission The strained interface controcorrouts We there are statutions The transmission of the primary transmission Access Figure 2 The primary transmission We there are statutions The transmission of the primary transmission The transmission of the primary transmission The transmission (Chica deep deep deep deep deep deep deep dee		associated with immune	associated dermatitis?		even if dermatitis is	inhibitors?
Answer Figles 2 (Brief) Brief (Brief) Brief (Brief) Brief) Brief (Brief) Brief (Brief) Brief) Brief (Brief) Brief) Brief (Brief) Brief) Brief (Brief) Brief) Brief (Brief) Brief) Brief (Brief) Brief) Brief (Brief) Brief) Brief (Brief) Brief) Brief) Brief (Brief) Brief) Brief) Brief) Brief (Brief) Brief)		checkpoint inhibitors?			suspected?	
 using socials of the totax socials of a consistent of the totax socials of a consistent of the totax socials of consort of totax social of consort of t	Answer Engine 2	The primary treatment for	Systemic corticosteroids	Life-threatening immune	Yes, there are situations	The treatment for pruritis without
 addicates with immune addicates with imm	(Bard)	localized rash on the torso	should be considered for	checkpoint inhibitor (ICI) skin	where immune checkpoint	rash from immune checkpoint
 The transfer of the topical function to the service of the topical function to the topica		associated with immune	immune checkpoint inhibitor-	conditions include:	inhibitors (ICIs) can be	inhibitors (ICIs) depends on the
controsteriolsstatusticsstatusticsand classinclusioncontrosteriols		is **topical	dermatitis) in the following	* **Stevens-Johnson	is suspected. These situations	sevenity of the fitching. For filld
 centrestruction, or example of the tradition of the large of any shift and autors the tradition of the large of any shift and autors the tradition of the large of any shift and autors that autors t		corticosteroids** Tonical	situations:	syndrome (SIS)**: SIS is a	include:	may be beinful:
 and an alter the server of a star bit buscer star bit buscers of the spear of the s		corticosteroids are creams	situations.	rare, serious skin condition	include.	nuy be neiprui.
applied to the skn for induct infamily and problems such a sky skn, it bit spectra of the topal controstroid to their prostroid will be to their prostroid will be to their induct infamily structured to be structured by the induct infamily structured induct infamily structured infamily structured induct infamily structured infamily structured 		or ointments that are	* **Grade 3 or 4 rash:**	that causes the top layer of	* **Mild dermatitis:** If the	* **Emollients:** Emollients are
 reduce information and busices retriking or useration input metals. Six is thought to be conclusing or useration input metals. Six is thought to be conclusing or useration input metals. Six is thought to be conclusing or useration. The superior for transmission of the total conclusions and of inclusions in the superior for transmissions. The superior for transmission of the total conclusions in the superior for transmissions. The superior for transmissions is the superior for transmissions in the superior for transmissions. The superior for transmissions is the superior for transmissions. The superior for transmissions is the superior for transmissions. The superior for transmissions is the superior for transmissions is the superior for transmissions. The superior for transmissions is the superior for transmissions is the superior for transmissions. The superior for transmissions is the superior for transmissions is the superior for transmissions is the superior for transmissions. The superior for transmissions is the superior for the superior for transmissions is the superior for transmissions is the superior for transmissions is the superior for the superior for transmissions is the superior for transmission for transmissions is the superior for transmissions is		applied to the skin to	Grade 3 rash is characterized	skin to blister, peel, and	dermatitis is mild, with	moisturizers that can help to
Rthing.as bilistering or uncertainty.as bilistering or uncerta		reduce inflammation and	by severe inflammation, such	erode. It can also affect the	symptoms such as dry skin,	soothe dry, itchy skin.
and/or significant impairment the survey for the topolar the survey for the rank is a set of the survey for the survey for the rank is the characterized by life the survey for the rank is the characterized by life the survey for the rank is the characterized by life the survey for the rank is the characterized by life the survey for the rank is the characterized by life the survey for the rank is the characterized by life the survey for the rank is the characterized by life the survey for the rank is the characterized by life the survey for the rank is the survey. The survey for the rank is the survey. The survey for the rank is the ran		itching.	as blistering or ulceration,	lining of the mouth, eyes, and	itching, and redness, and	* **Oatmeal baths:** Oatmeal
The strength of the topical conceptsory of daily setwines, carded set interactive approximation. if administron of the transmers. is an ordex e inflammation. is an ordex e inflammation. For mild rates, over-the status of the rate. is an ordex e inflammation. is an ordex e inflammation. is an ordex e inflammation. For mild rates, over-the status of the rate. is an ordex e inflammation. is an ordex e inflammation. is an ordex e inflammation. For mild rates, over-the status of the rates. is an ordex e inflammation. is an ordex e inflammation. is an ordex e inflammation. Controls controls or any be controls in status of the rates. is an ordex e inflammation. is an ordex e inflammation. is an ordex e inflammation. Controls controls or any be controls in status of the rates. is an ordex e inflammation. is an ordex e inflammation. is an ordex e inflammation. If the rates in sequencing in the status on units of the			and/or significant impairment	genitals. SJS is thought to be	there are no signs of severe	baths can also help to soothe itchy
concentroid rate is the source type of the shall the source type of the shall type of the shall the shall be shall type of the shall type of the shall type of the shall the shall be shall type of the shall type of the shall type of the shall the shall be shall type of the shall type of the shall be shall type of the shall type of the shall type of the shall be shall be shall the		The strength of the topical	of daily activities. Grade 4	caused by an overactive	inflammation or blistering,	skin and reduce inflammation.
 present and your depend on the second to transmission of the second to transmissi the feal transmission of the second to transmission of the se		corticosteroid that is	rash is characterized by life-	immune response to a	the doctor may recommend	* **Antihistamines:**
 For mild up, werkere counter togical answerker, "* To		the severity of the rash	threatening or debilitating	other trigger	continuing icls with close	to holp roduce itching
 continuer rapical immersity if a safe design of the control of the c		For mild rashes over-the-	* **Rash that does not	* **Toxic enidermal	* **Dermatitis that is	* **Topical anesthetics ** Topical
controsteroids may be sufficient. Four one server rables, prescription- tatenght polari controsteroids and other torisoteroids and other controsteroids may be calamine lotion or auturel being and subsective to critosteroids may be controsteroids may be calamine lotion or auturel being and subsective to relate later manue. A lis a meteroids. "**Oralig reaction with controsteroids may be controsteroids may be controsteroid		counter topical	respond to topical	necrolysis (TEN)**: TEN is a	responding to treatment:** If	anesthetics, such as pramoxine.
sufficient, for more sever, rake, precision may be on the torson stancing and toricotateroid and and toricotateroid and and toricotateroid and there are on signs of systemic conticotateroid and there are on signs of systemic, and there are on signs of systemic, and there are on signs of systemic, and there are on signs of systemic incomment, the doctor may recomment, the doctor may recomment to inclusion and help to relieve itching and toricotateroid and there is on on the torso associated with doct or regions."** Patients in patients with a poor premonsite, spatial satisfies associated with other recomment to its importants in patients toricotateroid and whether recomment to its importants in patients with a good prognosis."*the area is a menthol or signs of systemic with a good prognosis."* Patients in patients with a good prognosis."*the area is a menthol or signs of systemic with a good prognosis."*the area is a menthol or signs of systemic with a good prognosis."*the area is a menthol or signs of systemic with a good prognosis."*the area is a menthol or signs of systemic with a good prognosis."*the area is a menthol or signs of systemic with a good prognosis."*the area is a menthol or signs of systemic mentioned associated with other mentioned associated with other with a good prognosis."*the area is a menthol or signs of systemic mentioned associated with other mentioned associated with other <br< td=""><td></td><td>corticosteroids may be</td><td>treatments:** If a rash does</td><td>more severe form of SJS that</td><td>the dermatitis is responding</td><td>can be applied to the skin to numb</td></br<>		corticosteroids may be	treatments:** If a rash does	more severe form of SJS that	the dermatitis is responding	can be applied to the skin to numb
ranke, prescription- strength topical controsteroids may be controsteroids may be to make may be more life in topic may be controsteroids may be their concern may be more life in cance, a such as their with a concern may be more life in cance, a such as their with a concern may be more life in cance, a such as their with a concern may be more life in cance, a such as their concern may be more life in cance, a sad phentyfering controsteroids controsteroids may a such as their concern may be more life in cance, a systemic controsteroids may a such as their concern may be more life mathies and heir to controsteroids may a such as the tow their cancern may be more life mathies can heir to socher the sak no and their to controsteroids may a such as the tow their same may be more life use the same may be <br< td=""><td></td><td>sufficient. For more severe</td><td>not respond to topical</td><td>affects more than 30% of the</td><td>to topical treatments, such as</td><td>the area and relieve itching.</td></br<>		sufficient. For more severe	not respond to topical	affects more than 30% of the	to topical treatments, such as	the area and relieve itching.
 strength topical corritosteroids may be needed. Other treatments, that may needed. Other treatments that may be used for localized rash too conticusteroids may be used for localized rash too localized rash too localized rash		rashes, prescription-	corticosteroids and other	body's surface area. It is a	corticosteroids or calcineurin	* **Cooling agents:** Cooling
controsteroids may be needed. calamine lotion or admeal burs, systemic conticosteroids may be considered. requires immediate involvement. If the doctor may considered. requires immediate involvement. If the doctor may reaction bits a systemic symptoms (DRSS)** DRISS is may be considered. requires immediate involvement. If the isotoring symptoms (DRSS)** DRISS is may be considered. requires immediate involvement. If the isotoring symptoms (DRSS)** DRISS is may be considered. requires immediate involvement. If the isotoring symptoms (DRSS)** DRISS is may be considered. requires immediate involvement. If the isotoring symptoms (DRSS)** DRISS is may be considered. requires immediate involvement. If the agood progross:** Patients with a good controsteroids or other the doct may prescribe systemic controsteroids in patients with a poor progross for their cancer may be more their sa diple-net/prime (Benadry), can be used to no acsidered. requires immediate involvement. If the isotory requires immediate involvement. If the cancer may be more their sa diple-net/prime to a medication. requires immediate involvement. If the worker transment options ** Tealents with a poor progross for their cancer may be more their sa diple-net/prime to a medication. requires immediate is in the situation controsteroids no systemic controsteroids no systemic controsteroids in the biolowing isginfant distress to the patient. This may sho be for mole upst that can be post is in a states; signifant distress to the patient. This may second is controsteroids for the ransment provide systemic controsteroids may a the state on second controsteroids for the ransment provide systemic controsteroids may a the state and shores a signifant distress to the patient. This may second is controsteroids may a the apatent. This may second proutoes state and shoreso		strength topical	topical treatments, such as	medical emergency and	inhibitors, and there are no	agents, such as menthol or
needed. babbs.systemic constoxeroids may be considered. hospitalization. incomment downeemet, the doctor may recommend continuing (CL, is consobility) itching. 0 the treatments that may be used for localized rash on the tors associated with CL incluse: ****Rash that is cassoliated with CL is important to net their cancer, subtassing for readment downeemet, the doctor may recommend continuing (CL, is casso as control with escinophila and systemic to releve thing and the readment downeemet, the doctor may recommend continuing (CL, is casso as control with escinophila and systemic to releve thing and there are some stpo for good control with escinophila information. if the itching is more severe, the doctor may prescribe systemic control with escinophila information. if the itching is more severe, the doctor may prescribe systemic control with escinophila information. if the itching is more severe, the doctor may prescribe systemic control with escinophila information. if the itching is more severe, the doctor may prescribe systemic control with escinophila information. if the itching is more severe, the doctor may prescribe systemic control with escinophila information. if the itching is more severe, the doctor may prescribe systemic control with escinophila is information. if the itching is more severe, the doctor may prescribe systemic control with escinophila is information. if the itching is more severe, the doctor may prescribe systemic control with escinophila is information. if the itching is more severe, the doctor may prescribe systemic control with escinophila is information. if the itching is more severe, the doctor may prescribe systemic control with escinophila is information. if the itching is more severe, the is is information the adation with escino		corticosteroids may be	calamine lotion or oatmeal	requires immediate	signs of systemic	calamine, can also help to relieve
Other treatments that may be used for localized rish on the troos associated with ICIs include:		needed.	baths, systemic	hospitalization.	involvement, the doctor may	itching.
Control to be used function.Control to the torso associated with localized rash is range to be resolution.Control to the torso associated with localized rash is a range to the torso associated with localized rash is a range to the torso associated with localized rash.Control the torso associated with localized rash.If the training in the torse to the torso associated with localized rash.If the training in the torse to the torso associated with localized rash.If the training in the torse to the torso associated with localized rash.If the training in the torse torso associated with localized rash.If the training in the torse the systemic to relieve it ching and torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse the systemic torso associated with localized rash.If the training in the torse torso torso associated with localized rash.If the training in the torse torso torso associated in the torse systemic torse associated with localic ras		Other treatments that may	conticosteroids may be	 * * Drug reaction with and systemic 	* **Dermatitis in patients	If the itching is more severe, the
 be base in a local analytical sams of the sams and region in a good progressis for their cancer, and their a sessence of the sams and region in the sams and region in a sessence of the sams and region in a sessence a sessence the sams and region in a sessen		be used for localized rach	considered. * **Pash that is associated	eosinophilia and systemic	with a good prognosis:**	If the itching is more severe, the
with CIs include:adverse events (inAS)** for rabs is associated with other indust graph, fever, aveland or prevents (inAS), systemic conticateroids may be or orgeness.** Cool compresses can also help to relieve tribing and burning.and treatment for orgene motility to be avert for their cancer may be more likely to been fit from orgene motility to be avert for their cancer may be more likely to been fit from to reliceve tribing and burning.prograph is for their cancer, stage disease, may be more long in molwement. It is the got contacteroids may be orgeness.** Cool compresses can also help to relieve tribing and burning.contacteroids may be orgeness.** to a medication.prograph is for their cancer, stage disease, may be more long in molwement. It is the got contacteroids may be oreactive limmune response to a medication.prograph is for their cancer, stage disease, may be more long in molwement. It is the got contacteroids may be oreacter limmune response to a medication.prograph is for their cancer, stage disease, may be more long in molwement. It is the order treatment for oreacter limmune response to a medication.contacteroids may be to achieve the state math their order or the state math is order or the state math is and fit mark the list so to form on the state.*** Success synthme to continuing ICS, even if they area, a stuations: **** Suth at is causing significant distress to the patient*** they considered for IC- dematts shuble to achieve the stah and make the itching worse. **** as that is located in a security of significant distress to the patient*** they considered in or they state, contorsteroids in the same shube security of significant distress to the patient**** they and make the itch		on the torso associated	with other immune-related	is a rare but serious drug	Patients with a good	medications such as
 A static associated with other it rAFs, such as collish, peating the programme lotion: "It rates, such as collish, peating the programme lotion can help to relieve tiching and burning. ***Coll compresses: "A Cool compresses: analy considered. ***Corl antihistamines: "I show prognosis: "P attents with a poor prognosis for the race may be more considered. ***Toral antihistamines: "I significant distress to the point responder to the balow, adjuent-th, the considered for Lick and lighters to the south as poor prognosis for there are some adjutional to the south as poor prognosis for the race are some the skin and regulation. ***Bash in patients with a poor prognosis for the race are some the skin and regulation. ***Bash in patients with a poor prognosis for the trace are some the skin and regulation. ***Bash in a to severe. ***Bash in a trace some topical trastments, the doctor right away. ***Rash that is causing significant distress to the patient. "the again the following discompressive analyty of sin mates, including context and patient." The mate some that can be server, it is important to note that the significant distress to the patient." The mate some that can be server, it is important to note that the significant distress to the patient." The mate considered for Lick significant distress to the patient." The mate considered for cli- discompressive analyty of sin nabes, including constructions and the server, it may be considered including bitters, uncest and that can be servers, it is important to note that the significant distress to the patient." The mate some factors that that can be servers, it is important to seever. *** were if a sone shower as the search and patient." Sin or servers. This is decorred in a sensitive araa, sensitive araa, such as the to continue search as that is located in a sensitive araa, sensitive araa sensitive araa, sensitive araa, such as that inclu		with ICIs include:	adverse events (irAEs):** If a	reaction that can cause a	prognosis for their cancer.	corticosteroids or other
 ***Calamine loton:** Calamine loton:** Calamine loton:** Calamine loton:** Calamine loton:** Considered. ***Cola compresses:** Considered. ***Cola antibisamines:** Considered. ***Cola antibisamines:** Considered for Losse Considered for Lossee Considered for Lossee			rash is associated with other	variety of symptoms,	such as those with early-	immunosuppressive drugs.
Calamine lotion can help to releve tiching and burning.or pneumonitis, systemic corticostroids may be considered.It is important to note that there is organizovement. It is thought to be caused by an overactive immune response to a medication.likely to benefit from have dermattis.It is important to note that there is organizovement. It is thought to be caused by an overactive immune response other it casting and with a poor prognosis: ** Patients to a medication.likely to benefit from to a medication.It is important to note that there is organizovement. It is thought to be caused by an overactive immune response other it reatments patient with avanced cancer or ancer that has not escored to there responde to other responde to other significant distress to the patient.** Even if a rash is not severe, it may be considered for ICI- discorticisteroids or severe, it may be considered for ICI- discorticisteroids or severe, it may be considered for ICI- discorticisteroids or severe, it may be considered significant distress to the patient.** Even if a rash is not severe, it may be considered patient.** Even if a rash is not severe, it may be considered for retatement with systemic corticisteroids or perfor		* **Calamine lotion:**	irAEs, such as colitis, hepatitis,	including rash, fever, swollen	stage disease, may be more	
to relieve ltching and burning.considered.continuing lCls, even if they have dermattis.no one-size-fits-all treatment for puruitus without rash from ICls.Cool compresses cm***Rash in patients with a poor prognosis** Patientswith a poor prognosis** Patients***Dermattis in patients.no one-size-fits-all treatment for puruitus without rash from ICls.Cool compresses cm***Dermattis in patients.with a poor prognosis** Patientswith a poor prognosis** Patientsne dermattis.Oral anthistamines.**ilkely to benefit from systemic rash is not severe.Other ICl skin conditions that conticosteroids ny systemic corticosteroids may systemic corticosteroids may systemic corticosteroids may systemic corticosteroids or systemic corticosteroids or severe, it have be analted or to patient.** it sim be following significant distress to the patient.** it may be considered for ICL severe, it may be considered for ICL reliable form on the skin.The decision of whether or not to continue ICLs in a severe, it may be considered or treatment with systemic corticosteroids or severe, it may be considered significant distress to the patient.** is may be considered significant distress to the patie		Calamine lotion can help	or pneumonitis, systemic	lymph nodes, and internal	likely to benefit from	It is important to note that there is
burning.considered.thought to be caused by an poor prognosis:** Patients to a medication.here dermattis.profus subsection***Orall antihistamines.** Ural antihistamines.such as diphenhydramine (Benadry), can be used to reduce itching.conticosteroids, even if their rash is not severe.corticosteroids may subsectioncorticosteroids may subsectioncorticost		to relieve itching and	corticosteroids may be	organ involvement. It is	continuing ICIs, even if they	no one-size-fits-all treatment for
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develop any type of rash while taking ICIs, it is important to see your doctor right away.perform daily activities. ***Rash that is located in a sensitive area, such as the conditions listed above while taking ICIs, it is important to see yourrelated adverse events (irAEs).If you have any questions or concerns about the treatment or management of pruritus without rash from ICIs, please talk to yourHere are some tips for managing a localized rash with ICIs:considered for a rash that is located in a sensitive area, event if it is not severe. This is with ICIs:Prompt treatment can help to and even death.when making the decision of whether or not to continue ICIs in a patient with suspected dermatitis:doctor.		that can be serious. If you	the patient's ability to	scarring.	or developing other immune-	worsen itching.
while taking ICIs, it is * **Rash that is located in a sensitive area, such as the conticions listed above while doctor right away. If you have any questions or concerns about the treatment or taking ICIs, it is important to see your If you have any questions or concerns about the treatment or taking ICIs, it is important to see your If you have any questions or concerns about the treatment or management of pruritus without doctor right away. face or genitals:** Systemic corticosteroids may be see your doctor right away. Here are some factors that the doctor may consider management of pruritus without Here are some tips for managing a localized rash considered for a rash that is Prompt treatment can help to managing a localized rash when the tors complications whether or not to continue doctor. on the torso associated even if it is not severe. This is with lCIs: because rashes in these areas and even death. ICIs in a patient with suspected dermatitis: ICIs in a patient with		develop any type of rash	perform daily activities.		related adverse events	
important to see your sensitive area, such as the doctor right away. sensitive area, such as the conticosteroids may be concerns about the treatment or taking ICIs, it is important to see your doctor right away. concerns about the treatment or management of pruritus without taking ICIs, it is important to see your doctor right away. the doctor may consider rash from ICIs, please talk to your doctor right away. Here are some tips for managing a localized rash located in a sensitive area, on the torso associated with ICIs: concerns this is not seevere. This is and even death. when making the decision of ICIs in a patient with with ICIs: doctor.		while taking ICIs, it is	* **Rash that is located in a	If you develop any of the skin	(irAEs).	If you have any questions or
acctor right away. face or genitals:** Systemic corticosteroids may be managing a localized rash on the torso associated taking ICIs, it is important to see your doctor right away. Here are some factors that the doctor may consider management of pruritus without rash from ICIs, please talk to your Here are some tips for managing a localized rash with ICIs: considered for a rash that is located in a sensitive area, even if it is not severe. This is because rashes in these areas Prompt treatment can help to prevent serious complications and even death. Whether or not to continue ICIs in a patient with suspected dermatitis: ICIs in a patient with suspected dermatitis:		important to see your	sensitive area, such as the	conditions listed above while		concerns about the treatment or
Here are some tips for managing a localized rash considered for a rash that is located in a sensitive area, on the torso associated Prompt treatment can help to prevent serious complications when making the decision of whether or not to continue doctor. with ICIs: because rashes in these areas and even death. ICIs in a patient with suspected dermatitis: ICIs in a patient with		doctor right away.	Tace or genitals:** Systemic	taking ICIs, it is important to	Here are some factors that	management of pruritus without
Include a solice dips for Considered in a rank to a rank		Here are some tins for	considered for a rash that is	Prompt treatment can bein to	when making the decision of	doctor
on the torso associated even if it is not severe. This is and even death. ICIs in a patient with with ICIs: because rashes in these areas suspected dermatitis:		managing a localized rash	located in a sensitive area.	prevent serious complications	whether or not to continue	00001.
with ICIs: because rashes in these areas suspected dermatitis:		on the torso associated	even if it is not severe. This is	and even death.	ICIs in a patient with	
		with ICIs:	because rashes in these areas		suspected dermatitis:	

