

Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. Search Strategy of MEDLINE via PubMed

#1	covid-19[mh]
#2	SARS-CoV-2[mh]
#3	“covid”[tiad]
#4	“coronavirus disease 2019”[tiad]
#5	“coronavirus disease”[tiad]
#6	“Severe Acute Respiratory Syndrome Coronavirus 2”[tiad]
#7	#1 OR #2 OR #3 OR #4 OR #5 OR #6
#8	Vaccination[mh]
#9	Vaccine[mh]
#10	“vaccines”[tiad]
#11	#8 OR #9 OR #10
#12	Myocarditis[mh]
#13	Myopericarditis[mh]
#14	Pericarditis
#15	#13 OR #14
#16	Adolescent[mh]
#17	Children
#18	Pediatric
#19	Young adult[mh]
#20	“child”[tiad]
#21	“young adults”[tiad]
#22	#16 OR #17 OR #18 OR #19 OR #20 OR #21
#23	#7 AND #11 AND #15 AND #22

eTable 2. Search Strategy of EMBASE

#1	exp covid-19/ or exp coronavirus disease 2019/ or exp SARS-CoV-2/ or exp severe Acute Respiratory Syndrome Coronavirus 2/
#2	(“covid-19” or “coronavirus disease 2019” or “SARS-CoV-2” or “severe Acute Respiratory Syndrome Coronavirus 2”).ti,ab,kw.
#3	exp vaccination/ or exp vaccine/
#4	(“vaccination” or “vaccine”).ti,ab,kw.
#5	exp myocarditis/ or exp myopericarditis/ or exp pericarditis
#6	(“myocarditis” or “myopericarditis” or “pericarditis”).ti,ab,kw.
#7	exp adolescent/ or exp child/ or exp children/ or exp pediatric/ or exp young adult/ or exp young adults
#8	(“adolescent” or “child” or “children” or “pediatric” or “young adult” or “young adults”).ti,ab,kw.
#9	#1 or #2
#10	#3 or #4
#11	#5 or #6
#12	#7 or #8
#13	#9 and #10 and #11 and #12

eTable 3. Characteristics of Observational Studies Included

Author	Ethnicity, No. (%)						Incident rate (per million persons)	Symptoms, No. (%)				
	Caucasian	African American	Asian	Hispanic	Native American or Alaskan Native	Other		Fever	Chest pain	Dyspnea	Headache	Myalgia
Li et al. ¹⁹	NA	NA	NA	NA	NA	NA	1st dose 3.1; 2nd dose 22.2	NA	NA	NA	NA	NA
Krug et al. ²⁰	NA	NA	NA	NA	NA	NA	1st dose: Female 0.6, Male 10; 2nd dose: Female 12.7, Male 118.7	NA	NA	NA	NA	NA
Mevorach et al. ²¹	NA	NA	NA	NA	NA	NA	NA	4 (30.8)	13 (100)	4 (30.8)	NA	NA
Truong et al. ²²	92 (66.1)	6 (4.3)	9 (6.5)	29 (20.9)	2 (1.4)	13 (10.1)	NA	43 (30.9)	138 (99.2)	38 (27.3)	22 (15.8)	19 (13.7)
Foltran et al. ²³	NA	NA	NA	NA	NA	NA	NA	22 (11.4)	50 (25.9)	NA	13 (6.7)	NA
Jain et al. ²⁴	43 (68.3)	NA	3 (4.8)	9 (14.3)	NA	2 (3.2)	NA	28 (44.4)	63 (100)	22 (34.9)	16 (25.4)	24 (38.1)
Amir et al. ²⁵	NA	NA	NA	NA	NA	NA	NA	15 (100)	4 (26.7)	NA	NA	NA
Nygaard et al. ²⁶	NA	NA	NA	NA	NA	NA	Female 16, Male 97	11 (73.3)	15 (100)	NA	NA	NA
Chelala et al. ²⁷	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Das et al. ²⁸	9 (36.0)	3 (12.0)	1 (4.0)	11 (44)	1 (4.0)	NA	NA	6 (24.0)	25 (100)	3 (12.0)	2 (8.0)	1 (4.0)
Roh et al. ²⁹	0 (0)	0 (0)	40 (100)	0 (0)	0 (0)	0 (0)	NA	NA	40 (100)	7 (17.5)	NA	NA
Patel et al. ³⁰	6 (66.7)	1 (11.1)	0 (0)	0 (0)	0 (0)	2 (22.2)	NA	NA	9 (100)	4 (44.4)	NA	NA

Author	Treatment, No. (%)				Laboratory values						Electrocardiography, No. (%)		
	NSAIDs	Glucocorticoid	IVIG	Colchicine	CRP (mg/dL)	Elevated CRP, No. (%)	Troponin I, (ng/mL)	Troponin T, (ng/mL)	Elevated troponin, No. (%)	BNP (pg/mL)	ST-elevation / depression	T wave changes	NSVT
Li et al. ¹⁹	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Krug et al. ²⁰	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mevorach et al. ²¹	NA	NA	NA	NA	NA	12 (98)	NA	NA	13 (100)	NA	5 (38.0)	2 (15.0)	0 (0)
Truong et al. ²²	113 (81.3)	30 (216%)	30 (21.6)	11 (7.9)	3.3 (range 1.1-6.2)	NA	8.1 (range 3.5-15.9)	0.61 (range 0.25-1.30)	139 (100)	55.0 (range 18.9-147.0)	95 (69.0)	NA	7 (5.1)
Foltran et al. ²³	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jain et al. ²⁴	54 (85.7)	15 (23.8)	17 (27)	4 (6.3)	37 ± 35	62 (98)	8.8 ± 9.1	NA	63 (100)	94 ± 147	44 (70.0)	NA	3 (4.8)
Amir et al. ²⁵	NA	NA	NA	NA	NA	NA	NA	NA	14 (93)	NA	13 (87.0)	NA	NA
Nygaard et al. ²⁶	9 (60.0)	1 (6.7)	NA	NA	NA	11 (73)	NA	NA	12 (80)	NA	5 (33.0)	3 (20.0)	NA
Chelala et al. ²⁷	NA	NA	NA	1 (20)	NA	NA	5.9 ± 4.3	0.33 ± 0.13	5 (100)	206.5 ± 206.7	1 (20.0)	NA	1 (20.0)
Das et al. ²⁸	23 (92.0)	1 (4.0)	2 (8.0)	NA	NA	17 (94.0)	NA	NA	25 (100)	NA	19 (76.0)	3 (12.0)	3 (12.0)
Roh et al. ²⁹	3 (77.5)	8 (40.0)	1 (2.5)	2 (5.0)	9.4 [1.6-50]	NA	0.01 [0.003-0.01]	0.003 [0.003-0.52]	5 (12.5)	NA	7 (40.0)	NA	NA
Patel et al. ³⁰	8 (88.9)	0 (0)	1 (11.1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Author	Echocardiography			CMR	
	LV systolic dysfunction (LVEF< 55%), No. (%)	LVEF, %	Pericardial effusion, No. (%)	Timing of CMR after the onset, d	Myocardial edema, No. (%)
Li et al. ¹⁹	NA	NA	NA	NA	NA
Krug et al. ²⁰	NA	NA	NA	NA	NA
Mevorach et al. ²¹	2 (15.0)	NA	3 (23.0)	NA	NA
Truong et al. ²²	26 (19.0)	NA	1 (0.7)	5 [3-17]	54 (55.7)
Foltran et al. ²³	NA	NA	NA	NA	NA
Jain et al. ²⁴	9 (14.0)	60.9 ± 6.5	NA	NA	50 (89.3)
Amir et al. ²⁵	2 (13.3)	NA	2 (13.0)	28 ± 21	4 (26.7)
Nygaard et al. ²⁶	3 (20.0)	NA	1 (6.7)	NA	NA
Chelala et al. ²⁷	1 (20.0)	NA	NA	5.8 ± 1.2	5 (80.0)
Das et al. ²⁸	2 (8.0)	NA	1 (4.0)	NA	6 (37.5)
Roh et al. ²⁹	6 (15.0)	65 ± 8.9	3 (7.5)	NA	NA
Patel et al. ³⁰	2 (22.2)	59.7 [57.8-67.2]	1 (11.1)	NA	NA

Numbers represent n (%) for categorical variables, and mean ± standard deviation (SD), median (interquartile range [IQR]) for continuous variables.