		can be more difficult to	Here are some signs and		
	* Keep the rash clean and	manage and can cause more	symptoms of life-threatening	* The severity of the	
	dry.	discomfort.	ICI skin conditions:	dermatitis	
	* Avoid scratching the	* **Rash that is accompanied		* The patient's response to	
	rash, as this can damage	by other symptoms, such as	* **Rash that is painful,	treatment for the dermatitis	
	the skin and make the rash	fever or malaise:** If a rash is	blistering, or ulcerating**	* The patient's prognosis for	
	worse.	accompanied by other	* **Rash that covers a large	their cancer	
	* Apply a cool compress to	symptoms, such as fever or	area of the body**	* The patient's other	
	the rash for 10-15 minutes	malaise, it may be a sign of a	* **Rash that is accompanied	treatment options	
	at a time to relieve itching	more serious condition.	by fever, chills, or other	* The patient's preferences	
	and burning.	Systemic corticosteroids may	systemic symptoms**		
	* Take an oatmeal bath to	be considered in these cases	* **Difficulty breathing**	It is important to note that	
	soothe the skin and reduce	to help control the	* **Swelling of the face, lips,	there is no right or wrong	
	inflammation.	inflammation and other	or tongue**	answer to this question. The	
	* Apply a topical	symptoms.	* **Difficulty swallowing**	best decision for each patient	
	corticosteroid to the rash		* **Vision changes**	will vary depending on their	
	as directed by your doctor.	The decision of whether or		individual circumstances.	
	* Avoid using harsh soaps	not to prescribe systemic	If you experience any of these		
	or detergents on the rash.	corticosteroids for ICI-	signs or symptoms while	If you have any questions or	
	* Wear loose-fitting,	dermatitis should be made on	taking ICIs, it is important to	concerns about the decision	
	comfortable clothing.	a case-by-case basis,	seek medical attention	of whether or not to	
	* Avoid sweating, as this	considering the patient's	immediately.	continue ICIs if you have	
	can aggravate the rash.	individual risks and benefits.		suspected dermatitis, please	
		The doctor will weigh the		talk to your doctor.	
	If you have any questions	potential benefits of systemic			
	or concerns about the	corticosteroids, such as rapid			
	treatment or management	and effective relief of			
	of a localized rash on the	symptoms, against the			
	torso associated with ICIs,	potential risks, such as			
	please talk to your doctor.	increased risk of infection,			
		suppression of the immune			
		system, and other side			
		effects.			
		If you have any questions or			
		concerns about the use of			
		systemic corticosteroids for			
		ICI-dermatitis, please talk to			
		your doctor.			
· · · · · · · · · · · · · · · · · · ·					

	Thuroid Toxicity	Thyroid Toxicity	Thyroid Toxicity	Thuroid Toxicity	Thuroid Toxicity
Question	What is the primary	What is the primary	Should immune checknoint	When should thuroid	How often should thyroid
Question	treatment for thyroiditis	treatment for hypothyroid	inhibitors be discontinued for	hormone therapy be initiated	laboratory assessment be
	associated with immune	associated with immune	hypothyroidism?	for immune checkpoint	performed in patients receiving
	checkpoint inhibitors?	checkpoint inhibitors?		inhibitor associated	immune checkpoint inhibitors?
				hypothyroid and at what	·
				dose?	
Answer Engine 2	The primary treatment for	The primary treatment for	Whether or not to	Thyroid hormone therapy	The frequency of thyroid
(Bard)	thyroiditis associated with	hypothyroidism associated	discontinue immune	should be initiated for	laboratory assessment in patients
	immune checkpoint	with immune checkpoint	checkpoint inhibitors (ICIs) for	immune checkpoint inhibitor	receiving immune checkpoint
	inhibitors (ICIs) is	inhibitors (ICIs) is	hypothyroidism is a decision	(ICI)-associated	inhibitors (ICIs) varies depending
	levotnyroxine, a	**levotnyroxine**, a	that should be made on a	hypothyroidism as soon as	on the patient's individual risk
	Levothyrovine is used to	Levothyroxine is used to	on the individual nationt's	hormone levels fall below the	used However most guidelines
	replace the thyroid	replace the thyroid hormone	circumstances	reference range. The initial	recommend that thyroid function
	hormone that the body is	that the body is no longer		dose of thyroid hormone	tests (TFTs) be performed at
	no longer producing due to	producing due to the ICI-	In general, ICI-induced	therapy should be weight-	baseline and then every 6-8 weeks
	the ICI-induced thyroiditis.	induced hypothyroidism.	hypothyroidism is mild and	based, with a starting dose of	during ICI therapy.
			can be managed with	1.45 mcg/kg/day of	
	The dose of levothyroxine	The dose of levothyroxine	levothyroxine replacement	levothyroxine.	Patients with a higher risk of ICI-
	that is needed will vary	that is needed will vary	therapy. Therefore, ICIs do		related thyroid dysfunction may
	depending on the	depending on the individual	not need to be discontinued	The dose of thyroid hormone	need to have their IFIs checked
	The dector will start the	will start the patient on a low	In most cases of	therapy will need to be	include patients with:
	natient on a low dose of	dose of levothyroxine and	hypothyroldisin.	natient's thyroid hormone	include patients with.
	levothyroxine and increase	increase the dose gradually	However, there are some	levels are normalized. This	* A history of thyroid disease
	the dose gradually until	until the patient's thyroid	situations where ICI	may take several weeks or	* Autoimmune diseases, such as
	the patient's thyroid	hormone levels are	discontinuation may be	even months.	type 1 diabetes or rheumatoid
	hormone levels are	normalized.	considered for		arthritis
	normalized.		hypothyroidism:	The patient's thyroid	* Use of certain medications, such
		In most cases, patients with		hormone levels should be	as lithium or amiodarone
	In addition to	ICI-induced hypothyroidism	* Severe hypothyroidism that	monitored regularly, at least	
	levothyroxine, the doctor	will need to take	does not respond to	every 4-6 weeks, to ensure	The type of ICI being used may also
	may also prescribe other	their lives. However in some	thorapy	hormono thorony is	monitoring For example ICIs that
	manage the symptoms of	cases the hypothyroidism	* Hypothyroidism that is	adequate The doctor may	block the PD-1/PD-I 1 pathway
	ICI-induced thyroiditis.	may resolve once the patient	accompanied by other	also adjust the dose of	such as pembrolizumab and
	such as:	discontinues the ICI.	immune-related adverse	thyroid hormone therapy	nivolumab, are more likely to cause
			events (irAEs), such as colitis,	based on the patient's clinical	thyroid dysfunction than ICIs that
	* **Beta-blockers:** Beta-	If you have any questions or	hepatitis, or pneumonitis	symptoms, such as fatigue,	block the CTLA-4 pathway, such as
	blockers can help to	concerns about the treatment	* Hypothyroidism in patients	weight gain, and cold	ipilimumab.
	reduce symptoms such as	of hypothyroidism associated	with a poor prognosis for	intolerance.	
	anxiety, palpitations, and	with ICIs, please talk to your	their cancer		If the patient develops any
	tremors.	doctor.	The decision of whether or	bormono lovels are	symptoms of thyroid dysfunction,
	medications ** Anti-	**Here are some additional	not to discontinue ICIs for	normalized thyroid hormone	intolerance or constination their
	inflammatory medications.	tips for managing	hypothyroidism should be	therapy should be continued	TFTs should be checked
	such as corticosteroids,	hypothyroidism associated	made in consultation with the	indefinitely in most cases of	immediately.
	can help to reduce	with ICIs:**	patient's oncologist and	ICI-associated	
	inflammation and swelling.		endocrinologist. The risks and	hypothyroidism.	Here is a summary of the
	* **Pain relievers:** Pain	* Get regular blood tests to	benefits of continuing ICIs		recommendations for thyroid
	relievers, such as	monitor your thyroid	should be weighed against	Here are some additional	laboratory assessment in patients
	acetaminophen or	normone levels.	the risks and benefits of	things to keep in mind about	receiving ICIs:
	ipuproten, can be used to	medication on an empty	uiscontinuing ICIs and	Invroid normone therapy for	* Baseline TETs
	discomfort	stomach, at least 30 minutes	with levothyroxine	hypothyroidism.	* TFTs every 6-8 weeks during ICI
		before eating or drinking	replacement therapy.		therapy
	In some cases, the doctor	anything other than water.		* Thyroid hormone therapy	* More frequent TFTs for patients
	may also recommend that	* Avoid taking other	Here are some factors that	should be taken on an empty	at high risk
	the patient stop taking the	medications, such as calcium	the doctor may consider	stomach, at least 30 minutes	* Immediate TFTs if symptoms of
	ICI that is causing the	or iron supplements, at the	when making the decision of	before eating or drinking	thyroid dysfunction develop
	thyroiditis. However, this	same time as levothyroxine,	whether or not to discontinue	anything other than water.	
	decision should be made	as these can interfere with its	icis for hypothyroidism:	- Other medications, such as	It is important to note that these
	un a case-by-case basis,	ausorption. * Be aware of the symptoms	* The severity of the	can interfere with the	are just general guidelines. The
	henefits of continuing the	of hypothyroidism such as	hypothyroidism	absorption of thyroid	monitoring should be determined
	ICI against the risks of	fatigue, weight gain. cold	* The patient's response to	hormone, so they should not	by the patient's oncologist in
	worsening thyroiditis or	intolerance, constipation, and	levothyroxine replacement	be taken at the same time as	consultation with their
	developing other immune-	dry skin. If you experience any	therapy	thyroid hormone.	endocrinologist.
	related adverse events	of these symptoms, talk to	* The presence of other irAEs	* Patients with ICI-associated	
	(irAEs).	your doctor.	* The patient's prognosis for	hypothyroidism may be more	If you have any questions or
		* Make sure to get enough	their cancer	sensitive to the effects of	concerns about thyroid laboratory
	If you have any questions	sleep and exercise regularly.	* The patient's preferences	thyroid hormone, so it is	assessment while receiving ICIs,
	or concerns about the	 Eat a neartny diet that includes plonty of fruits 	If you have any guestions	important to start with a low	please talk to your doctor.
1	creatment or thyroiditis	includes plenty of fruits,	in you have any questions or	uose and increase the dose	1

associated with ICIs, please	vegetables, and whole grains.	concerns about whether or	gradually.	
talk to your doctor.		not to discontinue ICIs for	* Patients should monitor	
	If you have any questions or	hypothyroidism, please talk to	their symptoms closely and	
**Here are some	concerns about the	your doctor.	report any changes to their	
additional tips for	management of		doctor.	
managing thyroiditis	hypothyroidism associated			
associated with ICIs:**	with ICIs, please talk to your		If you have any questions or	
	doctor.		concerns about thyroid	
* Get regular blood tests			hormone therapy for ICI-	
to monitor your thyroid			associated hypothyroidism,	
hormone levels.			please talk to your doctor.	
* Take your levothyroxine				
medication on an empty				
stomach, at least 30				
minutes before eating or				
drinking anything other				
than water.				
* Avoid taking other				
medications, such as				
calcium or iron				
supplements, at the same				
time as levothyroxine, as				
these can interfere with its				
absorption.				
* If you have any questions				
or concerns about taking		1	1	
levothyroxine, please talk				
to your doctor.				

	Pituitary/Adrenal Toxicity	Pituitary/Adrenal Toxicity	Pituitary/Adrenal Toxicity	Pituitary/Adrenal Toxicity	Pituitary/Adrenal Toxicity
Question	What are symptoms	What are the main diagnostic	Should immune checkpoint	What is the primary	Can corticosteroid hormone
	concerning for immune	tests to assess for immune	inhibitors be discontinued for	treatment for hypophysitis	replacement typically be
	checkpoint inhibitor	checkpoint inhibitor	hypopituitarism?	associated with immune	discontinued in patients with
	associated hypophysitis or	associated hypophysitis?		checkpoint inhibitors? Please	immune checkpoint inhibitor
	hypopituitarism?			list the dose of any	associated hypophysitis?
Answer Engine 2	The following sumptoms	The main diagnostic tests to	Whether or not to	medications	No corticostoroid hormono
(Bard)	are concerning for immune	assess for immune checknoint	discontinue immune	hypophysitis associated with	replacement typically cannot be
(baru)	checkpoint inhibitor (ICI)-	inhibitor (ICI)-associated	checkpoint inhibitors (ICIs) for	immune checknoint	discontinued in patients with
	associated hypophysitis or	hypophysitis are:	hypopituitarism is a decision	inhibitors (ICIs) is	immune checkpoint inhibitor (ICI)-
	hypopituitarism:	7 P - P - 7 - 1 - 1 - 1	that should be made on a	**glucocorticoid	associated hypophysitis. This is
		* **Pituitary hormone	case-by-case basis, depending	replacement therapy**. The	because ICI-associated
	* Headache	levels:** This test measures	on the individual patient's	most commonly used	hypophysitis is often permanent,
	* Fatigue	the levels of pituitary	circumstances.	glucocorticoid for this	meaning that the damage to the
	* Nausea and vomiting	hormones in the blood. A		purpose is prednisone. The	pituitary gland cannot be reversed.
	* Weakness	decrease in the levels of one	In general, ICI-induced	dose of prednisone will vary	In some cases, nationts may be
	* Dizziness * Confusion	or more pituitary normones	hypopitultarism is mild and	the hypophysitis A typical	in some cases, patients may be
	* Weight gain	* **Pituitary MRI:** This test	hormone replacement	starting dose is 20-40 mg ner	gradually, but they will likely need
	* Loss of appetite	creates images of the	therapy. Therefore, ICIs do	day. The dose may be	to remain on some level of
	* Cold intolerance	pituitary gland. Pituitary MRI	not need to be discontinued	tapered gradually once the	corticosteroid replacement therapy
	* Constipation	can show signs of	in most cases of	inflammation is under	for the rest of their lives.
	* Dry skin	inflammation, such as	hypopituitarism.	control.	
	* Decreased libido	swelling of the pituitary gland			If a patient is able to discontinue
	* Erectile dysfunction	and thickening of the pituitary	However, there are some	In some cases, other	corticosteroids completely, they
	* Vision changes	stalk.	situations where ICI	medications may be used to	will need to be monitored closely
	Those symptoms can be	tost:** This tost mossures the	discontinuation may be	treat ICI-associated	Adropal insufficiency is a condition
	caused by a variety of	body's response to glucagon.	hypopituitarism:	hypophysicis, such as.	in which the adrenal glands do not
	other conditions, so it is	a hormone that stimulates		* **Growth hormone:**	produce enough cortisol, a
	important to see a doctor	the release of growth	* Severe hypopituitarism that	Growth hormone	hormone that is essential for
	to get a diagnosis.	hormone from the pituitary	does not respond to hormone	replacement therapy may be	survival.
	However, if you are	gland. A failure to respond to	replacement therapy	used to treat growth	
	experiencing any of these	glucagon stimulation may	* Hypopituitarism that is	hormone deficiency in	Symptoms of adrenal insufficiency
	symptoms while taking	indicate growth hormone	accompanied by other	patients with ICI-associated	include fatigue, weakness,
	ICIS, It is important to let	deficiency, which is a sign of	immune-related adverse	hypophysitis. The typical	dizziness, lightneadedness, nausea,
	your doctor know right	* **Corticotropip-releasing	events (IFAES), such as colltis,	0.2-0.4 mg per day	vomiting, and abdominal pain. If
	away.	hormone (CRH) stimulation	* Hypopituitarism in patients	* **Thyroid hormone:**	symptoms, it is important to see a
	Here is a more detailed	test:** This test measures the	with a poor prognosis for	Thyroid hormone	doctor right away.
	description of some of the	body's response to CRH, a	their cancer	replacement therapy may be	<i>c</i> ,
	symptoms listed above:	hormone that stimulates the		used to treat thyroid	If you have any questions or
		release of adrenocorticotropic	The decision of whether or	hormone deficiency in	concerns about discontinuing
	* **Headache:** The	hormone (ACTH) from the	not to discontinue ICIs for	patients with ICI-associated	corticosteroid hormone
	headache associated with	pituitary gland. ACTH is a	hypopituitarism should be	hypophysitis. The typical	replacement for ICI-associated
	is often severe and	adrenal glands to produce	nade in consultation with the	synthetic thyroid hormone is	doctor
	persistent. It may be	cortisol. A failure to respond	endocrinologist. The risks and	1.45 mcg/kg/day.	
	accompanied by other	to CRH stimulation may	benefits of continuing ICIs	* **Adrenal hormone:**	Here are some factors that may
	symptoms, such as nausea,	indicate ACTH deficiency,	should be weighed against	Adrenal hormone	affect whether or not a patient can
	vomiting, and vision	which is a sign of	the risks and benefits of	replacement therapy may be	discontinue corticosteroid
	changes.	hypophysitis.	discontinuing ICIs and	used to treat adrenal	hormone replacement for ICI-
	* **Fatigue:** The fatigue associated with ICL	The specific tests that are	managing hypopituitarism	normone deficiency in	associated hypophysitis:
	associated hypophysitis is	ordered will depend on the	therany	hypophysitis The typical	* The severity of the hypophysitis
	often severe and	patient's individual symptoms	cherupy.	dose of hydrocortisone. the	* The length of time the patient
	debilitating. It may be	and the doctor's suspicion of	Here are some factors that	synthetic adrenal hormone. is	has been taking corticosteroids
	difficult to get out of bed	hypophysitis.	the doctor may consider	15-20 mg per day.	* The presence of other immune-
	or perform everyday		when making the decision of		related adverse events (irAEs)
	activities.	In addition to the tests listed	whether or not to discontinue	It is important to note that	* The patient's response to
	* **Nausea and vomiting:** The neuros	above, the doctor may also	icis for hypopituitarism:	tnese are just general	* The patient's professores
	and vomiting associated	blood tests to check for other	* The severity of the	medications and doses that	the patient's preferences
	with ICI-associated	causes of the patient's	hypopituitarism	are used to treat ICI-	It is important to discuss the risks
	hypophysitis can be severe	symptoms and imaging tests	* The patient's response to	associated hypophysitis will	and benefits of discontinuing
	and persistent. It may be	to check for other problems in	hormone replacement	vary depending on the	corticosteroid replacement therapy
	accompanied by other	the brain.	therapy	individual patient's needs	with your doctor before making a
	symptoms, such as		* The presence of other irAEs	and the recommendations of	decision.
	diarrhea and abdominal	If you are experiencing any	* The patient's prognosis for	their doctor.	
	pain.	symptoms of hypophysitis	their cancer	Horo pro como - dalla l	
	weakness associated with	important to see a doctor	The patient's preferences	things to keep in mind about	
	ICI-associated hynonhysitis	right away. Early diagnosis	If you have any questions or	the treatment of ICI-	
	can be severe and	and treatment of hypophysitis	concerns about whether or	associated hypophysitis:	

4.1.295.25.2.0.2.2.1.2				
debilitating. It may be	can neip to prevent serious	not to discontinue ICIS for	* 14 in increases the second	
difficult to walk or stand.	complications.	nypopituitarism, please talk	It is important to monitor	
* **Dizziness:** The		to your doctor.	the patient's hormone levels	1
dizziness associated with			closely and adjust the	
ICI-associated hypophysiti			medication doses as needed.	
can be severe and			* Some patients may need to	
debilitating. It may be			take hormone replacement	
difficult to maintain			therapy for the rest of their	
			therapy for the rest of their	
balance and coordination.			lives.	
* **Confusion:** The			* Patients with ICI-associated	
confusion associated with			hypophysitis are at an	
ICI-associated hypophysiti			increased risk of other	
can be mild or severe. It			immune-related adverse	
may be difficult to think			events (irAEs). It is important	
sloarly or make desisions			to monitor the nationt for	
clearly of make decisions.			to monitor the patient for	
* **Weight gain:** The			signs of other irAEs and treat	
weight gain associated			them promptly.	
with ICI-associated				
hypophysitis is often			If you have any questions or	
unexplained. It may be due			concerns about the	
to a combination of			treatment of ICI-associated	
fostors including fordat			hypophysitic places talk to	
ractors, including fluid			hypophysicis, please talk to	
retention, decreased	.		your doctor.	
metabolism, and increased			1	1
appetite.			1	
* **Loss of appetite:**			1	
The loss of appetite			1	
associated with ICI-			1	
associated with ICF			1	
associated hypophysitis			1	
can be severe and				
debilitating. It may be				
difficult to eat enough				
food to maintain a healthy				
weight				
* **Cold intolerance:**				
The cold intolerance				
associated with ICI-				
associated hypophysitis is				
due to a decrease in				
thyroid hormone				
production Patients may				
fact and such as the				
leel cold even when the				
room temperature is				
comfortable.				
* **Constipation:** The				
constipation associated				
with ICI-associated			1	
hynonhysitis is due to a			1	1
decrease in thursid			1	
			1	
hormone production.			1	
Thyroid hormone helps to			1	
regulate the digestive			1	
system, so a decrease in			1	1
thyroid hormone			1	
production can lead to			1	
constination			1	
* **Dry clin:** The dry			1	
- Dry skin The dry			1	
skin associated with ICI-			1	1
associated hypophysitis is			1	
due to a decrease in			1	
thyroid hormone			1	
production. Thyroid			1	
hormone helps to regulate			1	
the skin's oil production			1	
the skin's on production,			1	
so a decrease in thyroid			1	
hormone production can			1	
lead to dry skin.			1	
* **Decreased libido:**			1	
The decreased libido			1	
associated with ICI-			1	
associated with ICF			1	
associated hypophysitis is			1	
due to a decrease in sex			1	
hormone production. Sex		1		
hormones are produced b	/		1	
the pituitary gland. so a			1	
	•	•	•	•

decrease in pituitary		
function can lead to		
decreased libido.		
* **Erectile dysfunction:**		
The erectile dysfunction		
associated with ICI-		
associated hypophysitis is		
due to a decrease in		
testosterone production.		
Testosterone is a sex		
hormone that is produced		
by the testes, but the		
testes need signals from		
the pituitary gland to		
produce testosterone.		
Therefore, a decrease in		
pituitary function can lead		
to erectile dysfunction.		
* **Vision changes:** The		
vision changes associated		
with ICI-associated		
hypophysitis are due to		
pressure on the optic		
nerve from the enlarged		
pituitary gland. Vision		
changes can include		
blurred vision, double		
vision, and loss of vision.		
If you are experiencing any		
of the symptoms listed		
above while taking ICIs, it		
is important to see a		
doctor right away. ICI-		
associated hypophysitis		
and hypopituitarism are		
serious conditions, but		
they can be managed with		
appropriate treatment.		

r	Phoumatologic Toxicity	Phoumatologic Toxicity	Phoumatologic Toxicity	Phoumatologic Toxicity	Phoumatologic Toxicity
Question	What is the istic!	What is the initial tractions of	What adjunctive	What is the treatment for	If a patient has increase the short
Question	what is the initial	what is the initial treatment	what adjunctive	wriat is the treatment for	ir a patient nas immune checkpoint
	diagnostic workup for	for moderate (grade 2)	immunosuppressive	xerostomia associated with	innibitor associated myositis, what
	suspected immune	arthritis associated with	treatments can be used for	immune checkpoint	are life threatening complications
	checkpoint inhibitor	immune checkpoint	arthritis from immune	inhibitors?	that can occur?
	associated arthritis?	inhibitors?	checkpoint inhibitors as		
			alternatives to		
			corticosteroids?		
Answer Engine 2	The initial diagnostic	The initial treatment for	There are a number of	The treatment for xerostomia	Immune checkpoint inhibitor (ICI)-
(Bard)	workup for suspected	moderate (grade 2) arthritis	adjunctive	associated with immune	associated myositis is a rare but
	immune checkpoint	associated with immune	immunosuppressive	checkpoint inhibitors (ICIs) is	serious complication of ICI therapy.
	inhibitor (ICI)-associated	checkpoint inhibitors (ICIs) is	treatments that can be used	aimed at relieving the	It is characterized by inflammation
	arthritis should include the	typically **nonsteroidal anti-	for arthritis from immune	symptoms and preventing	of the muscles, which can lead to
	tollowing:	inflammatory drugs	checkpoint inhibitors (ICIs) as	complications.	muscle weakness, pain, and
		(NSAIDs)**. NSAIDs are over-	alternatives to		fatigue. In severe cases, ICI-
	* **Physical	the-counter medications that	corticosteroids. These	**Here are some tips for	associated myositis can lead to life-
	examination:** The doctor	can help to reduce	include:	managing xerostomia	threatening complications, such as:
	will perform a physical	inflammation and pain. Some		associated with ICIs:**	
	examination to assess the	common NSAIDs include	* Disease-modifying		* **Respiratory failure:** If the
	patient's joints for	ibuprofen, naproxen, and	antirheumatic drugs	* **Stay hydrated:** Drink	muscles that control breathing are
	tenderness, swelling,	aspirin.	(DMARDs): DMARDs are a	plenty of fluids throughout	affected, it can lead to respiratory
	warmth, and redness. The	1	class of medications that can	the day, even if you don't feel	failure. This is a life-threatening
	doctor will also look for	If NSAIDs are not effective or	help to slow the progression	thirsty. Water is the best	condition in which the body is
	other signs of	are not tolerated, the doctor	of ICI-associated arthritis and	choice, but other fluids such	unable to get enough oxygen.
	inflammation, such as	may prescribe	prevent joint damage. Some	as unsweetened tea, juice,	* **Cardiac arrhythmias:**
	fever and rash.	<pre>**glucocorticoids**.</pre>	common DMARDs include	and milk can also be helpful.	Inflammation of the heart muscle
	* **Blood tests:** The	Glucocorticoids are powerful	methotrexate, sulfasalazine,	* **Avoid sugary drinks:**	can lead to cardiac arrhythmias,
	doctor will order blood	anti-inflammatory drugs that	and leflunomide.	Sugary drinks can dehydrate	which are abnormal heart rhythms.
	tests to check for signs of	can be taken orally or injected	* Biologic agents: Biologic	the mouth and make	Cardiac arrhythmias can be life-
	inflammation, such as	into the affected joint.	agents are a newer class of	xerostomia worse.	threatening if they cause the heart
	elevated erythrocyte		medications that target	* **Use artificial saliva:**	to stop beating or beat too slowly
	sedimentation rate (ESR)	In some cases, the doctor may	specific molecules in the	Artificial saliva products can	or too fast.
	and C-reactive protein	also prescribe **disease-	immune system. Some	help to lubricate the mouth	* **Rhabdomyolysis:**
	(CRP). The doctor may also	modifying antirheumatic	biologic agents that have	and make it feel less dry.	Rhabdomyolysis is a condition in
	order blood tests to rule	drugs (DMARDs)**. DMARDs	been used to treat ICI-	They are available in a variety	which muscle tissue breaks down
	out other possible causes	are medications that can help	associated arthritis include	of forms, such as sprays, gels,	and releases harmful proteins into
	of the patient's symptoms,	to slow the progression of ICI-	tocilizumab, adalimumab, and	and lozenges.	the bloodstream. Rhabdomyolysis
	such as infection and	associated arthritis. Some	infliximab.	* **Chew sugarless gum or	can lead to kidney failure and
	autoimmune diseases.	common DMARDs include	* Janus kinase (JAK)	candy:** Chewing sugarless	death.
	* **Imaging studies:**	methotrexate, sulfasalazine,	inhibitors: JAK inhibitors are a	gum or candy can help to	
	The doctor may order	and leflunomide.	newer class of medications	stimulate saliva production.	Other life-threatening
	imaging studies, such as X-	1	that block the activity of a	* **Avoid smoking and	complications of ICI-associated
	rays and MRI scans, to look	The specific treatment plan	group of enzymes called	tobacco use:** Smoking and	myositis include:
	for signs of joint damage.	that is right for a patient with	Janus kinases. JAK inhibitors	tobacco use can dry out the	
		moderate ICI-associated	have been shown to be	mouth and make xerostomia	* **Sepsis:** Sepsis is a life-
	In some cases, the doctor	arthritis will depend on the	effective in treating a variety	worse.	threatening condition in which the
	may also order other tests,	severity of the arthritis, the	of inflammatory diseases,	* **Use a humidifier:** A	body's response to infection
	such as joint fluid analysis	patient's other medical	including ICI-associated	humidifier can add moisture	damages its own tissues and
	and synovial biopsy.	conditions, and the patient's	arthritis. Some common JAK	to the air and help to reduce	organs.
		response to treatment.	inhibitors include tofacitinib	dryness in the mouth.	* **Multisystem organ failure:**
	Joint fluid analysis is a		and baricitinib.		Multisystem organ failure is a
	procedure in which a small	Here are some additional		**Medications may also be	condition in which two or more
	sample of fluid is removed	things to keep in mind about	The specific adjunctive	used to treat xerostomia	organs fail to function properly.
	from the affected joint and	the treatment of moderate	immunosuppressive	associated with ICIs.	* **Death:** In rare cases, ICI-
	examined under a	ICI-associated arthritis:	treatment that is best for a	Common medications	associated myositis can lead to
	microscope. Joint fluid		patient will depend on the	include:**	death.
	analysis can help to	* It is important to start	severity of the arthritis, the		
	identify the cause of the	treatment early to prevent	patient's other medical	* **Pilocarpine:**	It is important to note that these
	inflammation in the joint.	joint damage.	conditions, and the patient's	Pilocarpine is a prescription	are life-threatening complications,
		* The goal of treatment is to	response to other treatments.	medication that stimulates	but they are not inevitable. With
	Synovial biopsy is a	control the inflammation and		saliva production. It is	early diagnosis and treatment,
	procedure in which a small	pain, and to prevent joint	**Here is a summary of the	available in pill and eye drop	most patients with ICI-associated
	sample of tissue is	damage.	adjunctive	form.	myositis will make a full recovery.
	removed from the lining of	* Treatment should be	immunosuppressive	* **Cevimeline:**	
	the affected joint and	individualized based on the	treatments that can be used	Cevimeline is a prescription	If you are taking ICIs and develop
	examined under a	patient's individual needs.	for arthritis from ICIs as	medication that stimulates	any symptoms of myositis, such as
	microscope. Synovial	* It is important to monitor	alternatives to	saliva production. It is	muscle weakness, pain, or fatigue,
	biopsy can help to confirm	the patient's response to	corticosteroids:**	available in pill form.	it is important to see a doctor right
	the diagnosis of ICI-	treatment and adjust the		* **Xerostomia lozenges or	away. Early diagnosis and
	associated arthritis.	treatment plan as needed.	* DMARDs	mouthwashes:** These	treatment are essential to
			* Biologic agents	products contain ingredients	preventing life-threatening
	Once the doctor has	If you have any questions or	* JAK inhibitors	that can help to lubricate the	complications.
	completed the initial	concerns about the treatment		mouth and relieve dryness.	
	diagnostic workup, they	of moderate ICI-associated	The doctor will choose the		
	will be able to develop a	arthritis, please talk to your	best treatment option or	**If xerostomia is severe or	1

treatment plan for the	doctor.	combination of treatment	does not respond to other	
patient.		options for the individual	treatments, the doctor may	
	**Here is a summary of the	patient.	recommend additional	
Here are some additional	initial treatment options for		treatments, such as:**	
tips for diagnosing ICI-	moderate (grade 2) arthritis	It is important to note that		
associated arthritis:	associated with immune	these adjunctive	* **Sialendoscopy:**	
	checkpoint inhibitors:**	immunosuppressive	Sialendoscopy is a procedure	
* Consider the patient's		treatments can have side	in which a small camera is	
medical history, including	* NSAIDs	effects, so it is important to	inserted into the salivary duct	
the type of ICI they are	* Glucocorticoids	discuss the risks and benefits	to look for blockages. If a	
taking and how long they	* DMARDs	with the doctor before	blockage is found, it can be	
have been taking it.		starting treatment.	removed using a laser or	
* Be aware of the	The doctor will choose the		other instruments.	
symptoms of ICI-	best treatment option or		* **Salivary gland surgery:**	
associated arthritis, such	combination of treatment		In rare cases, surgery may be	
as joint pain, stiffness,	options for the individual		necessary to treat	
swelling, and redness.	patient.		xerostomia. Surgery may	
* Order appropriate blood			involve transplanting a	
tests and imaging studies			salivary gland from another	
to rule out other possible			part of the body to the	
causes of the patient's			mouth, or creating a new	
symptoms.			salivary duct.	
* Consider joint fluid				
analysis and synovial			It is important to work with	
biopsy if necessary.			the doctor to develop a	
			treatment plan that is right	
If you have any questions			for you. The best treatment	
or concerns about the			plan will depend on the	
diagnosis of ICI-associated			severity of the xerostomia,	
arthritis, please talk to			your other medical	
your doctor.			conditions, and your	
			response to treatment.	