Abbreviation: ECMO, extracorporeal membrane oxygenation; ICU, intensive care unit; IVIG, intravenous immune globulin; J&J, Johnson & Johnson; LGE, Late gadolinium enhancement; LV, left ventricular; LVEDV, Left ventricle end-diastolic volume; LVEF, left ventricle ejection fraction; NA, not available; NSAIDs, Non-steroidal anti-inflammatory drugs; NSVT, Non-sustained ventricular tachycardia; WBC, white blood cell

eTable 4. Characteristics of Case Series Included

Author	Year	Country	Number of patients	Age	Sex	BMI	Ethnicity	Vaccine type	Dose of vaccine with symptoms	Onset of symptoms after vaccine (days)	Duration of symptoms (days)	History of COVID-19	Comorbidity
Puchalski et al ³¹	2022	Poland	5	15	M	27	NA	BNT162b2 (Pfizer-BioNTech)	2	2	3	NA	Obesity
				17	M	25.8	NA	BNT162b2 (Pfizer-BioNTech)	2	2	3	NA	Obesity
				17	M	30	NA	BNT162b2 (Pfizer-BioNTech)	1	2	4	NA	Obesity
				17	M	30	NA	BNT162b2 (Pfizer-BioNTech)	1	3	4	NA	Obesity
				17	M	24.8	NA	BNT162b2 (Pfizer-BioNTech)	1	23	6	NA	Overweight
Manfredi et al. ³²	2022	Italy	5	17	F	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	NA	NA	NA	AVRT
				18	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	NA	NA	NA	RBBB
				16	F	NA	NA	MRNA-1273 (Moderna)	2	NA	NA	NA	None
				15	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	NA	NA	NA	None
				14	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	NA	NA	NA	None
Ambati et al. ³³	2021	US	2	16	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	2	1	No	von Willebrand disease, anxiety disorder, Lennox-Gastaut syndrome

				17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	3	NA	No	Attention deficit hyperactivity disorder, mild intermittent asthma
Tano et al. ³⁴	2021	US	8	17.6	M	24.2	White, Hispanic	BNT162b2 (Pfizer-BioNTech)	2	4	NA	yes	Vitiligo
				16.7	M	25.1	White, Hispanic	BNT162b2 (Pfizer-BioNTech)	2	3	NA	no	None
				17.2	M	39.7	White, Hispanic	BNT162b2 (Pfizer-BioNTech)	1&2	3	NA	no	Myocarditis
				15.9	M	16.8	White, Hispanic	BNT162b2 (Pfizer-BioNTech)	1	2	NA	yes	Marfan syndrome
				16.6	M	30.8	White, Hispanic	BNT162b2 (Pfizer-BioNTech)	2	1	NA	no	None
				15.8	M	29.5	White, Hispanic	BNT162b2 (Pfizer-BioNTech)	2	2	NA	no	Insulin resistance, dyslipidemia
				15.2	M	17.3	White, Hispanic	BNT162b2 (Pfizer-BioNTech)	2	3	NA	no	None
				17.2	M	NA	White, Hispanic	BNT162b2 (Pfizer-BioNTech)	2	1	NA	no	None
Park et al. ³⁵	2022	US	2	15	M	NA	Asian/Filipino	BNT162b2 (Pfizer-BioNTech)	1	3	1	NA	NA
				16	M	NA	Asian/Filipino	BNT162b2 (Pfizer-BioNTech)	2	2	1	NA	NA
Marshall et al. ³⁶	2021	US	7	16	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	2	NA	No	None
				19	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	3	NA	No	None

				17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	2	NA	No	None
				18	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	3	NA	No	None
				17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	3	NA	No	None
				16	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	3	1	No	None
				14	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	2	4	No	None
Starekova et al. ³⁷	2021	US	2 (3 of 5 are adults)	17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	2	NA	NA	NA
				18	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	3	NA	NA	NA
Łażniak-Pfajfer et al. ³⁸	2022	Poland	3	17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	1	8	NA	NA	NA
				17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	1	10	NA	NA	NA
				17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	1	NA	NA	NA
Meyer-Szary et al. ³⁹	2021	Poland	2	12	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	2	NA	No	NA
				17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	1	NA	No	NA
Ahmed et al. ⁴⁰	2022	Iraq	3	19	M	NA	NA	MRNA-1273 (Moderna)	2	2	NA	No	NA
				16	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	4	NA	No	NA

				17	M	NA	NA	BNT162b2 (Pfizer-BioNTech)	2	2	NA	No	NA
Freise et al. ⁴¹	2022	Germany	2	13	M	NA	Caucasian	BNT162b2 (Pfizer-BioNTech)	2	3	5	NA	No
				15	F	NA	Caucasian	BNT162b2 (Pfizer-BioNTech)	2	3	5	NA	Limb girdle muscle dystrophy type 2D
Author	Symptoms			Outcomes		Length of stay (days)	Treatment		Vital Signs				
									Temperature (C)	Systolic blood pressure (mmHg)	Diastolic blood Pressure (mmHg)	Heart rate (bpm)	
Puchalski et al. ³¹	Chest pain, fever			Discharge		10	NA		NA	NA	NA	NA	NA
	Chest pain, fever, shoulder pain at injection site, diarrhea			Discharge		13	NA		NA	NA	NA	NA	NA
	Chest pain, fever, cough			Discharge		16	NA		NA	NA	NA	NA	NA
	Chest pain			Discharge		12	NA		NA	NA	NA	NA	NA
	Chest pain, sore throat, fever			Discharge		11	NA		NA	NA	NA	NA	NA
Manfredi et al. ³²	NA			Hospitalization		NA	NA		37.1	110	70	NA	NA
	NA			Hospitalization		NA	NA		38.2	120	80	NA	NA
	NA			Hospitalization		NA	NA		37.6	125	65	NA	NA
	NA			Hospitalization		NA	NA		38.3	115	67	NA	NA
	NA			Hospitalization		NA	NA		37.7	123	70	NA	NA
Ambati et al. ³³	Chest pain, vomiting			Admitted to PICU for close monitoring Discharge		3	NSAIDs		NA	NA	NA	NA	NA

	Chest pain, fatigue, headache, fever, arthralgia, shortness of breath	Admitted to the PICU for close monitoring Discharge	3	NSAIDs	NA	NA	NA	NA
Tano et al. ³⁴	NA	Discharge	2	NSAIDs	NA	NA	NA	NA
	NA	Discharge	3	NSAIDs	NA	NA	NA	NA
	NA	Discharge	4	NSAIDs, IVIG	NA	NA	NA	NA
	NA	Discharge	3	None	NA	NA	NA	NA
	NA	Discharge	3	None	NA	NA	NA	NA
	NA	Discharge	2	None	NA	NA	NA	NA
	NA	Discharge	3	NSAIDs	NA	NA	NA	NA
	NA	Discharge	4	NSAIDs	NA	NA	NA	NA
Park et al. ³⁵	Chest pain	Discharge	NA	NA	37.2	119	72	116
	Chest pain	Discharge	NA	NA	37.2	132	91	108
Marshall et al. ³⁶	Chest pain, fatigue, poor appetite, fever, arm pain	Hospitalization Discharge	6	NSAID, IVIg, IV methylprednisolone, PO prednisone, famotidine	NA	NA	NA	NA
	Chest pain, fatigue, weakness, subjective low-grade fever	Hospitalization Discharge	2	NSAID, colchicine, aspirin	NA	NA	NA	NA
	Chest pain, arm pain, paresthesia,	Hospitalization Discharge	2	NSAID, famotidine	NA	NA	NA	NA
	Chest pain, malaise, arthralgia/myalgia, subjective fever	Hospitalization Discharge	3	NSAID, IVIG, IV methylprednisolone, PO prednisone	NA	NA	NA	NA