Question	Neuromuscular Toxicity What are the primary treatments for immune checkpoint inhibitor associated myasthenia gravis?	Neuromuscular Toxicity What is the primary treatment for immune checkpoint inhibitor associated encephalitis?	Neuromuscular Toxicity What supportive care treatments should patients treated with immune checkpoint inhibitors who develop myasthenia gravis or Guillain Barre syndrome receive?	Neuromuscular Toxicity What is the differential diagnosis for immune checkpoint inhibitor associated meningitis?	Neuromuscular Toxicity What are indications associated with neurologic toxicities to permanently discontinue immune checkpoint inhibitors?
			receiver		
Answer Engine 2 (Bard)	The primary treatments for immune checkpoint inhibitor (ICI)-associated myasthenia gravis (MG) are:	The primary treatment for immune checkpoint inhibitor (ICI)-associated encephalitis is high-dose corticosteroids, such as prednisone. Corticosteroids are powerful	Patients treated with immune checkpoint inhibitors (ICIs) who develop myasthenia gravis (MG) or Guillain-Barré syndrome (GBS) should receive the	The differential diagnosis for immune checkpoint inhibitor (ICI)-associated meningitis is broad and includes both infectious and non-infectious causes.	The following indications are associated with neurologic toxicities to permanently discontinue immune checkpoint inhibitors (ICIs):
	* **Corticosteroids:** Corticosteroids are	anti-inflammatory drugs that can help to suppress the	following supportive care treatments:	## Infectious causes	* Grade 3 or 4 neurologic toxicity that is not responsive to
	powerful anti- inflammatory drugs that can help to suppress the autoimmune response	autoimmune response that is causing the encephalitis. In some cases, other	* **Monitoring of vital signs:** This includes monitoring the patient's	 * Bacterial meningitis * Viral meningitis * Fungal meningitis 	treatment or is associated with significant morbidity or mortality * Grade 2 neurologic toxicity that is progressive or does not respond
	that is causing the MG. * **Pyridostigmine:** Duridostigmine is a	medications, such as intravenous immunoglobulin	heart rate, blood pressure, respiratory rate, and	 * Tuberculosis meningitis * Parasitic meningitis 	to treatment * Any neurologic toxicity that is
	medication that helps to improve communication	(PLEX), may also be used to treat ICI-associated	* **Fluid and electrolyte management:** Patients	## Non-infectious causes	immune-related adverse events (irAEs)
	between the nerves and muscles. It can help to	encephalitis. IVIg is a blood product that contains antibadies from baalthy	with MG or GBS may need to receive intravenous fluids to	* ICI-associated aseptic meningitis * Other immune related adverse	Examples of grade 3 or 4
	and reduce fatigue in patients with MG.	people. It can be used to treat ICI-associated	electrolyte balance. * **Nutritional support:**	events (irAEs) such as encephalitis, myelitis, and	warrant permanent discontinuation of ICIs include:
	* **Intravenous immunoglobulin (IVIg):**	encephalitis by suppressing the autoimmune response.	Patients with MG or GBS may have difficulty eating and depline. They may need to	Guillain-Barré syndrome * Subarachnoid hemorrhage * Carringmateur, maniaritic	* Myasthenia gravis with bulbar
	that contains antibodies from healthy people. It	the patient's blood is filtered to remove harmful	receive nutritional support through a feeding tube or	* Drug-induced meningitis	* Guillain-Barré syndrome with respiratory failure
	can be used to treat MG by suppressing the	antibodies. It can be used to treat severe ICI-associated	intravenous nutrition. * **Respiratory support:**	### ICI-associated aseptic meningitis	* Encephalitis or meningitis with significant neurologic impairment
	autoimmune response and improving muscle strength.	encephalitis that does not respond to corticosteroids.	Patients with MG or GBS may need respiratory support, such as mechanical	ICI-associated aseptic meningitis is the most common type of	* Transverse myelitis with significant neurologic impairment
	* **Plasma exchange (PLEX):** PLEX is a procedure in which the	In addition to medication, there are a number of things	ventilation, if they have difficulty breathing.	meningitis associated with ICI therapy. It is characterized by inflammation of the maninger	Examples of grade 2 neurologic toxicities that may warrant
	patient's blood is filtered to remove harmful	associated encephalitis may need, such as:	Physical therapy can help patients with MG or GBS to	the membranes that surround the brain and spinal cord. The	if they are progressive or do not respond to treatment include:
	antibodies. It can be used to treat severe MG that	* Supportive care in a	regain muscle strength and function.	exact mechanism of ICI- associated aseptic meningitis is	* Peripheral neuropathy with
	does not respond to other treatments.	hospital or intensive care unit (ICU) * Mechanical ventilation to	* **Occupational therapy:** Occupational therapy can help patients with MG or	not fully understood, but it is thought to be an autoimmune reaction.	significant sensory or motor impairment * Mvasthenia gravis with mild to
	In some cases, other medications, such as	help with breathing * Medications to control	GBS to learn how to perform activities of daily living with	### Other immune-related	moderate symptoms * Encephalitis or meningitis with
	azathioprine and mycophenolate mofetil, may also be used to treat	seizures and other symptoms * Rehabilitation therapy to bein regain lost function	their limitations.	adverse events (irAEs)	mild to moderate neurologic impairment * Transverse myelitis with mild to
	ICI-associated MG.	The specific treatment plan	supportive care treatments, patients with MG or GBS may	that can occur in patients receiving ICI therapy. These side	moderate neurologic impairment
	The specific treatment plan that is right for a	that is right for a patient with ICI-associated encephalitis will depend on the severity of	also need to receive specific medications to treat their	effects are caused by the immune system attacking healthy calls and tissues. Other	It is important to note that the decision of whether or not to
	MG will depend on the severity of the MG, the	the encephalitis, the patient's other medical conditions, and	patients with MG may need to receive corticosteroids,	irAEs that can affect the central nervous system include	neurologic toxicity is a complex one that should be made on a
	patient's other medical conditions, and the	the patient's response to treatment.	pyridostigmine, or intravenous immunoglobulin	encephalitis, myelitis, and Guillain-Barré syndrome.	case-by-case basis, taking into account the severity of the
	treatment.	It is important to note that ICI-associated encephalitis is	need to receive IVIg or plasma exchange.	### Subarachnoid hemorrhage	to treatment, and the patient's overall prognosis.
	In addition to medication, there are a number of	a rare and serious condition. It is important to seek	The specific supportive care	Subarachnoid hemorrhage is a type of stroke that occurs when	In addition to the indications
	trungs that patients with ICI-associated MG can do to manage their	imedical attention immediately if you are taking ICIs and develop anv	treatments and medications that a patient with MG or GBS needs will depend on	a blood vessel in the brain ruptures. The blood can leak into the subarachnoid space, which is	may also be considered when making the decision of whether or
	symptoms and improve their quality of life. These	symptoms of encephalitis, such as headache, confusion,	the severity of their condition and their response	the space between the brain and the meninges. This can cause	not to permanently discontinue ICIs for neurologic toxicity:
	include:	seizures, or changes in	to treatment.	inflammation of the meninges	

	behavior.		and meningitis.	* The patient's cancer type and
* Getting plenty of rest		Here are some additional tips		stage
* Eating a healthy diet	If you have any questions or	for providing supportive care	### Carcinomatous meningitis	* The patient's response to ICI
* Avoiding strenuous	concerns about the	to patients with MG or GBS:		therapy
activity	treatment of ICI-associated		Carcinomatous meningitis is a	* The patient's other medical
* Using adaptive devices,	encephalitis, please talk to	* Be patient and	type of meningitis that occurs	conditions
such as caries and walkers,	your doctor.	understanding. Patients with	when cancer cells spread to the	The patient's preferences
* Managing stress		fatigue weakness and other	through the bloodstream or	If you have any questions or
ivialiaging stress		symptoms that can make it	through direct extension of the	concerns about whether or not t
If you have any questions		difficult for them to perform	tumor	permanently discontinue ICIs for
or concerns about the		activities of daily living.	tunioi.	neurologic toxicity, please talk to
treatment of ICI-		* Provide a safe and	### Drug-induced meningitis	your doctor.
associated MG, please talk		comfortable environment.	5 5	
to your doctor.		Patients with MG or GBS may	Drug-induced meningitis is a rare	
		be at risk of falls and other	side effect of certain	
		injuries. Make sure that their	medications, including some	
		environment is free of	antibiotics and nonsteroidal anti-	
		hazards and that they have	inflammatory drugs (NSAIDs).	
		access to assistive devices if		
		needed.	## Diagnostic workup	
		encourage the patient to	The diagnostic workup for ICI	
		much as possible involve the	associated meningitis will	
		patient in making decisions	typically include a lumbar	
		about their care. This will	puncture. This is a procedure in	
		help them to feel more in	which a needle is inserted into	
		control of their situation.	the spinal cord to collect	
		* Provide support to the	cerebrospinal fluid (CSF). The	
		patient's family and	CSF is then analyzed for signs of	
		caregivers. MG and GBS can	infection and inflammation.	
		be stressful for both the		
		patient and their loved ones.	Other tests that may be ordered	
		Provide support and	include blood tests, imaging	
		resources to the patient's	studies, and	
		family and caregivers so that	electroencephalography (EEG).	
		they can help the patient to	infection and other causes of	
		lecovel.	meningitis Imaging studies can	
			help to identify any underlying	
			structural abnormalities of the	
			brain. EEG can help to assess the	
			electrical activity of the brain	
			and identify any abnormalities.	
			## Treatment	
			The treatment of ICL associated	
			meningitis will depend on the	
			underlying cause If the	
			meningitis is caused by an	
			infection, then antibiotics or	
			other anti-infective medications	
			will be needed. If the meningitis	
			is caused by an irAE, then	
			corticosteroids or other	
			immunosuppressive medications	
			will be needed.	
			In some cases, patients with ICI	
			associated moningitis may no - 1	
			to be hospitalized for supportivo	
			care and monitoring Supportive	
			care may include intravenous	
			fluids, pain medication. and	
			respiratory support.	
			## Prognosis	
			The prognosis for patients with	
			ICI-associated meningitis is	
			generally good with prompt	
1	1	1	Land the second s	1
			diagnosis and treatment.	
			diagnosis and treatment. However, some patients may	

		neurological complications, such	
		as headache, fatigue, and	
		cognitive impairment.	
		## Conclusion	
		The differential diagnosis for ICI-	
		associated meningitis is broad	
		and includes both infectious and	
		non-infectious causes. Prompt	
		diagnosis and treatment are	
		essential to prevent long-term	
		neurological complications.	

	Cardiac Toxicity	Cardiac Toxicity	Cardiac Toxicity	Cardiac Toxicity	Cardiac Toxicity
Question	What initial screening tests	What are the life threatening	What are the primary	What supportive	What are other potential
	should be ordered if	consequences of immune	treatments for immune	management strategies	cardiovascular toxicities from
	immune checkpoint	checkpoint inhibitor	checkpoint inhibitor	should be undertaken when	immune checkpoint inhibitors
	inhibitor associated	associated myocarditis?	associated myocarditis?	immune checkpoint inhibitor	other than myocarditis?
	myocarditis is suspected?			associated myocarditis is	
				suspected?	
Answer Engine 2	If Immune checkpoint	Immune checkpoint inhibitor	Ine primary treatments for	The following supportive	Other potential cardiovascular
(Baru)	myocarditis is suspected	a rare but serious	(ICI)-associated myocarditis	should be undertaken when	inhibitors (ICIs) other than
	the following initial	complication of ICI therapy It	are:	immune checknoint inhibitor	myocarditis include:
	screening tests should be	is characterized by	u.e.	(ICI)-associated myocarditis is	ingocaratio include:
	ordered:	inflammation of the heart	* **High-dose	suspected:	* **Pericarditis:** Pericarditis is
		muscle, which can lead to a	corticosteroids:**		inflammation of the pericardium,
	* **Electrocardiogram	number of life-threatening	Corticosteroids are powerful	* **Close monitoring:**	the sac that surrounds the heart.
	(EKG)**: An EKG is a non-	consequences, including:	anti-inflammatory drugs that	Patients with suspected ICI-	Pericarditis can cause chest pain,
	invasive test that measures	* ** Caudia and a set to u **	can help to suppress the	associated myocarditis	shortness of breath, and
	the electrical activity of	Cardiomyopathy:	autoimmune response that is	for signs and symptoms of	paipitations. * **Heart failure is
	detect abnormalities in the	in which the heart muscle is	* **Immunosuppressive	worsening heart failure	a condition in which the heart
	heart rhythm and heart	weakened and cannot pump	drugs:** Immunosuppressive	including shortness of	cannot pump enough blood to
	rate.	blood as effectively as it	drugs are medications that	breath, fatigue, swelling in	meet the body's needs. ICI-
	* **Troponin:** Troponin	should. This can lead to heart	weaken the immune system.	the legs and feet, and fluid	associated heart failure can be
	is a protein that is released	failure, which is a life-	They may be used in addition	accumulation in the lungs.	caused by a number of factors,
	into the bloodstream	threatening condition in	to corticosteroids or in	* **Vital sign monitoring:**	including myocarditis, pericarditis,
	when the heart muscle is	which the heart cannot pump	patients who do not respond	This includes monitoring the	and coronary artery vasculitis.
	damaged. A troponin test	enough blood to meet the	to corticosteroids. Some	patient's heart rate, blood	* **Arrhythmias:** Arrhythmias
	myocardial injury	* **Heart failure·** Heart	drugs used to treat ICI-	and temperature	associated arrhythmias can include
	* **NT-proBNP:** NT-	failure is a condition in which	associated myocarditis	* **Oxygen therapy:**	atrial fibrillation, ventricular
	proBNP is a hormone that	the heart cannot pump	include azathioprine,	Oxygen therapy may be	tachycardia, and ventricular
	is released from the heart	enough blood to meet the	mycophenolate mofetil, and	needed if the patient has low	fibrillation.
	when it is under stress. A	body's needs. This can lead to	cyclosporine.	blood oxygen levels.	* **Coronary artery vasculitis:**
	NT-proBNP test can be	a number of complications,	* **Intravenous	* **Intravenous fluids:**	Coronary artery vasculitis is
	used to detect heart	including shortness of breath,	immunoglobulin (IVIg):** IVIg	Intravenous fluids may be	inflammation of the coronary
	failure.	fatigue, swelling in the legs	is a blood product that	needed to maintain hydration	arteries, the arteries that supply
	Other tests that may be	accumulation in the lungs. In	healthy people. It may be	* **Diuretics:** Diuretics are	Coronary artery vasculitis can lead
	ordered include:	severe cases, heart failure can	used in patients who do not	medications that help to	to coronary artery spasm, angina.
		lead to death.	respond to corticosteroids or	remove excess fluid from the	and myocardial infarction (heart
	* **Echocardiogram:** An	* **Arrhythmias:**	immunosuppressive drugs.	body. They may be used to	attack).
	echocardiogram is a non-	Arrhythmias are abnormal	* **Plasma exchange:**	treat heart failure and fluid	* **Hypertension:** Hypertension
	invasive imaging test that	heart rhythms that can be	Plasma exchange is a	accumulation in the lungs.	is high blood pressure. ICI-
	uses ultrasound to	life-threatening. ICI-	procedure in which the	* **Inotropic medications:**	associated hypertension is thought
	heart It can be used to	increase the risk of a number	remove barmful antibodies. It	medications that strengthen	factors including inflammation
	assess the heart's	of arrhythmias, including	may be used in patients who	the heart muscle and	endothelial dysfunction, and
	structure and function.	atrial fibrillation, ventricular	do not respond to other	improve its pumping	activation of the renin-angiotensin-
	* **Cardiac magnetic	tachycardia, and ventricular	treatments.	function. They may be used	aldosterone system.
	resonance (CMR):** CMR	fibrillation.		to treat heart failure.	
	is a non-invasive imaging	* **Cardiogenic shock:**	In some cases, patients with	* **Vasopressors:**	ICI-associated cardiovascular
	test that uses powerful	Cardiogenic shock is a life-	ICI-associated myocarditis	Vasopressors are medications	toxicities can be mild or severe. In
	to produce detailed	which the heart is unable to	may also need supportive	They may be used to treat	threatening It is important to be
	images of the heart. It is	pump enough blood to meet	ventilation and medications	cardiogenic shock.	aware of the potential
	the most sensitive test for	the body's needs. This can	to control heart failure.		cardiovascular toxicities of ICIs so
	diagnosing myocarditis.	lead to low blood pressure,		In addition to these	that they can be diagnosed and
	* **Endomyocardial	organ failure, and death.	The specific treatment plan	supportive measures,	treated promptly.
	biopsy:** An	1	that is right for a patient with	patients with suspected ICI-	11
	endomyocardial biopsy is a	in addition to these life-	ILI-associated myocarditis will	associated myocarditis	Here are some additional tips for
	normality invasive	ICI-associated myocarditic can	myocarditis the national's	with high-dose	associated cardiovascular toxicities
	sample of heart muscle is	also lead to a number of	other medical conditions, and	corticosteroids and/or	
	removed and examined	other serious complications,	the patient's response to	immunosuppressive drugs as	* **Educate patients about the
	under a microscope. It is	such as:	treatment.	soon as possible.	signs and symptoms of ICI-
	the definitive test for				associated cardiovascular
	diagnosing myocarditis.	* **Pericarditis:** Pericarditis	It is important to note that	It is important to note that	toxicities.** Advise patients to seek
	The secold state of the second	is an inflammation of the	ICI-associated myocarditis can	ICI-associated myocarditis	medical attention promptly if they
	ine specific tests that are	pericardium, the sac that	pe a serious condition, and	can be a serious condition,	experience any of the following
	the natient's clinical	Surrounds the neart. Pericarditis can cause chest	are essential to prevent life	drive early diagnosis and treatment are essential to	symptoms: cnest pain, snortness of breath painitations edema
	presentation and the	pain, shortness of breath and	threatening complications	prevent life-threatening	(swelling) in the legs and feet and
	physician's judgment.	palpitations.		complications.	fatigue.
		* **Endocarditis:**			* **Monitor patients for
	It is important to note that	Endocarditis is an infection of		Here are some additional tips	cardiovascular toxicities.** This

the diagnosis of ICI- associated myocarditis is based on a combination of clinical findings, imaging results, and endomyocardial biopsy findings. No single test is *** diagnostic.	e inner lining of the heart. Idocarditis can cause a imber of complications, cluding valvular heart sease, heart failure, and roke. ** Myocardial infarction:** yocardial infarction, also iown as a heart attack, curs when blood flow to	tor managing patients with suspected ICI-associated myocarditis: * ** Provide a safe and comfortable environment.** Patients with suspected ICI- associated myocarditis may	may include performing regular blood pressure checks, electrocardiograms (EKGs), and echocardiograms. * **Treat ICI-associated cardiovascular toxicities promptly.** Treatment may include medications such as
associated myocarditis is Enc based on a combination of nur clinical findings, imaging incl results, and dise endomyocardial biopsy stro findings. No single test is *** diagnostic. Myy	Idocarditis can cause a Imber of complications, cluding valvular heart sease, heart failure, and roke. **Myocardial infarction: ** yocardial infarction, also Iown as a heart attack, curs when blood flow to	suspected ICI-associated myocarditis: * **Provide a safe and comfortable environment.** Patients with suspected ICI- associated myocarditis may	blood pressure checks, electrocardiograms (EKGs), and echocardiograms. * **Treat ICI-associated cardiovascular toxicities promptly.** Treatment may include medications such as
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findings. No single test is diagnostic. Myu kno	**Myocardial infarction:** yocardial infarction, also own as a heart attack, curs when blood flow to	Patients with suspected ICI- associated myocarditis may	promptly.** Treatment may include medications such as
diagnostic. Myu kno	yocardial infarction, also own as a heart attack, ccurs when blood flow to	associated myocarditis may	include medications such as
kno	own as a heart attack, curs when blood flow to		
	curs when blood flow to	be at risk for arrhythmias and	corticosteroids,
OCC		heart failure. Make sure that	immunosuppressive drugs, and
the	e heart muscle is blocked.	their environment is free of	diuretics. In some cases, patients
This	is can damage or destroy	hazards and that they have	may need to be hospitalized for
the	e heart muscle and can lead	access to medical care if	supportive care.
to h	heart failure and death.	needed.	
		* **Educate the patient and	It is important to note that the risk
It is	is important to note that	their family about ICI-	of ICI-associated cardiovascular
ICI-	I-associated myocarditis is a	associated myocarditis.**	toxicities is relatively low. However,
rare	re but serious complication	Explain the signs and	it is important to be aware of the
of Ir	ICI therapy. Early diagnosis	symptoms of worsening	potential risks and to monitor
and	d treatment are essential to	heart failure and the	patients closely for any signs or
pre	event life-threatening	importance of seeking	symptoms of cardiovascular
con	mplications.	medical attention promptly.	toxicity.
		* **Provide support to the	
		patient and their family.**	
		ICI-associated myocarditis	
		can be a stressful experience	
		for both the patient and their	
		loved ones. Be available to	
		answer questions and	
		provide support.	

Patient Specific Scenarios						
	ICI general - practical	ICI general - practical	Colitis – practical	Colitis – practical		
Question	My patient is a 65 year old	My patient is a 77 year old	57 year old with MSI-high	62 year old with diarrhea		
	with a history of a heart	with a history of rheumatoid	colorectal cancer on	following 3 doses of		
	transplant and several	arthritis on methotrexate and	ipilimumab and nivolumab	pembrolizumab given for		
	episodes of acute	prednisone. They now have	has come in with a total of 20	metastatic non-small cell		
	rejection, now on	metastatic melanoma with	bowel movements over the	lung cancer had initial		
	prednisone and	liver and bone metastases.	last 2 days. Her labs are	improvement from 8 bowel		
	tacrolimus. They now have	What are the pros and cons of	normal except for slightly low	movements per day to 3, but		
	metastatic melanoma. Are	different immune therapy	potassium (3.4). What is the	has now worsened with		
	impune checkpoint	options, specifically anti-PD-1	best treatment for her?	movements today, He is still		
	inhibitor thorapy?	of inilimumab and		on produisono 1mg/kg What		
	initiation therapy?	nivolumah?		is my next step in treatment?		
Answer Engine 1	Treating metastatic	For a 77-year-old natient with	A 57-year-old natient with	In a 62-year-old patient with		
(ChatGPT)	melanoma in a patient	a history of rheumatoid	MSI-high (microsatellite	metastatic non-small cell		
(with a history of organ	arthritis (RA) on methotrexate	instability-high) colorectal	lung cancer (NSCLC) who has		
	transplantation.	and prednisone, and now	cancer on combination	developed diarrhea following		
	particularly a heart	diagnosed with metastatic	immunotherapy with	treatment with		
	transplant, and a history of	melanoma with liver and	ipilimumab (a CTLA-4	pembrolizumab (an anti-PD-1		
	acute rejection episodes, is	bone metastases, the choice	inhibitor) and nivolumab (a	therapy), and whose		
	highly complex. Immune	between anti-PD-1	PD-1 inhibitor) who is	condition initially improved		
	checkpoint inhibitors, such	monotherapy (e.g.,	experiencing a significant	on prednisone 1 mg/kg from		
	as CTLA-4, PD-1, and PD-L1	pembrolizumab or nivolumab)	increase in bowel movements	8 bowel movements per day		
	inhibitors, have	and combination therapy with	(20 over the last 2 days) is	to 3 but has since worsened		
	revolutionized the	ipilimumab (a CTLA-4	likely suffering from an	back to 8 bowel movements		
	treatment of metastatic	inhibitor) and nivolumab (a	immune-related adverse	per day, the worsening of		
	melanoma by enhancing	PD-1 inhibitor) involves a	event (irAE), specifically	symptoms despite being on		
	the body's immune	careful consideration of	colitis, which is a known side	high-dose corticosteroids		
	response against tumor	various factors. Both	effect of this type of therapy.	suggests a severe grade of		
	cells. However, these	treatment strategies have	The slightly low potassium	immune-related colitis or an		
	therapies can also lead to	shown effectiveness in	level (3.4) could be a result of	inadequate response to		
	enhanced immune	metastatic melanoma, but	the increased bowel	corticosteroids. Here's how		
	responses against	they differ significantly in	movements. Immediate and	you can proceed:		
	transplanted organs,	their side effect profiles and	appropriate management is			
	potentially resulting in	potential impact on	crucial to prevent further	### Immediate Steps:		
	graft rejection.	underlying conditions like RA.	complications and ensure	4 ***		
			patient safety.	1. **Assessment and		
	Given your patient's	### Anti-PD-1 Monotherapy		Supportive Care:**		
	history and current	(e.g., Pembrolizumab,	### Initial Management	- Conduct a thorough		
	immunosuppressive	Nivolumab)	Steps:	assessment to rule out		
	regimen (prednisone and	**Droc.**	1 **Discontinuo	infectious causes of diarrnea,		
	immuno chocknoint	**Efficacy:** Apti PD 1	I. Discontinue	or mimic the symptoms of		
	inhibitors poses a	- Efficacy. After-D-1	Temporarily stopping the	immune-related colitis		
	significant risk	efficacy in the treatment of	inilimumah and nivolumah is	- Ensure the nationt is		
	Immunosuppressive	metastatic melanoma	usually the first sten in	adequately hydrated and		
	medications are used to	improving overall survival and	managing severe irAFs to	manage electrolyte		
	reduce the activity of the	progression-free survival in	reduce immune system	imbalances. Hospitalization		
	patient's immune system	many patients.	activation.	may be necessary for		
	to prevent organ rejection,	- **Tolerability:** Generally,		intravenous fluids and closer		
	while immune checkpoint	anti-PD-1 monotherapy is	2. **Hydration and	monitoring, especially if		
	inhibitors aim to boost the	better tolerated than	Electrolyte Management:**	there's concern for		
	immune system to fight	combination therapy, with a	Given the increased bowel	dehydration or other		
	cancer, which could lead to	lower incidence of severe	movements and slightly low	complications.		
	an increased risk of	immune-related adverse	potassium, the patient will			
	transplant rejection.	events (irAEs).	need intravenous fluids to	**Modify Corticosteroid		
		- **RA Consideration:**	maintain hydration and	Therapy:**		
	There have been case	Monotherapy may pose a	correct electrolyte	- Confirm that the patient is		
	reports and studies	lesser risk of exacerbating	imbalances.	adhering to the prescribed		
	discussing the use of	autoimmune conditions like		prednisone regimen and		
	Immune checkpoint	RA compared to combination	3. **Corticosteroids:**	assess whether the current		
	innibitors in patients with	therapy, although the risk of	Initiate systemic	dose is adequate.		
	solid organ transplants,	IFAES STILL EXISTS.	conticosteroids, such as	- in cases where symptoms		
	often bigblight the deliver	**Concu**	prednisone or	persist or worsen despite		
	balance between treating	**Limited Personal in Com-	roduce inflammation. The	nigh-dose corticosteroids for		
	the cancer and preserving	- Limiteu Response in Some	decage can be significant	increasing the continenters		
	the function of the	nations respond well others	such as 1-2 mg/kg of	dose temporarily		
	transplanted organ in	may have limited or no	prednisone equivalent	dose temporarily.		
	some cases nationts on	response to monotherapy	depending on the severity of	3 **Advanced		
	these theranies have	narticularly in cases of high	the symptoms	Immunomodulatory		
	experienced organ	tumor hurden or aggressive	are symptoms.	Therany:**		
	rejection, which can be	disease.	4. **Symptom	- If there's no significant		
	life-threatening, especially	alsease.	Management:** Provide	improvement with		
	,					

in the context of a heart	- **Risk of Immune-Related	supportive care to manage	corticosteroids, or if	
transplant.	Adverse Events:** Despite a	symptoms, including	symptoms are severe,	
	better safety profile than	antidiarrheal medications if	consider introducing an	
In your patient's case, a	combination therapy.	appropriate and not	advanced	
multidisciplinary approach	monotherapy can still lead to	contraindicated.	immunomodulatory agent	
involving oncologists.	irAEs, potentially affecting any		such as infliximab (a TNF- α	
transplant specialists, and	organ system, including	5. **Gastroenterology	inhibitor) or vedolizumab (an	
other healthcare	exacerbation of RA.	Consultation:** Involve a	α4β7 integrin blocker).	
professionals is crucial to		gastroenterologist for further	Infliximab is often used for	
thoroughly assess the	### Combination Therapy	evaluation, including the	steroid-refractory colitis, but	
potential benefits and	(Ipilimumab + Nivolumab)	potential need for a	it should be avoided if there's	
risks. The decision to	(, , , , , , , , , , , , , , , , , , ,	colonoscopy to assess the	a suspicion of an infectious	
proceed with immune	**Pros:**	extent of colitis and to rule	process until infections are	
checkpoint inhibitor	- **Higher Response Rates:**	out other causes of diarrhea.	adequately ruled out or	
therapy would need to be	Combination therapy has		treated.	
highly individualized	been shown to result in	### If Symptoms Do Not	il colcol	
considering factors such	higher response rates and	Improve:	4 **Gastroenterology	
as.	longer duration of response in	mprotei	Consultation:**	
43.	some natient nonulations	- **Advanced Theranies·** If	- Involve a	
- The urgency and	compared to monotherapy	there is no improvement with	gastroenterologist for further	
aggressiveness of the	notentially offering a greater	corticosteroids within a few	evaluation which may	
melanoma	chance of significant tumor	days or the symptoms are	include endoscopic	
- The stability and function	reduction	severe inflivimab (a TNE	assessment to confirm the	
of the transplanted beart	**Supergistic Mechanism:**	alaba inhihitar) ar	diagnosis and assess the	
The patient's everall	- synergistic Mechanism:**	aipila IIIIIDILOI J OF	unagriousis and assess the	
- me patient s overall	different checks sizes (CTL)	veuolizumab (an integrin	severity of collds. This can	
nearth status and potential	amerent checkpoints (CILA-4	receptor antagonist) may be	also help in ruling out other	
for tolerating treatment-	and PD-1), which may provide	considered. These	potential causes of diarrhea.	
related adverse effects	a more robust activation of	medications can be effective	C **Discontinu	
- Available alternative	the immune system against	in treating steroid-refractory	5. **Discontinue	
therapies for the	tumor cells.	irAE colitis.	Immunotherapy:**	
melanoma that might pose			- Given the severe immune-	
less risk to the	**Cons:**	 **Hospitalization:** 	related adverse event,	
transplanted organ	 **Increased Toxicity:** The 	Patients with severe	pembrolizumab should be	
	risk of severe irAEs is	symptoms or complications	held until a complete	
It's also essential to have	significantly higher with	may require hospitalization	resolution of symptoms. The	
detailed discussions with	combination therapy, which	for closer monitoring and	decision to rechallenge with	
the patient regarding the	can lead to serious	management.	pembrolizumab in the future	
potential risks and benefits	complications and may		should be made with caution	
of such treatment,	require discontinuation of	### Monitoring and Follow-	and involves a thorough risk-	
including the possibility of	treatment.	Up:	benefit analysis.	
transplant rejection and	 **Management of RA:** 			
the need for close	The increased immune	 **Close Monitoring:** 	### Monitoring and Follow-	
monitoring.	response with combination	Regular monitoring of	Up:	
	therapy could potentially	symptoms, lab values		
Given the complexity of	exacerbate RA or other	(including electrolytes), and	 **Close Monitoring:** 	
your patient's case,	autoimmune conditions,	overall health status is crucial	Regularly assess the patient's	
consulting the latest	requiring more intensive	during treatment.	response to treatment,	
clinical guidelines and	management of these	-	including symptom	
potentially seeking advice	conditions.	- **Re-evaluation for	improvement and notential	
for an example of the			improvement and potential	
from centers with	 **Elderly Patients:** The 	Immunotherapy:** Re-	side effects of the	
experience in treating	 **Elderly Patients:** The increased risk of adverse 	Immunotherapy:** Re- introducing immunotherapy	side effects of the immunomodulatory agents.	
experience in treating cancer in transplant	 **Elderly Patients:** The increased risk of adverse events may be of particular 	Immunotherapy:** Re- introducing immunotherapy should be carefully	side effects of the immunomodulatory agents. - **Tapering	
experience in treating cancer in transplant recipients could provide	 **Elderly Patients:** The increased risk of adverse events may be of particular concern in elderly patients. 	Immunotherapy:** Re- introducing immunotherapy should be carefully considered and generally	side effects of the immunomodulatory agents. - **Tapering Corticosteroids:** Once	
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	due to the risk of	multidisciplinary approach	often involving a	
	exacerbating the autoimmune	involving oncology,	multidisciplinary team	
	condition.	gastroenterology, and	including oncologists,	
	 **Monitoring and 	possibly other specialties is	gastroenterologists, and	
	Management:** Regardless	essential for optimal patient	potentially infectious disease	
	of the chosen therapy, close	care.	specialists. The patient's	
	monitoring for irAEs is		overall clinical status,	
	essential, and a plan for		response to therapy, and	
	managing these, including the		potential risks should guide	
	potential need for		treatment decisions.	
	immunosuppressants, should			
	be in place.			
	Given the complexity of the			
	situation, a multidisciplinary			
	approach involving			
	oncologists, rheumatologists,			
	and potentially other			
	specialists is crucial to tailor			
	the treatment plan to the			
	patient's specific needs.			
	considering both the			
	melanoma and RA. In some			
	cases, consultation with a			
	tertiary cancer center with			
	experience in treating cancer			
	patients with underlying			
	autoimmune diseases may			
	provide additional valuable			
	insights			
	mangino.	l		