	Chest pain, sore throat, headache, dry cough, body aches, subjective fever	Hospitalization Discharge	NA	NSAID, IVIG, IV methylprednisolone, PO prednisone, aspirin	NA	NA	NA	NA
	Chest pain, malaise, subjective fever	Hospitalization Discharge	3	IVIG, PO prednisone	NA	NA	NA	NA
	Chest pain, shortness of breath, fever	LFNC, hospitalization Discharge	4	NSAID, famotidine, furosemide	NA	NA	NA	NA
Starekova et al. ³⁷	Subjective mild fever, chills, malaise, nausea, chest pain	Hospitalization	NA	NA	NA	NA	NA	NA
	Subjective mild fever, chills, malaise, chest pain, nausea	Hospitalization	NA	NA	NA	NA	NA	NA
Łażniak-Pfajfer et al. ³⁸	Chest pain, arm pain, diarrhea	Hospitalization Discharge	NA	NA	NA	NA	NA	NA
	Chest pain, fever, tachycardia, weakness	Hospitalization Discharge	NA	NA	NA	NA	NA	NA
	Chest pain, fever	Hospitalization Discharge	NA	NA	NA	NA	NA	NA
Meyer-Szary et al. ³⁹	Chest pain, fever, diarrhea	Hospitalization Discharge	5	Acetaminophen	NA	NA	NA	NA
	Chest pain	Hospitalization Discharge	5	Acetaminophen	NA	NA	NA	NA
Ahmed et al. ⁴⁰	Chest pain, fatigue	Hospitalization Discharge	NA	NSAIDs	36.5	115	80	68
	Chest pain, chills, fatigue	Hospitalization Discharge	NA	NSAIDs	36.7	122	76	81
	Chest pain, fever, fatigue	Hospitalization Discharge	NA	NSAIDs	37.2	126	68	82

Freise et al. ⁴¹	Chest pain					Hospitalization	7	NA	NA	NA	NA	NA	
	Chest pain					Discharge							
Author	Laboratory values					Electrocardiography	Echocardiography findings			CMR			
	CRP (mg/dL)	Troponin I (ng/mL)	Troponin T (ng/mL)	NT-pro BNP (pg/mL)	BNP (pg/mL)		LVEF (%)	Other findings		LVEDD (mm)	LVED (mL)	LVEF (%)	Abnormal findings
Puchalski et al. ³¹	3	14218.4	NA	269	NA	ST elevation in I, II, V5–V6, ST depression in V1–V2	64	Normal wall motion, no pericardial effusion		54.4	NA	NA	Myocardial edema, LGE
	3.9	37279.6	NA	27	NA	ST elevation in II, III, aVF, V5–V6	72	Normal wall motion, no pericardial effusion		47-50	NA	NA	Myocardial edema, LGE
	3.9	10450.3	NA	50	NA	ST elevation in V3–V4, Negative T wave in I–III, aVL, aVF, V4–V6	61	Normal wall motion, no pericardial effusion		47 - 50	NA	NA	Myocardial edema, LGE
	0.7	1895.2	NA	259	NA	ST elevation in II, III, aVF	62	Normal wall motion, no pericardial effusion		56.2	NA	NA	Myocardial edema, LGE
	40	1674	NA	391	NA	ST elevation in V4–V6	68	Normal wall motion, no pericardial effusion		55	NA	NA	Myocardial edema, LGE
Manfredi et al. ³²	2.2	439	NA	NA	73	NA	NA	NA	NA	67	55	LGE	
	4.3	8123	NA	NA	57	NA	NA	NA	NA	75	65	LGE	
	3.5	576	NA	NA	76	NA	NA	NA	NA	62	62	LGE	
	4.5	4070	NA	NA	58	NA	NA	NA	NA	67	60	LGE	
	2.7	676	NA	NA	45	NA	NA	NA	NA	65	67	LGE	

Ambati et al. ³³	8.7	38	NA	NA	NA	Diffuse ST segment elevations	NA	Normal biventricular systolic function with normal coronary origins and size	NA	NA	NA	NA
	9.5	5	NA	NA	NA	ST elevation	NA	Mildly decreased left, ventricular systolic function	NA	NA	NA	NA
Tano et al. ³⁴	NA	4.9	NA	NA	NA	Abnormal T waves, ST-segment depression	56	No pericardial effusion	NA	NA	NA	NA
	NA	5.6	NA	NA	NA	PR depression, diffuse ST elevation	55	No pericardial effusion	NA	NA	60	Myocardial edema, LGE
	NA	34.5	NA	NA	NA	PR depression, diffuse ST elevation	58	No pericardial effusion	NA	NA	61	Myocardial edema, LGE
	NA	11.8	NA	NA	NA	Normal sinus rhythm	57	No pericardial effusion	NA	NA	61	Myocardial edema, LGE
	NA	2.4	NA	NA	NA	Diffuse ST elevation	60	No pericardial effusion	NA	NA	NA	NA
	NA	5.1	NA	NA	NA	Normal sinus rhythm	62	No pericardial effusion	NA	NA	NA	NA
	NA	22.1	NA	NA	NA	Intraventricular conduction delay, transient ST depression	60	No pericardial effusion	NA	NA	NA	NA
	NA	5.1	NA	NA	NA	Mild diffuse ST elevation	61	No pericardial effusion	NA	NA	NA	NA
Park et al. ³⁵	1.9	3.4	NA	108	NA	ST elevation, left axis deviation	63	Increased patchy echogenicity of the myocardium	NA	NA	NA	NA
	2.4	4.3	NA	325	NA	ST elevation, T wave inversion	60	None	NA	NA	NA	EGE of myocardium

Marshall et al. ³⁶	1.0	2.6	NA	428	NA	Atrioventricular dissociation with junctional escape rhythm, ST elevation	NA	Normal	NA	NA	NA	LGE, myocardial edema, left axillary adenopathy
	6.7	NA	(High sensitivity Troponin T: 232)	NA	NA	ST elevation (diffuse)	NA	Normal	NA	NA	NA	LGE, myocardial edema
	2.5	5.55	NA	376	NA	ST elevation (diffuse), T-wave abnormality	NA	Borderline basal lateral and basal posterior strain	NA	NA	NA	LGE, myocardial edema
	12.7	NA	1.09	NA	NA	ST elevation in I, II, V5–V6, ST depression in V1–V2	64	Normal wall motion, no pericardial effusion	54.4	NA	NA	Myocardial edema, LGE
	18.1	3.2	NA	987	NA	ST elevation in II, III, aVF, V5–V6	72	Normal wall motion, no pericardial effusion	47-50	NA	NA	Myocardial edema, LGE
	1.5	NA	0.66	149	NA	ST elevation in V3–V4, Negative T wave in I–III, aVL, aVF, V4–V6	61	Normal wall motion, no pericardial effusion	47 - 50	NA	NA	Myocardial edema, LGE
	7.7	22.1	NA	NA	107.9	ST elevation in II, III, aVF	62	Normal wall motion, no pericardial effusion	56.2	NA	NA	Myocardial edema, LGE
Starekova et al. ³⁷	NA	14.65 (peak)	NA	NA	NA	ST elevation in V4–V6	68	Normal wall motion, no pericardial effusion	55	NA	NA	Myocardial edema, LGE
	NA	4 (peak)	NA	NA	38	NA	NA	NA	NA	67	55	LGE
Łażniak-Pfajfer et al. ³⁸	NA	5.3	NA	NA	NA	NA	NA	NA	NA	75	65	LGE
	NA	16.3	NA	NA	NA	NA	NA	NA	NA	62	62	LGE
	NA	16.9	NA	NA	NA	NA	NA	NA	NA	67	60	LGE