	Honotitic practical	Hanatitic practical	Proumonitic practical	Droumonitic practical	
Question	A2 year old whether	The nations had a -	Friedmonitus – practical	Friedmonius - practical	
Question	42 year old who has	ine patient had no	bo year old with metastatic	For the patient in the prior	
	received 2 doses of	improvement in 3 days with	non-small cell lung cancer	scenario, what is the best	
	ipilimumab and nivolumab	prednisone 1mg/kg. What is	who has received 5 doses of	treatment?	
	for metastatic melanoma	the next step?	pembrolizumab presents with		
	now has increase in liver		dry cough and shortness of		
	with permal (ASI 420		Chost y ray shows diffuse		
	with normal <45; ALT 475		hilatoral opacities new from		
	With Hormal <43).		prior Owgon saturation is		
	phosphatase and other		87% (from a baseling of 98%)		
	labs are normal and the		What is the most likely		
	natient is asymptomatic		diagnosis?		
	What is the treatment?		uugnosist		
Answer Engine 1	An asymptomatic 42-year-	If the nations with metastatic	The presentation of a 68-year-	For the 68-year-old nationt	
(ChatGPT)	old patient with metastatic	melanoma who has been	old natient with metastatic	with metastatic non-small	
()	melanoma who has	treated with inilimumab and	non-small cell lung cancer	cell lung cancer (NSCLC) who	
	received two doses of	nivolumab shows no	(NSCLC), who has received	has developed suspected	
	ipilimumab (a CTLA-4	improvement in liver function	five doses of pembrolizumab	pembrolizumab-induced	
	inhibitor) and nivolumab (a	tests (LFTs) after 3 days of	and is now experiencing a dry	pneumonitis, evidenced by a	
	PD-1 inhibitor) and now	high-dose prednisone (1	cough and shortness of	dry cough, shortness of	
	presents with significantly	mg/kg), it's essential to	breath for the last 5 days,	breath, a significant drop in	
	elevated liver enzymes	escalate the management.	accompanied by a drop in	oxygen saturation (from 98%	
	(AST and ALT) but normal	This situation indicates a	oxygen saturation from 98%	to 87%), and new diffuse	
	bilirubin, alkaline	severe or steroid-refractorv	to 87% and new diffuse	bilateral opacities on chest X-	
	phosphatase, and other	immune-mediated hepatitis,	bilateral opacities on chest X-	ray, the best treatment	
	lab values, is likely	which requires immediate	ray, strongly suggests an	approach involves immediate	
	experiencing an immune-	and more aggressive	immune-related adverse	and specific interventions:	
	related hepatotoxicity, also	treatment:	event (irAE) of pneumonitis.		
	known as immune-			### Immediate Treatment	
	mediated hepatitis. This is	### Immediate Next Steps:	Pembrolizumab is a PD-1	Steps:	
	a recognized side effect of		inhibitor used in the		
	both ipilimumab and	1. **Increase Corticosteroid	treatment of various cancers,	1. **Discontinue	
	nivolumab, with the	Dose:**	including NSCLC. While it can	Pembrolizumab:**	
	combination therapy	- Consider increasing the	be effective against cancer, it	- Temporarily halt	
	having a higher incidence	corticosteroid dose, for	can also cause the immune	pembrolizumab treatment to	
	of hepatotoxicity than	instance, to	system to attack normal	prevent further immune	
	either agent alone.	methylprednisolone 2	organs and tissues in the	stimulation.	
	-	mg/kg/day, especially if the	body, leading to irAEs.		
	### Initial Treatment	patient was on oral	Pneumonitis, an inflammation	2. **Initiate	
	Approach:	prednisone, to ensure	of lung tissue, is a recognized	Corticosteroids:**	
		adequate treatment of the	irAE associated with PD-1 and	- Start systemic	
	1. **Hold	severe immune-mediated	PD-L1 inhibitors. The	corticosteroids to reduce	
	Immunotherapy:**	hepatitis.	symptoms, radiographic	inflammation in the lungs.	
	- Temporarily discontinue		changes, and the temporal	For moderate to severe	
	both ipilimumab and	**Initiate Second-Line	association with	pneumonitis (which this case	
	nivolumab until liver	Therapy:**	pembrolizumab treatment in	appears to be, given the	
	function tests (LFTs)	- If there's no response to	this patient point towards	oxygen saturation of 87% and	
	normalize or significantly	the increased corticosteroid	pembrolizumab-induced	diffuse bilateral opacities),	
	improve. This is a standard	therapy or if the LFTs continue	pneumonitis as the most	high-dose corticosteroids	
	approach for grade 3 or	to worsen, initiate second-line	likely diagnosis.	such as prednisone at 1-2	
	higher hepatotoxicity, as	immunosuppressive therapy.		mg/kg/day or equivalent are	
	per Common Terminology	Mycophenolate mofetil	### Key points supporting this	recommended. In cases of	
	Criteria for Adverse Events	(MMF) is commonly used for	diagnosis:	severe respiratory	
	(CTCAE).	steroid-refractory cases. The		compromise, intravenous	
	a ***	typical starting dose is 1000	- **Symptoms:** The dry	methylprednisolone may be	
	2. **Initiate	mg twice daily, which can be	cough and shortness of	preterred.	
	Corticosteroids:**	adjusted based on response	breath are typical symptoms	2 ***	
	- Start systemic	and tolerability.	or pneumonitis.	3. "Supportive Care:**	
	corticosteroids, such as	2 **0	Oxygen Saturation:** The	- Provide supplemental	
	preanisone of	5. Consultation and	significant drop in oxygen	oxygen to maintain oxygen	
	high dose (e.g. 1.2	Hospitalization:**	saturation indicates impaired	Saturation above 90%.	
	mg/kg/day of aradaicar -	- nospitalization for close	gas excludinge, Which is		
	equivalent) The goal is to	not already done is highly	- **Radiographic Findings**	needed based on the	
	reduce liver inflammation	recommended due to the rick	Diffuse bilateral opacities op	natient's symptoms and	
	and prevent further	of ranid progression to liver	chest X-ray which are new	overall condition	
	damage.	failure.	compared to prior imaging		
	Ber	- Consult a hepatologist for	suggest a diffuse	### Further Evaluation and	
	 Close Monitoring: 	expert management and to	inflammatory process in the	Monitoring:	
	- Monitor LFTs closely	consider other potential	lungs.		
	(e.g., every 2-3 days) to	treatments, including	- **Temporal Relationship:**	- **High-Resolution CT	
	assess response to	tacrolimus or infliximab	The onset of symptoms after	Scan:** To obtain a detailed	
	corticosteroids and	(though infliximab is typically	several doses of	view of the lung parenchyma	
	progression of	avoided in cases of hepatitis	pembrolizumab suggests a	and to better characterize the	

	hepatotoxicity. Also,	due to the potential for	possible link to the	extent and pattern of lung	
	monitor for potential side	hepatotoxicity).	immunotherapy, as irAEs can	involvement.	
	effects of corticosteroid		occur after multiple doses	- **Infectious Workup:**	
	therapy.	**Re-evaluation:**	and may not necessarily	Rule out infectious causes of	
	- Assess for symptoms of	 Re-evaluate the patient to 	present immediately after the	the symptoms, such as	
	liver dysfunction (e.g.,	ensure there are no other	first dose.	bacterial pneumonia, viral	
	fatigue, jaundice, dark	contributing factors to the		pneumonia (including COVID-	
	urine, abdominal pain)	liver injury, including viral	Immediate steps should	19), or opportunistic	
	even if the patient is	hepatitis, other hepatotoxic	include:	infections, as these can	
	currently asymptomatic.	medications, alcohol use, or		mimic or coexist with	
		biliary obstruction. This may	- **Holding	pneumonitis.	
	### If There's No	include imaging studies like	Pembrolizumab:** The	- **Pulmonary	
	Improvement or	ultrasound or MRI and	immunotherapy should be	Consultation:** Involvement	
	Worsening Liver Function:	possibly a liver biopsy to	temporarily discontinued	of a pulmonologist for expert	
		guide management.	until a thorough evaluation is	management and	
	- **Advanced		conducted and the condition	consideration of a	
	Immunosuppressive	5. **Supportive Care:**	is managed.	bronchoscopy with	
	Therapy:**	- Ensure supportive care,	- **Further Evaluation:** This	bronchoalveolar lavage if the	
	- If there's no	including management of	should include a high-	diagnosis is uncertain or if	
	improvement with	symptoms and prevention of	resolution CT scan of the	there is no improvement	
	conticosteroids within a	complications associated with	chest for a better assessment	with Initial treatment.	
	week, or it liver enzymes	dose steroid uso	nulmonary function tests (if	### If No Improvement or	
	additional		the nationally runction tests (If	Worsening:	
	immunosuppressivo	### Monitoring and Eurthor	allows) and possibly	worsening.	
	therany Myconhonolato	Management:	bronchoscopy with	- **Additional	
	mofetil (MMF) or	management.	bronchoalveolar lavage to	Immunosuppression ** If	
	tacrolimus are notential	- **Close Monitoring.**	exclude infectious causes and	there is no response to	
	options, often used in	Regularly monitor I FTs renal	further characterize the	corticosteroids within 48-72	
	consultation with a	function and other relevant	nature of the nulmonary	hours or if the natient's	
	henatologist	lab parameters to assess	infiltrates	condition worsens consider	
	neputologisti	response to treatment and	- **Management of	additional	
	- **Hepatology	adjust therapy as needed.	Pneumonitis:** Depending	immunosuppressive	
	Consultation:**	- **Tapering	on the grade of pneumonitis	therapies such as infliximab	
	- Involve a hepatologist	Corticosteroids:** Once LFTs	(mild to severe, based on	(a TNF-α inhibitor.	
	for further evaluation and	begin to improve, gradually	symptoms and imaging).	contraindicated if there's a	
	management, especially if	taper the corticosteroids to	treatment may range from	suspicion of an infectious	
	advanced	the lowest effective dose to	close observation with	etiology) or mycophenolate	
	immunosuppression is	minimize potential side	supportive care for very mild	mofetil.	
	being considered or if	effects, under close	cases to high-dose	 **Hospitalization:** 	
	there's any diagnostic	supervision.	corticosteroids for more	Patients with significant	
	uncertainty.	 **Long-term Follow-up:** 	severe presentations.	respiratory compromise may	
		After resolution, patients	- **Consultation with	require hospitalization,	
	### Additional	require long-term follow-up	Specialists:** Involvement of	potentially in an intensive	
	Considerations:	given the risk of recurrence	a pulmonologist and possibly	care unit, for closer	
		and to manage the long-term	a critical care specialist,	monitoring and	
	- **Rule Out Other	effects of high-dose steroids	especially if there's significant	management.	
	Causes:**	and other	respiratory compromise.		
	- While immune-	immunosuppressants.		### Long-term Management:	
	mediated hepatitis is likely		The management of irAEs like		
	given the context, it's	Managing severe immune-	pneumonitis requires a	- **Gradual Tapering of	
	important to rule out	mediated hepatitis in the	careful balance between	Corticosteroids:** Once the	
	other potential causes of	context of cancer	treating the adverse event	patient shows clinical	
	liver injury, including viral	immunotherapy is complex	and managing the underlying	improvement, gradually	
	nepatitis, alcohol use, and	and often requires a	cancer, often necessitating a	taper the corticosteroids over	
	other arug-induced liver	multidisciplinary approach,	muitidisciplinary approach.	a period of at least 4-6 weeks	
	injury.	involving oncology,		to prevent recurrence.	
	**Dointraduction	nepatology, and possibly		- Ke-assessment for	
	- **Keintroduction of	other specialties to ensure		immunotherapy:** The	
	Decisions reporting the	comprehensive care.		nombrolizumab as to	
	- Decisions regarding the			consider alternative cancer	
	immunotherapy should be			treatments should be made	
	made cautiously once LETC			carefully considering the	
	have normalized and			severity of the pneumonitic	
	should take into			the patient's lung function	
	consideration the severity			recovery, and the oncological	
	of the hepatitis enisode			status. In many cases re-	
	the availability of			exposure to the same agent	
	alternative treatments.			that caused severe	
	and the patient's overall			pneumonitis is avoided.	
	cancer status. Often.				
	rechallenge with both			This situation requires a	
	agents may not be			multidisciplinary approach.	
1	recommended, and			involving oncologists,	

consultation with an	pulmonologists, and	
oncologist experienced in	potentially critical care	
immunotherapy is advised.	specialists, to ensure optimal	
	management of the	
The management of	pneumonitis and underlying	
immune-related	NSCLC.	
hepatotoxicity requires a		
careful, stepwise approach		
and close collaboration		
with specialists, including		
oncologists and		
hepatologists, to ensure		
the best outcomes for the		
patient.		

	· · · · · · ·	· · · · · · · · · · · · · · · · · · ·	and the state		
<u> </u>	Dermatitis – practical	Dermatitis – practical	Inyroid – practical	Inyroid - practical	
Question	82 year old man with	In the patient in the previous	58 year old with stage III	The patient in the prior	
	metastatic renal cell	scenario, what would be	melanoma on adjuvant	scenario returns for her next	
	carcinoma who has	concerning signs that would	pembrolizumab presents for	infusion 3 weeks later. The	
	received 2 doses of	indicate admission to the	dose 4 and is feeling well. TSH	TSH is now 22 (normal 0.36 -	
	pembrolizumab and	hospital or treatment with	is elevated to 4.5 (normal	3.6) and Free T4 is 0.45	
	axitinib presents with an	oral steroids?	0.35 - 3.6).Free T 4 and T3 are	(normal 0.7 - 1.35). The	
	itchy maculopapular rash		normal. How should the	patient has mild fatigue and	
	on the chest and arms		natient he managed?	extremity swelling How	
	covering approximately		patient be managear	should the nationt be	
	10% of the body surface			managed2	
	10% of the body surface			manageur	
	area. what is the				
	treatment for this rash?				
Answer Engine 1	An 82-year-old man with	For the 82-year-old man with	The presentation of an	The significant elevation in	
(ChatGPT)	metastatic renal cell	metastatic renal cell	elevated TSH (4.5, with	TSH to 22 (with a normal	
	carcinoma receiving	carcinoma who has	normal range being 0.35 - 3.6)	range of 0.36 - 3.6) and a	
	pembrolizumab (an anti-	developed an itchy	in a 58-year-old patient with	decrease in Free T4 to 0.45	
	PD-1 therapy) and axitinib	maculopapular rash on the	stage III melanoma on	(normal range 0.7 - 1.35),	
	(a tyrosine kinase	chest and arms covering	adjuvant pembrolizumab,	accompanied by mild fatigue	
	inhibitor) who presents	approximately 10% of the	who is otherwise feeling well	and extremity swelling.	
	with an itchy	body surface area after	and has normal free T4 and	indicate that the natient has	
	maculonanular rash on the	receiving pembrolizumab and	T3 levels suggests subclinical	progressed from subclinical	
1	chest and arms covoring	avitinih the rach is likely an	hypothyroidism This	hypothyroidism to overt	
	approximately 10% of the	immuno rolatod adverse	condition can assure as an	hypothyroidism This shares	
1	approximately 10% of the	minune-related adverse	condition can occur as an	in the main for a line to a line the main for a line to	
	body surface area is likely	event (IrAE) from	immune-related adverse	in thyroid function,	
	experiencing a cutaneous	pembrolizumab, a PD-1	event (IrAE) due to	particularly in the context of	
	immune-related adverse	inhibitor, possibly	pembrolizumab therapy,	pembrolizumab treatment	
	event (irAE) from	exacerbated or influenced by	which can induce thyroid	for stage III melanoma, is	
	pembrolizumab, a drug-	axitinib, a tyrosine kinase	dysfunction by triggering an	consistent with an immune-	
	induced rash from axitinib,	inhibitor. Initial management	immune response against the	related adverse event (irAE)	
	or a combination of both.	of such mild to moderate	thyroid gland.	affecting the thyroid gland.	
	Treatment strategies	dermatologic irAEs typically			
	typically focus on	involves topical therapies and	### Management Approach:	### Management Approach:	
	managing the symptoms	careful monitoring. However	min Management Approach.	www.wanagement.Approach.	
	and proventing	careful monitoring. nowever,	1 **Class Manitaring**	1 **Initiate Lovethyrovinov**	
	and preventing	certain signs and symptoms	1. Close Monitoring:	1. Initiate Levotnyroxine:	
	progression to more	would warrant more	- Since the patient is	- Start levotnyroxine	
	severe skin reactions.	aggressive treatment,	asymptomatic and the free 14	therapy to treat overt	
	Given the extent of body	including oral steroids, or	and T3 levels are within	hypothyroidism. The dose of	
	surface area involved	hospital admission:	normal ranges, close	levothyroxine is typically	
	(10%), this would likely be		monitoring of thyroid	determined based on the	
	classified as a Grade 1 or	### Signs Warranting Oral	function tests (TFTs) is	patient's weight	
	mild skin toxicity according	Steroids or Hospital	recommended. Repeating the	(approximately 1.6	
	to Common Terminology	Admission:	TFTs in 4-6 weeks can help	micrograms per kilogram of	
	Criteria for Adverse Events		determine if the TSH level is	body weight per day) but	
	(CTCAE)	1 **Increased Extent or	trending unward stable or	should be individualized	
	(crone).	Severity of the Pach:**	normalizing	based on age comorbidities	
	### Initial Treatment	If the rach caroads to cover	normalizing.	and covority of	
	### miliai reatment	- if the rash spreads to cover	2 **0	and sevenity of	
	Approach:	more than 30% of the body	2. Symptom Evaluation:**	nypotnyrolaism.	
		surrace area or shows signs of	- Assess for symptoms of	- Given the patient's age	
	1. **Topical Therapies:**	becoming severe (e.g., severe	hypothyroidism, such as	and clinical presentation, it	
	 High-potency topical 	blistering, extensive skin	fatigue, weight gain, cold	may be prudent to start at a	
	corticosteroids (e.g.,	sloughing resembling severe	intolerance, constipation, and	slightly lower dose and titrate	
	clobetasol propionate,	burns).	dry skin, even if the patient	up as needed, especially to	
1	betamethasone		currently feels well. The	avoid potential	
	dipropionate) applied to	**Signs of Severe Skin	absence of symptoms	cardiovascular side effects.	
	the rash areas can help	Reactions:**	supports a more conservative	1	
	reduce inflammation and	- Development of blisters.	approach initially.	2. **Symptom	
	itching. These are typically	skin peeling, or ulceration.	··· /	Management:**	
	used for 2-4 weeks or until	which may indicate more	3. **Consider Levothvroxine	- Address the patient's	
	the rash improves	severe conditions such as	for Symptoms or Rising	symptoms such as fatigue	
	- Emollients or	Stevens-Johnson syndrome	TCH-**	and extremity swelling with	
	moisturizors can balm	(SIS) or toxic oridormal	Initiation of lowethwavier-	supportive care while waiter	
	moisturizers can neip	(515) OF LOXIC epidermal	therapy may be an address of the	for the lowethy and the tail	
1	southe the skin and reduce	necroiysis (TEN).	the actions device and	of the levothyroxine to take	
	aryness and irritation.		the patient develops	eπect. Improvement in	
		 **Involvement of Mucous 	symptoms of hypothyroidism	symptoms should be seen as	
	Antihistamines:	Membranes:**	or if there is a significant rise	the patient's thyroid function	
1	- Oral antihistamines	 Involvement of the eyes, 	in TSH on subsequent testing	normalizes.	
	(e.g., diphenhydramine at	mouth, or genitals, which may	(e.g., >10), even in the	1	
	night for its sedative	suggest a more serious	absence of symptoms. The	3. **Monitor Thyroid	
	effects, or non-sedating	condition like SJS or erythema	decision to start treatment	Function:**	
1	options like cetirizine or	multiforme.	should be individualized,	- Recheck thyroid function	
	loratadine during the day)		taking into account the	tests (TETs) in approximately	
	can provide symptomatic	4 **Systemic Symptoms.**	natient's clinical nicture and	4-6 weeks after starting	
	relief from itching	- The presence of fever	nreferences	levothyrovine or after any	
	rener nom noming.	chills or other systemic	preferences.	doso adjustment to guide	
l	1	crims, or other systemic	1	uose aujustinent to guide	