Meyer-Szary et al. ³⁹	23 (peak)	5.1 (peak)	NA	NA	NA	NA	NA	NA	NA	65	67	LGE
	18.2 (peak)	8.9 (peak)	NA	NA	NA	Diffuse ST segment elevations	NA	Normal biventricular systolic function with normal coronary origins and size	NA	NA	NA	NA
Ahmed et al. ⁴⁰	NA	NA	NA	NA	NA	ST-changes	65	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	ST-changes	57	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA	ST-changes	61	NA	NA	NA	NA	NA
Freise et al. ⁴¹	NA	150	NA	520	NA	NA	NA	NA	NA	NA	NA	NA
	NA	NA	1438	300	NA	NA	NA	NA	NA	NA	NA	Myocarditis with edema and elevated T2-relaxation

Abbreviations: AVRT, atrioventricular reentrant tachycardia; BMI, body mass index; CRP, C-reactive protein; EGE, early gadolinium enhancement; ICU, intensive care unit; IVIG, intravenous immune globulin; LGE, late gadolinium enhancement; LV, left ventricular; LVEDD, left ventricle end-diastolic diameter; LVEDV, left ventricle end-diastolic volume; LVEF, left ventricle ejection fraction; NA, not available; NSAIDS, non-steroidal anti-inflammatory drugs; PCT, procalcitonin; PO, Per os; RBBB, right bundle branch block; VT, ventricular tachycardia; WBC, white blood cell

eTable 5. Definition of Myocarditis

Author	Definition of myocarditis
Li et al. ¹⁹	International Classification of Diseases, Ninth Revision, Clinical Modification (422.x and 429.0)
Krug et al. ²⁰	The Centers for Disease Control and Prevention working definition for probable acute myocarditis, new or worsening symptoms plus at least one abnormal laboratory or clinical finding (e.g., elevated troponin; electrocardiogram (EKG), echocardiogram (ECHO), or cardiac MRI (cMRI)) consistent with myo/pericarditis. Exclusions were made for lack of objective laboratory find
Mevorach et al. ²¹	Clinical data that involved International Classification of Diseases, 10th Revision, 422.0-9x and 429.0x codes were reviewed by a cardiologist and a rheumatologist, and the severity of disease was classified according to the Brighton Collaboration Case Definition for myocarditis
Truong et al. ²²	Centers for Disease Control and Prevention Case Definitions for Probable and Confirmed Cases of COVID-19 Vaccine-Associated Myocarditis. Lake Louise criteria were used for cardiac MRI findings.
Foltran et al. ²³	NA
Jain et al. ²⁴	The 2009 Lake Louise criteria or, when parametric mapping was available, the 2018 revised Lake Louise CMR criteria were used to test for a diagnosis of acute myocarditis.
Amir et al. ²⁵	Myocarditis was defined clinically, based on the presence of two or more of the following: (1) signs and symptoms of acute myocardial involvement (e.g., chest pain, arrhythmia); (2) elevated troponin; (3) echocardiographic evidence of ventricular dysfunction without an alternative explanation; and (4) (ST-T) changes in the ECG. The 2009 Lake Louise criteria or the 2018 revised Lake Louise CMR criteria were used for cardiac MRI findings
Nygaard et al. ²⁶	NA
Chelala et al. ²⁷	NA
Das et al. ²⁸	The Centers for Disease Control and Prevention criteria for myopericarditis.
Roh et al. ²⁹	We included patients with chest pain, pressure, chest discomfort, dyspnea, shortness of breath, palpitation or syncope after COVID-19 vaccination. We excluded patients with cardiac symptoms unrelated to COVID-19 vaccination or those that occurred 30 days after the COVID-19 vaccine.
Patel et al. ³⁰	The COVID-19 vaccine-related group consisted of patients with myocarditis after the vaccine, with no other etiology of myocarditis identified.

Abbreviations: CMR, cardiac magnetic resonance; NA, not available

eTable 6. Pooled Estimates for Clinical Characteristics and Outcomes From Subgroup Analyses Including Studies With Patients With Myocarditis

	Pooled estimates (95% CI)	I^2 (%)	P value for heterogeneity
Age, years	15.9 [15.6-16.3]	84.4	<0.001
Male, %	89.9 [85.7-94.2]	46.9	0.058
History of COVID-19, %	4.1 [0.5-7.7]	33.4	0.212
Dose of vaccination:			
1 st dose, %	16.7 [8.3-25.1]	89.7	<0.001
2 nd dose, %	76.1 [58.5-93.6]	97.8	<0.001
Type of vaccine:			
BNT162b2 (Pfizer-BioNTech)	96.8 [95.3-98.3]	0	0.530
mRNA-1273 (Moderna)	3.0 [1.5-4.4]	0	0.720
Days from vaccination to symptom onset, n	2.5 [1.8-3.2]	91.0	<0.001
Symptoms:			
Chest pain, %	79.3 [66.1-92.6]	98.9	<0.001
Fever, %	43.0 [9.3-76.8]	98.7	<0.001
Headache, %	14.9 [5.2-24.7]	86.4	<0.001
Dyspnea/ Respiratory distress, %	27.8 [20.8-34.7]	26.1	0.248
Myalgia, %	25.3 [1.4-49.2]	92.3	<0.001
Treatment:			
NSAIDs	79.1 [71.6-86.6]	46.6	0.095
Glucocorticoid	17.2 [11.2-23.1]	34.4	0.179
IVIg	13.0 [3.2-22.8]	83.2	<0.001
Colchicine	7.3 [4.1-10.4]	0	0.622
Laboratory values:			
Elevated troponin I, %	84.4 [74.0-94.8]	97.8	<0.001
Electrocardiography:			
ST-segment elevation or changes, %	50.6 [30.2-71.0]	92.1	<0.001
T-wave changes, %	16.0 [1.6-30.3]	0	0.029
Non-sustained VT, %	4.9 [2.1-7.8]	0	0.851
Echocardiography:			
LVEF, %	62.1 [59.1-65.1]	71.2	0.031

LV Systolic dysfunction (LVEF<55%), %	16.9 [12.6-21.2]	0	0.981
Mild (LVEF 45-54%), %	15.3 [11.0-19.5]	0	0.999
Moderate (LVEF 35-44%), %	1.3 [0-2.6]	0	0.960
Severe (LVEF <35%), %	1.3 [0-2.6]	0	0.903
Pericardial effusion, %	5.5 [0.1-11.0]	46.2	0.098
Cardiac magnetic resonance:			
Presence of LGE, %	85.6 [77.3-94.0]	52.8	0.095
Myocardial edema, %	62.9 [35.8-90.0]	93.2	<0.001
Outcome:			
Hospitalization, %	94.4 [89.3-99.4]	63.2	0.018
ICU admission, %	23.8 [12.4-35.2]	77.2	<0.001
Inotropes, %	1.3 [0-2.7]	0	0.930
Hospital length of stay, d	2.6 [1.8-3.3]	92.4	<0.001

Abbreviations: ICU, intensive care unit; IVIG, intravenous immune globulin; LGE, late gadolinium enhancement; LV, left ventricular; LVEF, left ventricle ejection fraction; NSAIDS, Non-steroidal anti-inflammatory drugs; VT, ventricular tachycardia.

eTable 7. Joanna Briggs Institute Critical Appraisal Checklist for Prevalence Studies

	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9
Li et al. ¹⁹	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes
Krug et al. ²⁰	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes
Mevorach et al. ²¹	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes
Truong et al. ²²	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes
Foltran et al. ²³	Yes	Yes	Yes	Not applicable	Yes	No	Yes	Yes	Yes
Jain et al. ²⁴	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes
Amir et al. ²⁵	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes
Nygaard et al. ²⁶	Yes	Yes	Yes	Not applicable	Yew	No	Yes	Yes	Yes
Chelala et al. ²⁷	Yes	Yes	No	Not applicable	Yes	No	Yes	Yes	Yes
Das et al. ²⁸	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes
Roh et al. ²⁹	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes
Patel et al. ³⁰	Yes	Yes	Yes	Not applicable	Yes	Yes	Yes	Yes	Yes

Item 1 Was the sample frame appropriate to address the target population? *Item 2* Were study participants sampled in an appropriate way?, *Item 3* Was the sample size adequate?, *Item 4* Were the study subjects and the setting described in detail?, *Item 5* Was the data analysis conducted with sufficient coverage of the identified sample?, *Item 6* Were valid methods used for the identification of the condition?, *Item 7* Was the condition measured in a standard, reliable way for all participants?, *Item 8* Was there appropriate statistical analysis?, *Item 9* Was the response rate adequate, and if not, was the low response rate managed appropriately?

eTable 8. Joanna Briggs Institute Critical Appraisal Checklist for Case Series

	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item 10
Puchalski et al. ³¹	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes
Manfredi et al. ³²	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes
Ambati et al. ³³	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Not applicable	Not applicable
Tano et al. ³⁴	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Not applicable
Park et al. ³⁵	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Not applicable	Yes
Marshall et al. ³⁶	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Not applicable
Starekova et al. ³⁷	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes
Łażniak-Pfajfer et al. ³⁸	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Not applicable	Not applicable
Meyer-Szary et al. ³⁹	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Not applicable	Not applicable
Ahmed et al. ⁴⁰	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Not applicable	Yes
Freise et al. ⁴¹	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Not applicable

Item 1 Were there clear criteria for inclusion in the case series?, *Item 2* Was the condition measured in a standard, reliable, *Item 3* Were valid methods used for identification of the condition for all participants included in the case series?, *Item 4* Did the case series have consecutive inclusion of participants?, *Item 5* Did the case series have complete inclusion of participants?, *Item 6* Did the case series have complete inclusion of participants?, *Item 7* Was there clear reporting of clinical information of the participants?, *Item 8* Were the outcomes or follow up results of cases clearly reported?, *Item 9* Was there clear reporting of the presenting site(s)/clinic(s) demographic information?, *Item 10* Was statistical analysis appropriate?

eTable 9. GRADE Evidence Profile for the Included Studies

First author	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Effect size	Dose-response	All plausible confounding and bias	Quality grading
Li et al. ¹⁹	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Low
Krug et al. ²⁰	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Moderate
Mevorach et al. ²¹	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Low
Truong et al. ²²	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Moderate
Foltran et al. ²³	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Moderate
Jain et al. ²⁴	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Moderate
Amir et al. ²⁵	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Low
Nygaard et al. ²⁶	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Low
Chelala et al. ²⁷	Observational study	Study subject was not a close representative of general population.	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Very Low
Das et al. ²⁸	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Moderate
Roh et al. ²⁹	Observational study	Low risk of bias	No serious inconsistency.	No serious indirectness.	No serious imprecision.	NA	Not large	NA	No obvious confounding factors.	Moderate

Patel et al. ³⁰	Observational study	Study subject was not a close representative of general population.	No serious inconsistency.	No serious indirectness.	No serious imprecision .	NA	Not large	NA	No obvious confounding factors.	Low
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Abbreviations: *NA*, not applicable

eTable 10. Results of Egger Linear Regression Tests of the Clinical Presentation and Outcomes

Clinical presentation and outcome	Intercept	<i>t</i>	<i>p</i>
LV systolic dysfunction	-0.35	0.91	0.391
Mild LV systolic dysfunction	-0.38	1.10	0.320
Moderate LV systolic dysfunction	0.70	0.94	0.389
Severe LV systolic dysfunction	0.47	0.45	0.672
LGE	1.63	2.94	0.061
Hospitalization	0.98	3.00	0.024
ICU admission	-0.73	0.38	0.726
Hospital length of stay	2.76	1.64	0.151

Abbreviations: ICU, intensive care unit; LGE, late gadolinium enhancement; LV, left ventricular

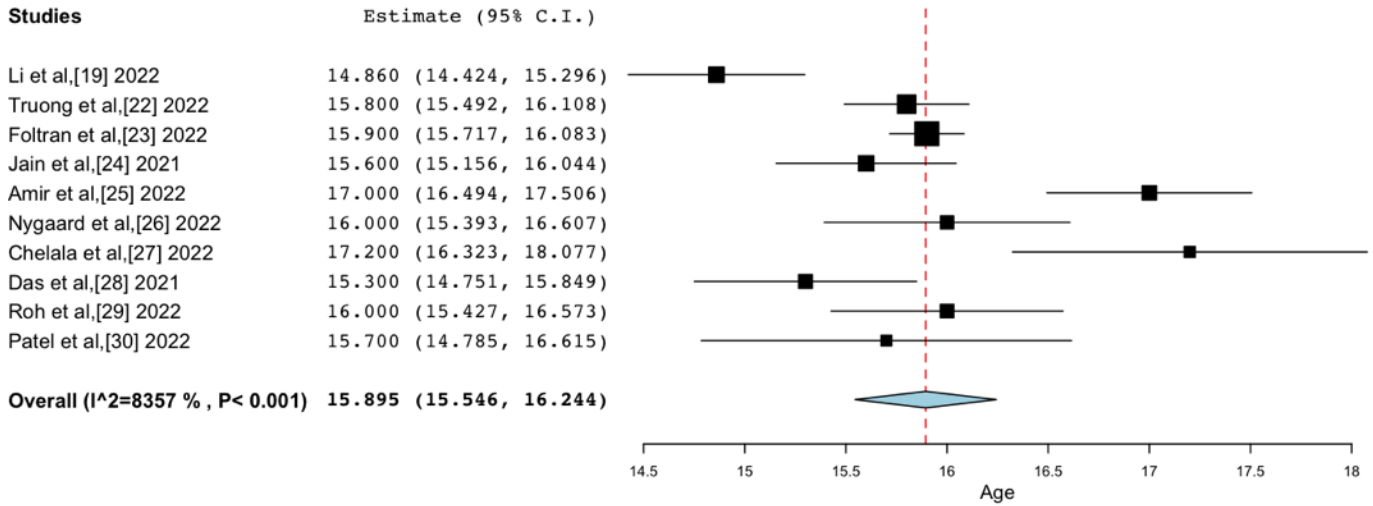
eTable 11. Results of Point Estimate of the Clinical Presentation and Outcomes Using the Trim-and-Fill Analysis

Clinical presentation and outcome	Studies Trimmed (n)	Point estimate via random effects for observed values (95% CI)	Point estimate via random effects for adjusted values (95% CI)
LV systolic dysfunction	0	0.167 [0.130-0.212]	0.167 [0.130-0.212]
Mild LV systolic dysfunction	2	0.147 [0.112-0.192]	0.153 [0.117-0.197]
Moderate LV systolic dysfunction	1	0.019 [0.008-0.045]	0.016 [0.007-0.037]
Severe LV systolic dysfunction	0	0.023 [0.010-0.052]	0.023 [0.010-0.052]
LGE	3	0.849 [0.749-0.866]	0.813 [0.720-0.853]
Hospitalization	3	0.884 [0.854-0.909]	0.880 [0.843-0.904]
ICU admission	2	0.208 [0.107-0.366]	0.277 [0.157-0.439]
Hospital length of stay	2	2.802 [2.136-2.292]	2.359 [1.692-2.243]