3. **Skin Care	symptoms could indicate a	4. **Pembrolizumab	further titration of the	
Guidance:**	more serious systemic	Continuation:**	levothyroxine dose. The goal	
 Advise gentle skin care 	involvement that requires	 Continue pembrolizumab 	is to normalize TSH and Free	
practices, such as using	immediate medical attention.	therapy as planned, unless	T4 levels.	
mild, fragrance-free soaps		the patient develops more		
and avoiding irritants or	5. **Signs of Infection:**	severe thyroid dysfunction or	4. **Evaluate Pembrolizumab	
narsh scrubbing that can	- Evidence of secondary	other ITAEs. The development	Continuo with	
exacerbate the fash.	nustules significant warmth	is not typically an indication	- continue with	
### Monitoring and	nurulent discharge increasing	to discontinue or delay	as by not by roidism can be	
Adjustments:	pain) may necessitate	pembrolizumab therapy in	managed with thyroid	
	systemic antibiotic therapy.	the context of melanoma	hormone replacement	
- **Close Monitoring:**		treatment.	without discontinuing the	
Regular follow-up to assess	6. **Impact on Daily		cancer therapy. However,	
the response to treatment	Activities:**	**Endocrinology	communicate closely with	
and the progression of the	- If the rash or associated	Consultation:**	the oncology team regarding	
rash. If the rash worsens or	symptoms significantly impair	- Consider consultation with	the irAE and the	
covers a greater body	the patient's ability to	an endocrinologist if there is	management plan.	
surface area, treatment	perform daily activities or	any uncertainty about the	5 **D	
needs to be escalated.	discomfort	management, if the ISH	5. **Patient Education:**	
- Dose Adjustments for Systemic Therapy:** If the	uistoilliont.	or if the nations transitions	- cuucate trie patient about	
rash becomes more severe	7 **Lack of Response to	from subclinical to overt	importance of adhering to	
(covering >30% of hody	Tonical Treatments	hypothyroidism	levothyroxine therapy and	
surface area, Grade 3 or	- If the rash does not		the need for regular	
higher), or if it's	improve or worsens despite	6. **Patient Education:**	monitoring of thyroid	
accompanied by systemic	appropriate topical therapy	- Educate the patient about	function. Inform the patient	
symptoms, consider	and careful skin care.	the signs and symptoms of	about the potential need for	
holding or dose-adjusting		hypothyroidism and the	lifelong thyroid hormone	
pembrolizumab and/or	### Initial Management	importance of reporting new	replacement, given the	
axitinib after assessing the	Before Escalation:	symptoms or changes in their	likelihood that the	
risk-benefit ratio in		health status.	pembrolizumab-induced	
consultation with the	- For a mild to moderate rash		hypothyroidism may be	
oncology team.	without the concerning	7. **Documentation and	permanent.	
- Systemic Therapies for	reatures mentioned,	Communication: **	6 **Endocrinology	
severe cases. For more	includes:	- Document the infungs and	6. Periodechinology	
systemic treatments such	- Tonical corticosteroids to	national's medical record and	- Consider referral to an	
as oral corticosteroids	reduce inflammation and	communicate the plan with	endocrinologist for further	
(e.g., prednisone) might be	itching.	the patient's primary care	management and	
necessary.	- Oral antihistamines to help	provider and other relevant	optimization of thyroid	
	control pruritus.	healthcare professionals	hormone replacement	
### Severe Rash	- Avoidance of irritants and	involved in the patient's care.	therapy, especially if there	
Management:	careful skin care to prevent		are challenges in normalizing	
	further aggravation of the	Monitoring and management	the thyroid function or if the	
 Grade 3 or Higher: 	rash.	of thyroid function is crucial	patient has other endocrine	
For severe (Grade 3) or		in patients receiving	issues or significant	
lite-threatening (Grade 4)	If any of the concerning signs	pembrolizumab due to the	comorbidities.	
rashes, systemic	develop, it is crucial to	risk of irAEs affecting the	Adama sing and i	
corticosteroias (e.g.,	escalate care promptly:	trivroid giand. A proactive,	ivianaging overt	
preamsone 0.5-1	- **Oral Steroids:** For mora	patient-centered approach	receiving pembrolizumab	
required and both	severe dermatologic in AFs or	the national's thuroid status	involves a multidisciplinary	
pembrolizumab and	those not responding to	worsens, while avoiding	approach, ensuring that the	
axitinib may need to be	topical treatments, systemic	unnecessary treatment in	patient receives appropriate	
discontinued until the rash	corticosteroids may be	those who remain	endocrine care while	
resolves to ≤ Grade 1.	initiated.	asymptomatic with subclinical	continuing necessary cancer	
- **Specialist	- **Hospital Admission:**	changes.	treatment. Regular	
Consultation:** Consider a	Hospitalization may be		monitoring and adjustments	
dermatology consultation	necessary for severe cases,		to the levothyroxine dose will	
for severe or complex	especially if there are signs of		be essential to maintain	
cases, especially if there is	SJS, TEN, or significant		euthyroid status and manage	
concern for other	systemic involvement, for		symptoms effectively.	
if the diagnosis is	mutidisciplinary			
ii the ulagnosis is	dermatology and possibly			
uncertain.	critical care			
The management of skin	entitur turci			
toxicities in patients on	It's also important to consider			
cancer immunotherapy	the role of axitinib in the			
and targeted therapies like	rash's development or			
axitinib requires a careful	exacerbation and to evaluate			
and individualized	the need for dose			
approach, taking into	adjustments or temporary			
account the severity of the	discontinuation of either		l	

skin reaction, the patient's overall clinical status, and the need for ongoing	pembrolizumab or axitinib, in consultation with the treating oncologist		
cancer therapy.	опсоюдин		

	Dituite a la desert a section l	Dituitanu (adapat) yanati ad	Dhaumatala sia una stias l	Discussion in a section i	
Question	44 year old woman with	The patient in the provious	74 year old with metastatic	52 year old on	
Question	metastatic melanoma	scenario has a normal	NSCLC on pembrolizumab	pembrolizumab for adjuvant	
	presents with a headache	laboratory workup except	complains of bilateral knee	treatment of resected renal	
	and severe fatigue after her	for a cortisol that is	and wrist pain 7 weeks after	cell carcinoma develops	
	4th dose of ipilimumab and	undetectable and a TSH of	starting pembrolizumab,	worsening dry mouth for the	
	nivolumab. What diagnostic	0.22 (normal 0.35 - 3.6).	worsening over the last few	last few weeks. Lab workup	
	workup should be done?	Brain MRI shows no	weeks. Laboratory workup	and physical exam is	
		enlargement in the sella	and CCP are unremarkable	oral mucous membranes	
		turcica. What is the most	What is the most likely	What is the most likely	
		likely diagnosis and most	diagnosis and most	diagnosis and most	
		appropriate treatment?	appropriate treatment?	appropriate treatment?	
Answer Engine 1	A 44-year-old woman with	The clinical presentation of a	The 74-year-old patient with	The 52-year-old patient on	
(ChatGPT)	metastatic melanoma	44-year-old woman with	metastatic non-small cell lung	pembrolizumab for adjuvant	
	and severe fatigue after her	developed a beadache and	nembrolizumah who	cell carcinoma, presenting	
	fourth dose of combination	severe fatigue after her	presents with bilateral knee	with worsening dry mouth	
	therapy with ipilimumab	fourth dose of combination	and wrist pain that has	and physical examination	
	and nivolumab requires a	therapy with ipilimumab	worsened over the last few	findings of dry oral mucous	
	thorough diagnostic workup.	and nivolumab, coupled	weeks, is likely experiencing	membranes, is likely	
	indicative of several	with an undetectable	an immune-related adverse	experiencing xerostomia (dry	
	conditions, including	low TSH (0.22 with a normal	inflammatory arthritis.	related adverse event (irAF)	
	immune-related adverse	range of 0.35 - 3.6), strongly	Pembrolizumab, a PD-1	associated with	
	events (irAEs), which are	suggests an immune-related	inhibitor used in the	pembrolizumab therapy.	
	known to occur with this	adverse event (irAE)	treatment of various cancers,	Pembrolizumab, a PD-1	
	combination therapy. The	affecting the pituitary gland,	can stimulate the immune	inhibitor, can cause various	
	workup should aim to	finding of enlargement in	system in a way that leads to	IFAEs due to its mechanism of	
	symptoms, considering both	the sella turcica on brain	symptoms similar to	modulating the immune	
	neurological and systemic	MRI supports this diagnosis	rheumatic diseases. The	system and can sometimes	
	irAEs, as well as other	by indicating inflammation	absence of rheumatoid factor	lead to autoimmune-like side	
	potential etiologies	and potential enlargement	and anti-cyclic citrullinated	effects.	
	unrelated to the	of the pituitary gland, which	peptide (CCP) antibodies		
	innunotherapy.	radiological finding in	traditional rheumatoid	- **Immune-Related	
	### Initial Diagnostic	hypophysitis.	arthritis but rather an irAE.	Xerostomia:** This condition	
	Workup:	//··/		is characterized by reduced	
		### Most Likely Diagnosis:	### Most Likely Diagnosis:	saliva production, leading to	
	1. **Comprehensive History	- **Hypophysitis:** This	- **Immune-Related	dry mouth, and can occur as	
	and Physical Examination:**	condition is an inflammation	Arthritis:** This condition is	an IrAE from Immunotherapy	
	on the onset, duration, and	can lead to various degrees	and inflammation, resembling	important to note that while	
	characteristics of the	of pituitary dysfunction. In	rheumatoid arthritis or other	xerostomia is less common	
	headache and fatigue.	the context of immune	inflammatory arthritides, but	compared to other irAEs, it	
	Assess for associated	checkpoint inhibitor	occurring as a side effect of	can significantly affect the	
	symptoms such as fever,	therapy, particularly with	immune checkpoint inhibitors	patient's quality of life.	
	stiffness or any focal	inilimumab (a CTLA-4	like pembrolizumab.	### Most Appropriate	
	neurological deficits.	inhibitor) and nivolumab (a	### Most Appropriate	Treatment:	
	- Physical examination	PD-1 inhibitor), hypophysitis	Treatment:		
	should include a thorough	is a recognized irAE, though		1. **Symptomatic	
	neurological exam,	it's more commonly	1. **Symptomatic	Management:**	
	assessment for signs of meningismus, and	associated with CTLA-4	 Initial management often 	 Stimulants:** Over-the- 	
	evaluation for	and in the application of the second se	includes nonsteroidal anti-	counter saliva substitutes can	
	lymphadenopathy or other	### Most Appropriate	inflammatory drugs (NSAIDs)	provide temporary relief.	
	masses.	Treatment:	for pain relief and reduction	Saliva stimulants such as	
	a ****	1. **Glucocorticoid	of inflammation. It's	sugar-free gum or candies	
	2. **Laboratory lests:**	Replacement:**	important to consider the	(preferably with xylitol) can	
	(CBC)** with differential to	glucocorticoid replacement	gastrointestinal risk before	saliva production if the	
	assess for anemia, infection,	is crucial to manage adrenal	starting NSAIDs.	patient has some residual	
	or hematological	insufficiency resulting from	-	salivary gland function.	
	abnormalities.	pituitary dysfunction. High-	2. **Local Therapies:**	- **Good Oral Hygiene:**	
	- **Comprehensive	dose intravenous	- Intra-articular	Emphasize the importance of	
	ivietabolic Panel (CMP)** to	giucocorticoids, such as	corticosteroid injections may be beneficial for significant	good oral hygiene practices,	
	function, electrolytes, and	methylprednisolone, may be	ioint pain or swelling that	brushing with fluoride	
	glucose levels.	needed initially, especially if	does not respond to NSAIDs,	toothpaste and flossing, to	
	- **Thyroid Function Tests	the patient is significantly	especially if only one or a few	prevent dental complications	
	(TFTs)** to rule out thyroid	symptomatic.	joints are involved.	that can arise from dry	
	dysfunction, which can be	- After stabilization, the		mouth.	
	an IFAE and cause fatigue.	patient can be switched to		l	

- **Adrenal Function	oral glucocorticoids. and the	3. **Systemic	- **Hydration:** Encourage	
Tests**, including cortisol	dose can be adjusted based	Corticosteroids:**	the patient to stay well-	
levels, as adrenal	on clinical response and	- If the arthritis is	hydrated by sipping water	
insufficiency is a potential	cortisol levels.	polvarticular or NSAIDs are	throughout the day, which	
irAE that can present with		ineffective or contraindicated,	can help alleviate dry mouth	
fatigue and headache.	2. **Electrolyte and Fluid	low-dose oral corticosteroids	symptoms.	
- **Inflammatory	Management:**	(e.g., prednisone) may be	<i>.</i> .	
Markers**, such as ESR	- Monitor and manage	used to control symptoms.	2. **Review Medications:**	
(erythrocyte sedimentation	electrolyte imbalances and	The goal is to use the lowest	- **Review Other	
rate) and CRP (C-reactive	ensure adequate hydration,	effective dose to minimize	Medications:** Evaluate	
protein), which might be	which can be affected by	potential side effects,	other medications the	
elevated in systemic	adrenal insufficiency.	particularly in the elderly.	patient may be taking that	
inflammatory processes.			could contribute to dry	
	**Thyroid Hormone	**Disease-Modifying	mouth, and consider	
Neuroimaging:	Replacement:**	Antirheumatic Drugs	alternatives if possible.	
 MRI of the Brain 	 Although the TSH is 	(DMARDs):**		
with and without contrast to	slightly low, free T4 levels	 For patients with 	**Pilocarpine:**	
assess for any intracranial	and clinical assessment of	persistent or severe	 For more severe cases, 	
abnormalities, including	thyroid function are	symptoms not controlled by	consider prescribing	
metastases, bleeding, or	necessary to determine if	the above measures,	pilocarpine, a cholinergic	
signs of immune-related	thyroid hormone	consideration may be given to	agonist that can stimulate	
encephalitis or other central	replacement is needed. If	disease-modifying	saliva production. The use of	
nervous system (CNS) irAEs.	central hypothyroidism is	antirheumatic drugs	pilocarpine should be	
	diagnosed (which might be	(DMARDs), such as	discussed with the patient,	
4. **Lumbar Puncture:**	the case given the pituitary	methotrexate or	considering potential side	
- If there is a clinical	involvement), levothyroxine	hydroxychloroquine, in	effects like sweating,	
suspicion of meningitis or	therapy should be initiated.	consultation with a	increased urination, and	
encephalitis, particularly if		rheumatologist.	flushing.	
the MRI shows any	4. **Assessment of Other			
concerning findings, to	Pituitary Hormones:**	5. **Hold or Discontinue	4. **Management of	
analyze cerebrospinal fluid	- Evaluate other anterior	Pembrolizumab:**	Underlying Condition:**	
(CSF) for cell count, protein,	pituitary hormones,	- Depending on the severity	- While the primary	
glucose, and possible	including LH, FSH, growth	of the arthritis and the	treatment is symptomatic,	
infectious agents.	hormone, and prolactin, to	response to treatment, it may	it's crucial to monitor for	
	assess the extent of	be necessary to hold	other potential irAEs, given	
5. **Infection Workup:**	pituitary dysfunction and	pembrolizumab temporarily	the context of	
- Consider testing for	address any other	or discontinue it, in discussion	pembrolizumab therapy.	
infections that could present	deficiencies.	with the oncology team.	Regular follow-up and	
with headache and fatigue,			comprehensive evaluation for	
including HIV, syphilis, and	5. **Consultation with	6. **Rheumatology	new or worsening symptoms	
viral hepatitis, based on risk	Endocrinology:**	Consultation:**	are important.	
factors and clinical	- Involve an	- A referral to a		
judgment.	endocrinologist for expert	rheumatologist is advisable	5. **Specialist Referral:**	
	management of	for further evaluation,	- Consider referral to a	
6. **Cardiac Evaluation:**	hypophysitis and endocrine	management, and long-term	dentist or oral medicine	
- IT there's any clinical	aystunctions, including long-	monitoring, particularly if	specialist for further	
indication or history	term hormone replacement	DIVIARDs are being	evaluation and management,	
suggesting a cardiac cause	therapy and monitoring.	considered or if the diagnosis	particularly if there are	
or ratigue, consider an ECG	6 **Mons	is uncertain.	concerns about oral health	
and possibly an	o. Invianagement of	7 ** 0	complications or it standard	
ecnocardiogram to evaluate	Immune Checkpoint	7. **Physical Therapy:**	measures are ineffective.	
cardiac function, especially		- Physical therapy can be	6 **Dotiont Education **	
since irALS can affect any	- Hold Ipilimumab and	function reducing joint	o. Patient Education:**	
organ system.	consult with the appellant	improving the quality of life	- Educate the patient about	
### Eurthor Considerations	toom regarding the risks and	improving the quality of life.	maintaining and hydratian	
### Further Considerations:	bonofits of continuing	9 **Dationt Education **	maintaining oral hydration,	
!	benefits of continuing	8. **Patient Education:	avoiding mouthwashes with	
- **Immune-Related	treatment, given the	- Educate the patient about	aicohol (which can be	
Hypophysitis:** Given the	development of	the importance of reporting	arying), and the need for	
and nively set. the	to recurse the recursion	new or worsening symptoms,	regular dental Check-ups to	
and nivolumab, there's a risk	depend on the severity of	autering to the prescribed	dry mouth	
inflammation of the	the information the severity of	neatment plan, and the	ary mouth.	
ninammation of the	concorstatus and sustable	potential need for	The management of	
procent with besideshe and	troatmont alternatives	aujustments in cancer	immuno rolated verestori-	
fatigue due to hormonal	treatment alternatives.	uierapy.	involves a multidisciplinant	
deficiencies Checking	7 ** Dation+ Education **	The management of intra	approach focusing	
nituitary bormana lavala	 Fauent Education:** 	such as immune related	approach, focusing on	
ACTH TSH LLL SCH CH	- Educate the patient on	such as immune-related	symptom relief, maintaining	
(ACTH, ISH, LH, FSH, GH,	adherence to hermone	arunnus requires a	monitoring for other	
an MPL of the attuiter and	roplacement thereas	involving opening approach,	nonitoring for other	
an IVIKI of the pituitary gland	replacement therapy,	rhoumatologists,	with nombrolizyman there are	
	adropal insufficiency (a.g.	other specialists to ansure	with perioronzumab therapy.	
- **Monitor and Manage	fatigue naucoa diazinase)	comprehensive care that		
- World and Widilage	and the need for stress days	addrassas both the samear		
TTT 10/01/0 TDO				