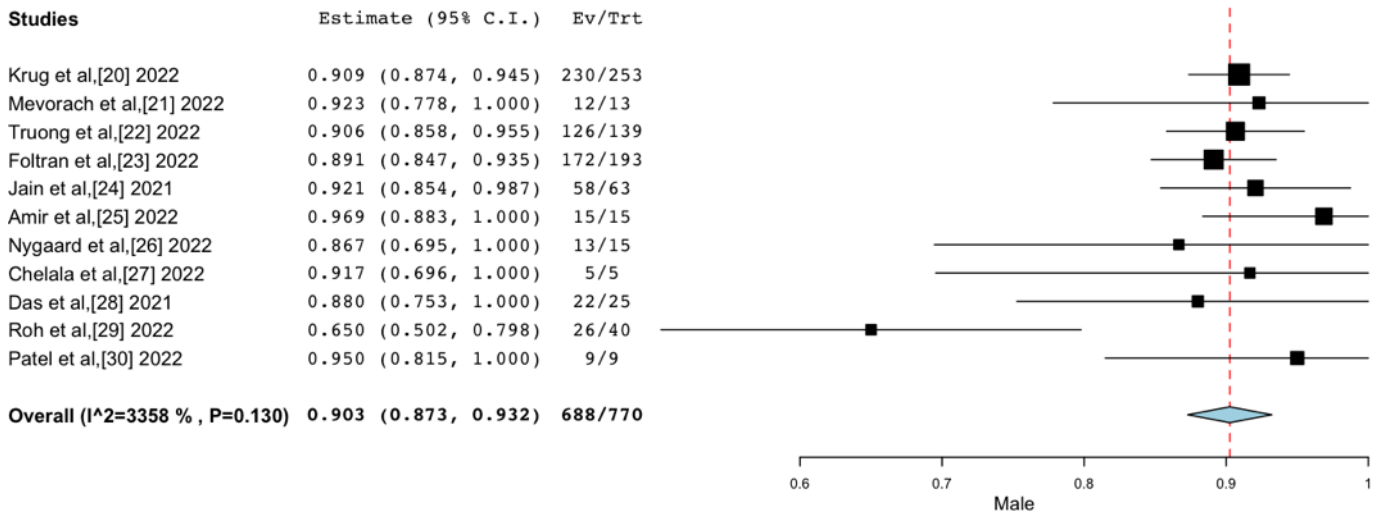
Abbreviations: ICU, intensive care unit; LGE, late gadolinium enhancement; LV, left ventricular

eFigure 1. Forest Plots Showing the Pooled Estimates of Clinical Characteristics and Early Outcomes

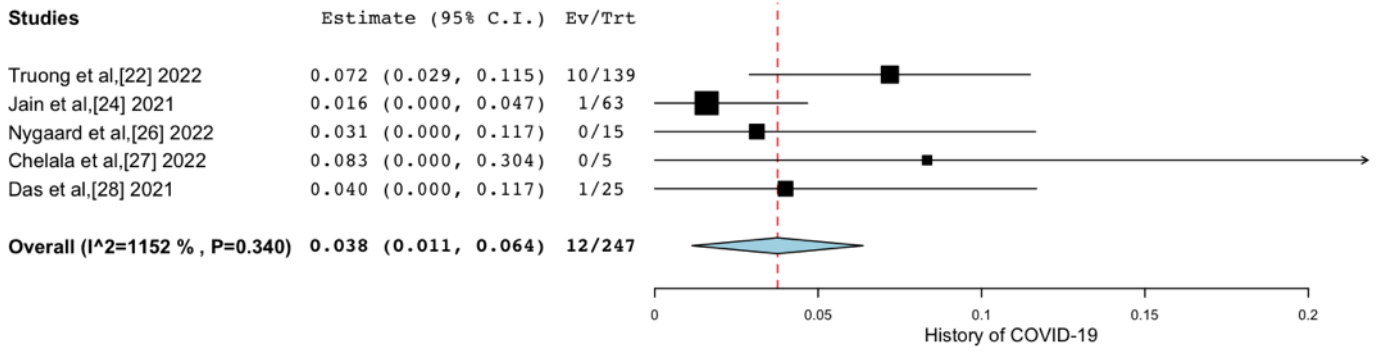
a. Age



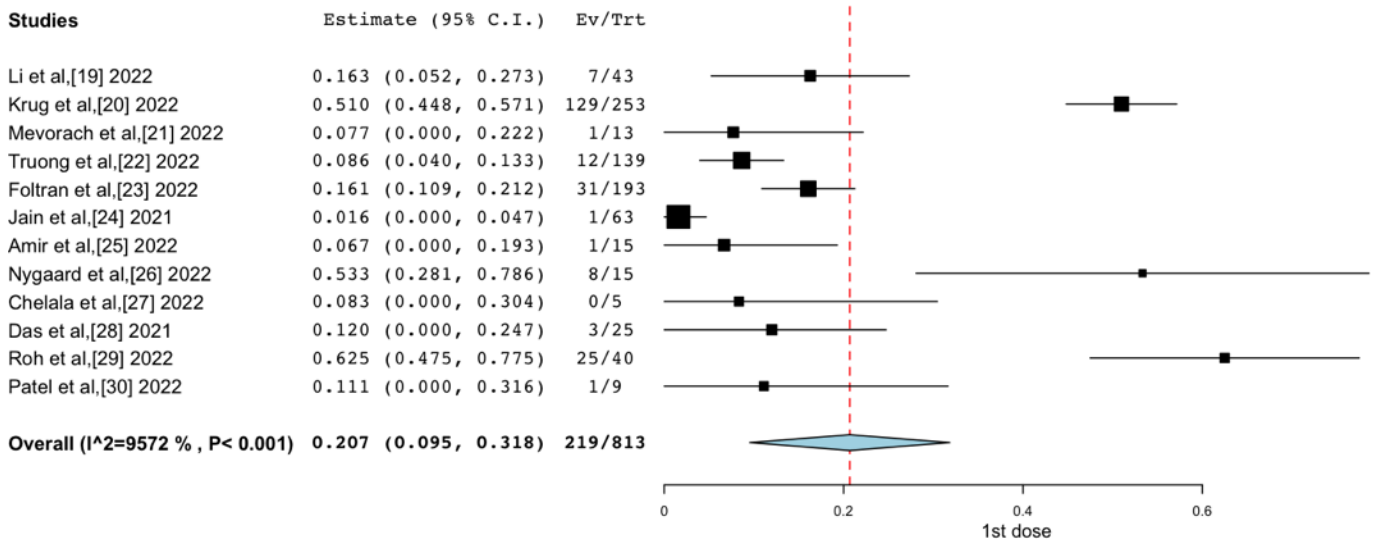
b. Male



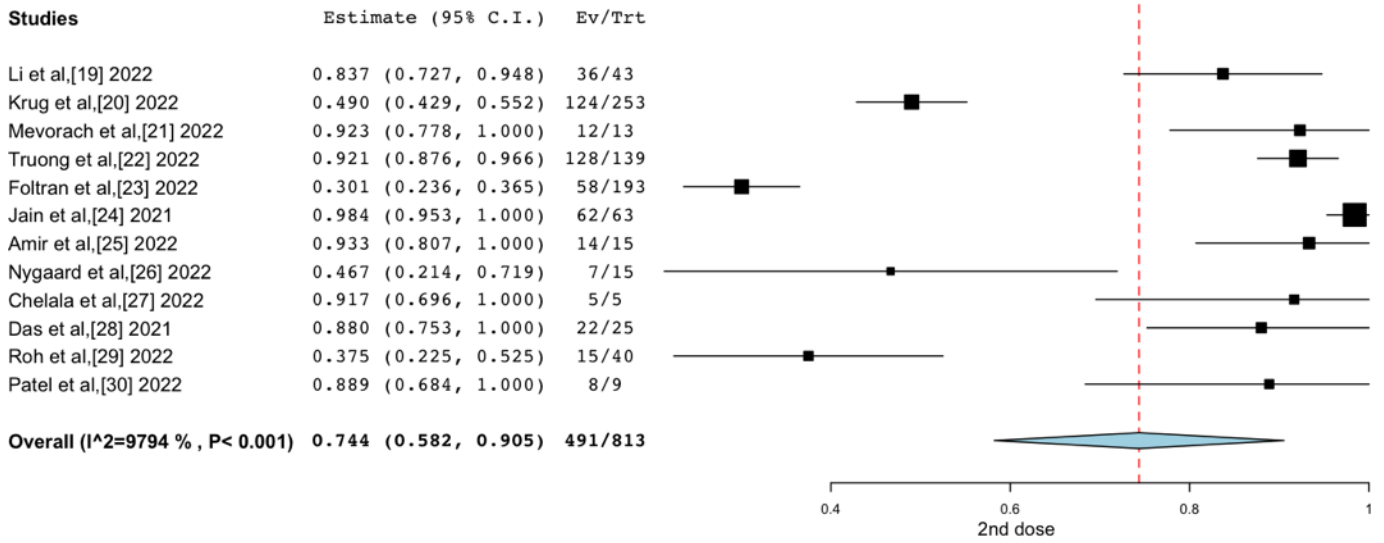
c. History of COVID-19



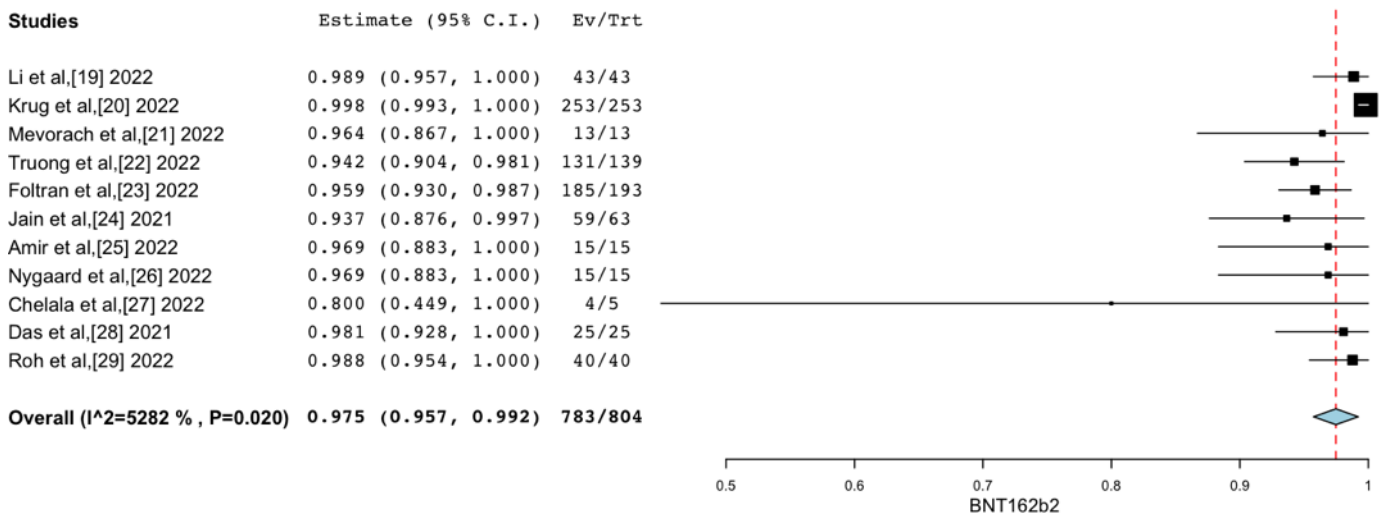
d. 1st dose



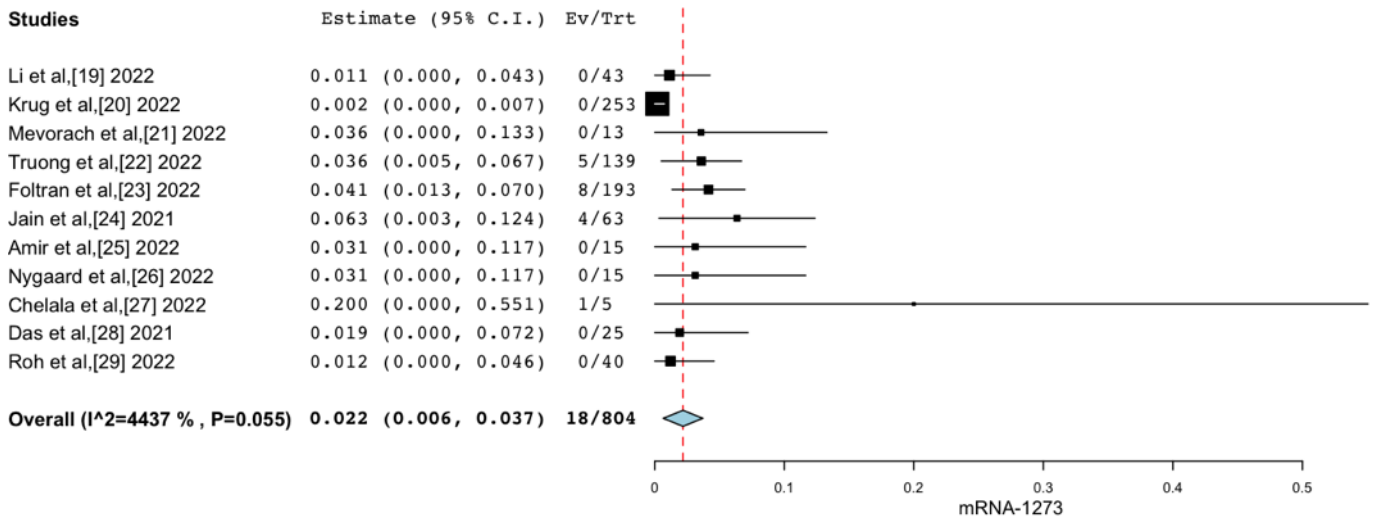
e. 2nd dose