diagnostic workup is	steroids during periods of	and the immune-mediated	
ongoing, symptomatic	illness or surgery.	side effects of treatment.	
management of the			
headache and fatigue	The management of		
should be provided, with	hypophysitis requires a		
careful consideration of the	comprehensive approach to		
potential need to hold or	address the acute		
discontinue the	symptoms, initiate		
immunotherapy, depending	appropriate hormone		
on the findings.	replacement therapies, and		
	consider the long-term		
Given the complexity of	implications of pituitary		
potential causes in this	dysfunction, all while		
scenario, a multidisciplinary	carefully weighing the		
approach involving	benefits and risks of ongoing		
oncology, neurology,	cancer immunotherapy.		
endocrinology, and possibly			
infectious disease specialists			
is recommended to ensure			
comprehensive evaluation			
and management.			

	Neuromusquiar practical	Nouromuscular practical	Cardian practical	Cardias practical	
Question	53 year old with metastatic	49 year old with metastatic	52 year old with metastatic	The nation tin the previous	
Question	NSCLC on pembrolizumab	melanoma on ipilimumab and	MSI-high colorectal cancer on	scenario is found to have 2nd	
	develops headaches and	nivolumab develops weakness	ipilimumab and nivolumab	degree heart block on EKG,	
	mild confusion after 3	in the legs and arms 16 days	presents for her second	normal echocardiogram, and	
	doses of treatment.	after his first treatment. What	infusion complaining of	elevated CK to 1575 (normal	
	Laboratory workup is	diagnostic tests and	fluttering in the chest and	30-220). What is the most	
	unremarkable other than	differential diagnoses should I	chest pain. Her troponin level	likely diagnosis and most	
	white blood cell count of	consider?	is elevated at 1.5 (normal	appropriate treatment?	
	14 (normal 3.5 - 10.5), but		<0.1). What other tests		
	lumbar puncture shows		should I order?		
	elevated protein, normal				
	cells (82% lymphocytes				
	8% monocytes 10%				
	neutrophils). He has a				
	maximum temperature of				
	100.2, vital signs are stable				
	otherwise. What is the				
	most likely diagnosis and				
	most appropriate				
A	treatment?	The dealer of the first	A 52		
Answer Engine 1 (ChatGRT)	Ine presentation of	The development of limb	A 52-year-old patient with	ald patient with motastatic	
(cliator I)	confusion elevated white	nationt with metastatic	colorectal cancer on	MSI-high colorectal cancer on	
	blood cell count. and	melanoma after starting	combination therapy with	ipilimumab and nivolumah	
	lumbar puncture findings	combination therapy with	ipilimumab and nivolumab.	including symptoms of	
	showing elevated protein,	ipilimumab and nivolumab	presenting with symptoms of	fluttering in the chest and	
	normal glucose, and	raises concerns for several	fluttering in the chest, chest	chest pain, elevated troponin	
	lymphocytic pleocytosis in	potential causes, including	pain, and an elevated	level, 2nd degree heart block	
	a 53-year-old patient with	immune-related adverse	troponin level, raises concern	on EKG, normal	
	metastatic non-small cell	events (irAEs) associated with	for potential cardiac	echocardiogram, and	
	lung cancer (NSCLC) on	immunotherapy. Here's how	involvement, including an	significantly elevated creatine	
	deses suggests an	you can approach the	avent (irAE) such as	suggestive of an immune	
	immune-related adverse	situation.	myocarditis which is a rare	related myocarditis which is	
	event (irAE), specifically	### Diagnostic Tests:	but serious complication of	a known but rare and	
	**immune-mediated		immune checkpoint inhibitor	potentially life-threatening	
	encephalitis**.	1. **Neurological	therapy. Immediate and	adverse effect of immune	
	Pembrolizumab, a PD-1	Examination:**	comprehensive evaluation is	checkpoint inhibitors (ICIs).	
	inhibitor, can cause various	 A detailed neurological 	crucial to assess the extent of		
	irAEs due to its	examination to assess the	cardiac involvement and to	### Most Likely Diagnosis:	
	immunomodulatory	pattern of weakness, reflexes,	rule out other potential	- **Immune-Related	
	enects, including	sensory function, and	causes.	wyocarditis: ** The	
	encenhalitis which	coordination.	### Additional Tests to Order:	symptoms elevated cardiac	
	although rare, can be	2. **Blood Tests:**		biomarkers, and EKG changes	
	serious and require	- Complete blood count	1. **Electrocardiogram	in the context of recent ICI	
	prompt recognition and	(CBC), comprehensive	(ECG):**	therapy points toward	
	management.	metabolic panel (CMP),	- To assess for arrhythmias,	myocarditis. The normal	
		including electrolytes to rule	ischemic changes, or other	echocardiogram does not	
	### Most Likely Diagnosis:	out metabolic causes;	electrical abnormalities that	rule out myocarditis, as	
	- **Immune-mediated	creatine kinase (CK) to	might explain the symptoms	structural changes might not	
	and CSE findings are	function tests given the	and elevated troponin.	periversity especially in the	
	suggestive of encephalitis	potential for irAEs affecting	2. **Echocardiogram:**	כטווץ שנמצבש טו נווב עושבמשל.	
	and in the context of	the thyroid; and possibly	- To evaluate cardiac	### Most Appropriate	
	recent pembrolizumab	specific autoantibodies if an	structure and function,	Treatment:	
	treatment, immune-	autoimmune etiology is	including ejection fraction,		
	mediated etiology is highly	suspected.	wall motion abnormalities,	1. **Immediate	
	probable.		and any signs of pericardial	Management:**	
		3. **Cerebrospinal Fluid (CSF)	ettusion, which can be	- Hospitalization for close	
	### Most Appropriate	Analysis:**	associated with myocarditis	monitoring in a setting where	
	neatment.	analyze CSE for cell count	or other carulac IFAES.	immediate intervention are	
	1. **Hold	protein, glucose, and nossible	3. **High-sensitivity C-	available, preferably in a	
	Pembrolizumab:**	oligoclonal bands, which can	reactive protein (hs-CRP) and	cardiac care unit.	
	- Discontinue	help in identifying infectious	Erythrocyte Sedimentation		
	pembrolizumab	or inflammatory processes.	Rate (ESR):**	2. **Hold Ipilimumab and	
	immediately to prevent		- To assess for systemic	Nivolumab:**	
	further immune activation.	4. **Magnetic Resonance	inflammation, which can be	- Discontinue the immune	
	0 **!!!=h_d	Imaging (MRI):**	elevated in the setting of	checkpoint inhibitors	
	2. **Hign-dose	- IVIKI OF THE BRAIN and spinal	myocarditis and other irAEs.	immediately to halt further	
	Conticosteroids:***	contrast to look for any		mmune-meulated damage.	
l	1	sector concording		1	

- Initiate high-dose	central nervous system (CNS)	4. **Natriuretic Peptides	3. **High-dose	
intravenous corticosteroids	lesions, signs of myelitis, or	(BNP or NT-proBNP):**	Corticosteroids:**	
(e.g., methylprednisolone)	other pathologies.	- As markers of cardiac	- Initiate high-dose	
to reduce inflammation in	other pathologiesi	stress and heart failure, which	intravenous corticosteroids.	
the central nervous system	5. **Nerve Conduction	can be elevated in	such as methylprednisolone.	
(CNS) This is the first-line	Studies and Electromyography	myocarditis or other forms of	to reduce inflammation. This	
treatment for moderate to	(EMG)·**	cardiac injury	is the first-line treatment for	
severe neurologic irAFs	- To assess peripheral perve	caralae injary.	severe irAFs, especially for	
severe neurologie inves.	and muscle function	5 **Cardiac Magnetic	conditions like myocarditis	
3 **Supportive Care·**	differentiate between	Besonance Imaging (Cardiac	contactions line myocaration	
- Provide supportive	neuronathic and myonathic	MRI)·**	4 **Cardiology and	
care including	natterns and evaluate for	- Considered the gold	Rheumatology	
management of fever	conditions like Guillain-Barré	standard for diagnosing	Consultations:**	
hydration and ensuring	syndrome or myositis	myocarditis as it can provide	- Involve cardiology for the	
nation, and ensuring	syndrome of myositis.	detailed information about	management of heart block	
if there is confusion or	6 **Mussla Pionsv:**	myocardial inflammation	and any other arrhythmias or	
altered mental status	- Considered if there is	edema, and fibrosis	cardiac complications A	
altered mental status.	suspicion of myositis or a	edenia, and horosis.	rhoumatologist or an	
4 **Nourology	suspicion of myosicis of a	6 **Additional Riomarkors**	immunologist or an	
4. Neurology	specific muscle pathology that	Consider testing for other	managing is AEc can also	
Consult nourology for	cannot be clarined with the	- Consider testing for other	nanidging irAEs can also	
- Consult neurology for	above tests.	CK MB and LDH, which might	provide valuable input,	
and management	### Difforontial Diagnosos	be elevated in mysecretic	especially regarding	
including considerations		iniuny	initialiosuppressive therapy.	
for additional diagnostic	1 **Immuno modiated	nijury.	E **Additional	
tosting to rule out other	1. IIIIIIIIIe-IIIEUIdteu	7 **Coropan/	J. Auutional	
causes of oncerbalitie	Inflammation of the	Angiography:**	If there is no improvement	
(infoctious, normanitis	- initialitiation of the	Doponding on the elisies!	or if the patient's condition	
(intectious, paraneoplastic,	direct offect of	- Depending on the clinical	worsons despite	
etc.) and for continuous	intercenter of	presentation and infulligs	worsens despite	
monitoring of neurological	Immunotherapy. Symptoms	from non-invasive tests,	conticosteroid treatment,	
status.	typically include proximal	coronary angiography might	additional	
	muscle weakness and may be	be necessary to rule out	immunosuppressive agents	
5. **Infectious Disease	associated with elevated	ischemic heart disease as a	such as mycophenolate	
Evaluation:**	muscle enzymes like CK.	cause of elevated troponins	motetil or tacrolimus may be	
- Consider a consultation		and chest pain.	considered. Infliximab is	
with infectious diseases to	2. **Guillain-Barré Syndrome		typically avoided in cases of	
evaluate and exclude	(GBS):**	8. **Consultations:**	myocarditis due to the	
infectious causes of	- An acute immune-	 Early involvement of a 	potential for worsening heart	
encephalitis, even though	mediated polyneuropathy,	cardiologist is crucial for	failure.	
the clinical and CSF profile	potentially triggered by	guiding further diagnostic		
may favor an immune-	immunotherapy, presenting	evaluation and management.	6. **Management of Heart	
mediated process. This	as ascending weakness, which	 Consider consulting 	Block:**	
might include additional	can be rapid in progression.	rheumatology or immunology	 Temporary pacing may be 	
testing for viruses like HSV,		for additional insights into the	required if the heart block	
HIV, and others, depending	**Myasthenia Gravis	management of potential	leads to significant	
on the clinical context and	(MG):**	irAEs.	hemodynamic instability or	
exposure history.	- An autoimmune disorder		symptomatic bradycardia.	
	characterized by muscle	### Differential Diagnoses to		
**Additional	weakness, which can be	Consider:	7. **Monitoring and	
Immunosuppression:**	exacerbated or unmasked by		Supportive Care:**	
- If there is no	immunotherapy.	- **Immune Checkpoint	- Continuous cardiac	
improvement with		Inhibitor-Associated	monitoring for arrhythmias.	
corticosteroids or if the	**Central Nervous System	Myocarditis:** A rare but	- Supportive care for heart	
patient's condition	(CNS) irAEs:**	serious irAE associated with	failure symptoms if present.	
worsens, consider	- Conditions such as	CTLA-4 and PD-1 inhibitors,	- Monitoring for potential	
additional	encephalitis, transverse	presenting with symptoms	complications of high-dose	
immunosuppressive	myelitis, or demyelinating	like chest pain, arrhythmias,	corticosteroid therapy.	
therapies such as IVIG	disorders, although rare, can	and elevated cardiac		
(intravenous	be associated with	biomarkers.	8. **Reassessment:**	
immunoglobulin) or	immunotherapy.	- **Acute Coronary Syndrome	- Frequent reassessment of	
plasmapheresis. The		(ACS):** Given the patient's	cardiac function, including	
choice of second-line	**CNS Metastasis:**	age and presentation with	repeat EKGs, cardiac	
therapy should be made in	- Metastatic lesions to the	chest pain and elevated	biomarkers, and possibly	
consultation with	brain or spinal cord from	troponins, ACS needs to be	advanced cardiac imaging like	
neurology and based on	melanoma could cause	considered and ruled out.	cardiac MRI, which can	
the patient's clinical status.	neurological deficits. including	- **Pericarditis:**	provide more definitive	
	weakness.	Inflammation of the	evidence of myocarditis.	
7 **Close Monitoring·**		pericardium which can		
- Monitor the nation	6 **Infectious Causes**	present with chest pain and	9 **Patient Education:**	
- Monitor the patient	- Considering the	notentially elevated troposing	- Educate the patient and	
appropriate neurological	- considering the	if accoriated with muscardial	family about the signs and	
appropriate neurological	the treatment experturistic	in associated with myocardial	symptoms of worsening	
and medical support can	infortions offections the CNC	** 4 rebuth min** Th-	symptoms of worsening	
be provided, potentially in	intections affecting the CNS or	- Arrnythmias:** The	myocarditis and the	
		workshop of fulthering in the	importance of immediate	
an intensive care unit if	peripheral nervous system	sensation of nuttering in the	importance of immediate	

the patient's airway		arrhythmic event,		
protection or if there is	 7. **Paraneoplastic 	necessitating ECG monitoring.	The management of	
significant alteration in	Syndromes:**		immune-related myocarditis	
consciousness.	 Neurological syndromes 	Given the seriousness of	requires a multidisciplinary	
	associated with cancer,	potential cardiac irAEs,	approach with close	
8. **Long-term	independent of metastasis,	prompt evaluation and	collaboration between	
Considerations:**	can present with various	management are essential,	oncology, cardiology, and	
- Discuss the long-ter	m neurological symptoms,	often requiring hospitalization	potentially other specialties.	
implications of this irA	E on including weakness.	for close monitoring, cardiac	It's crucial to recognize and	
the continuation of		imaging, and potentially	treat this condition promptly	
pembrolizumab therap	y 8. **Electrolyte	empiric treatment for	due to its potential for rapid	
with the patient and the	ne Imbalances:**	myocarditis, including high-	progression and severe	
oncology team. In mar	y - Hypokalemia,	dose corticosteroids, while	outcomes.	
cases, rechallenge with	the hypocalcemia, or other	awaiting definitive diagnostic		
same agent that cause	d a electrolyte disturbances can	results.		
severe irAE, particular	y lead to muscle weakness and			
neurologic, is not	should be considered.			
recommended.				
	Given the timing after			
The management of	immunotherapy initiation and			
immune-mediated	the potential for serious irAEs,			
encephalitis is complex	prompt and thorough			
and requires an	diagnostic evaluation is			
interdisciplinary appro	ach, crucial. In parallel, close			
ensuring the patient	communication with the			
receives both appropri	ate patient's oncology team is			
acute care and	essential to manage the			
consideration for the lo	ong- immunotherapy regimen			
term management of t	neir appropriately based on the			
underlying cancer and	findings.			
potential long-term				
sequelae of the irAE.				