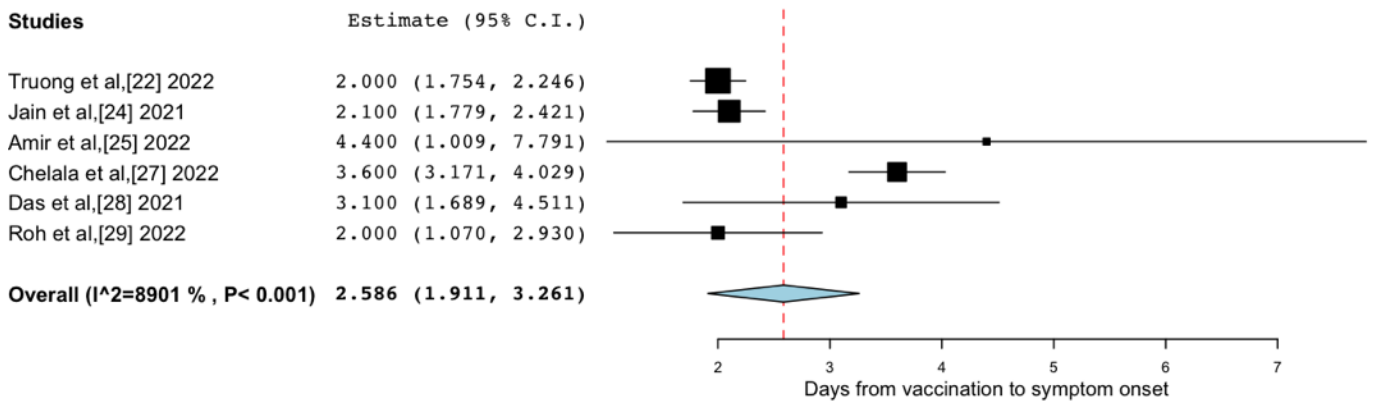
f. BNT162b2



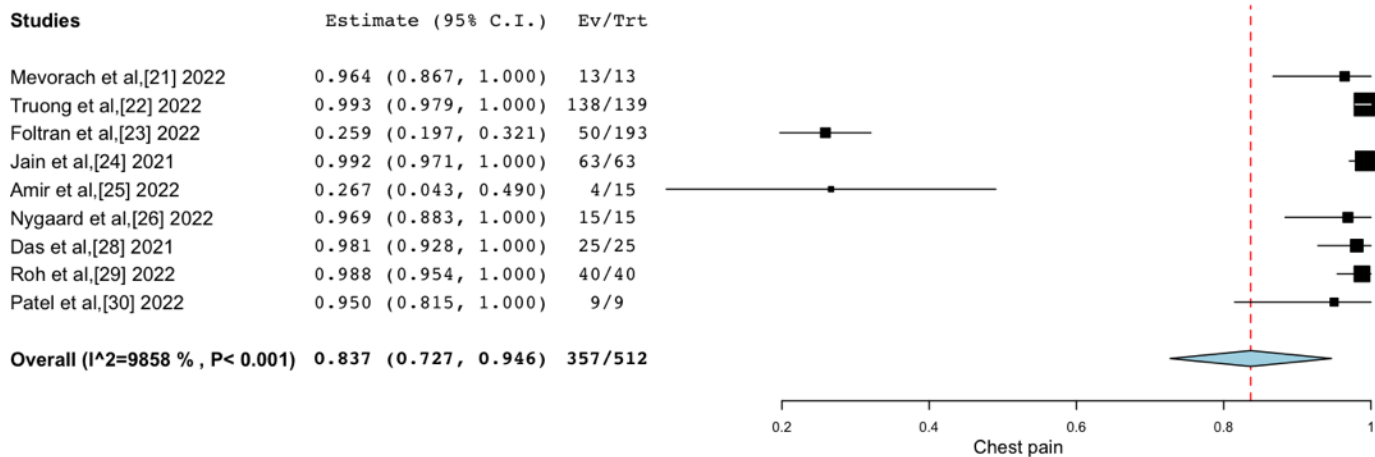
g. mRNA-1273



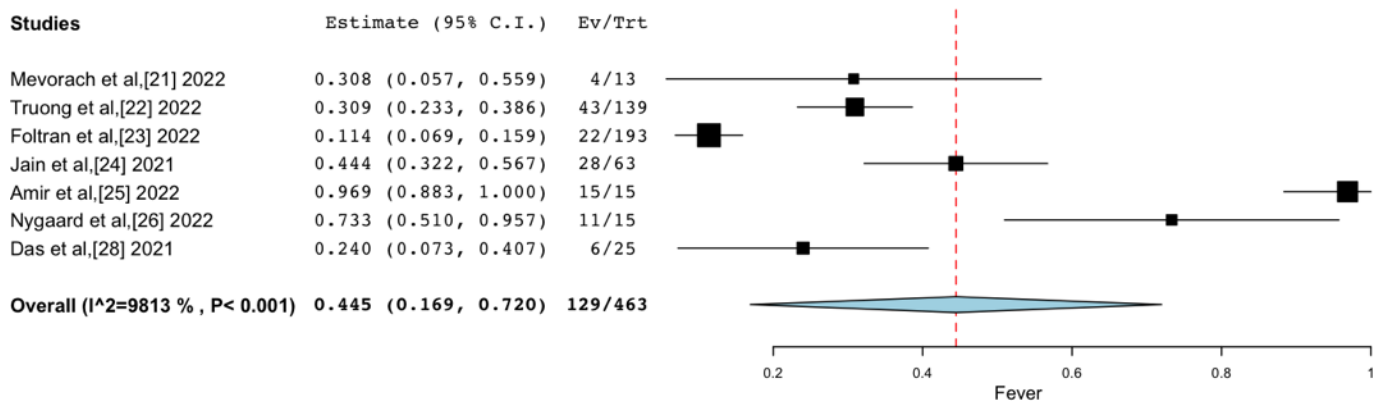
h. Days from vaccination to symptom onset



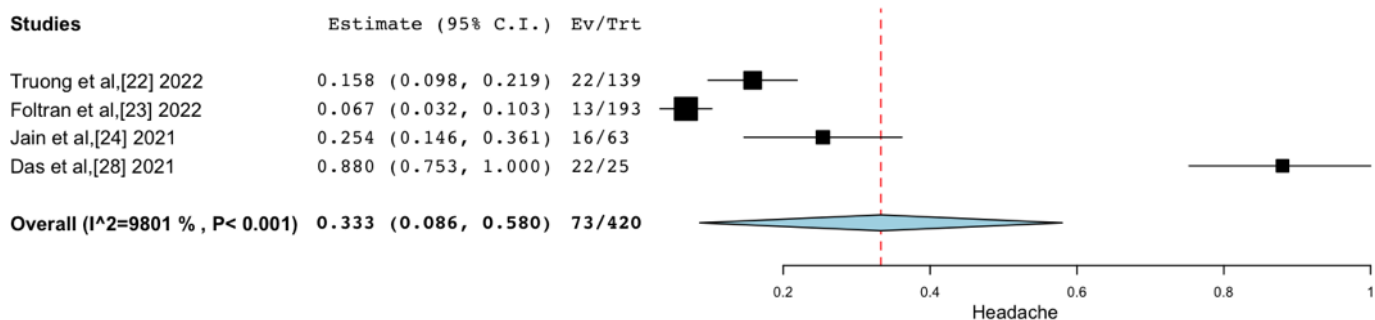
i. Chest pain



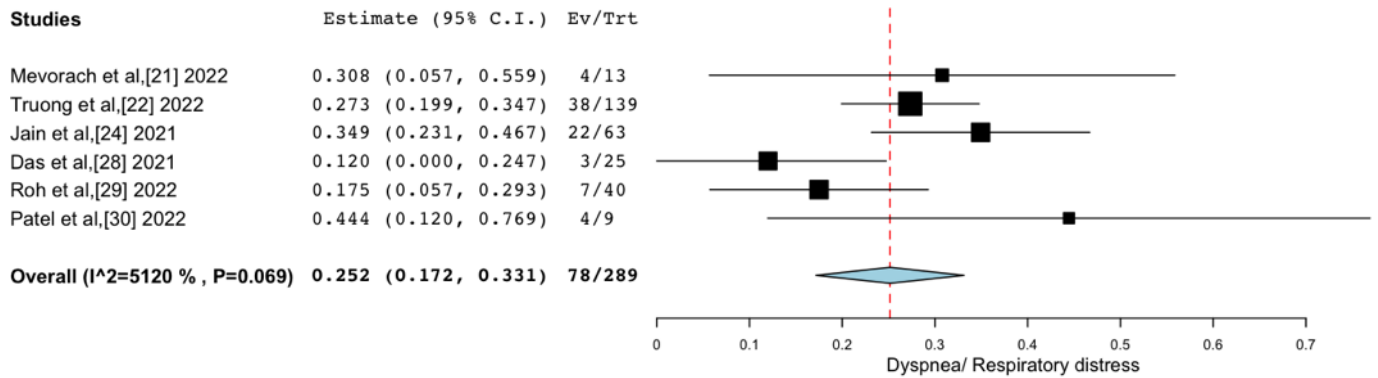
j. Fever



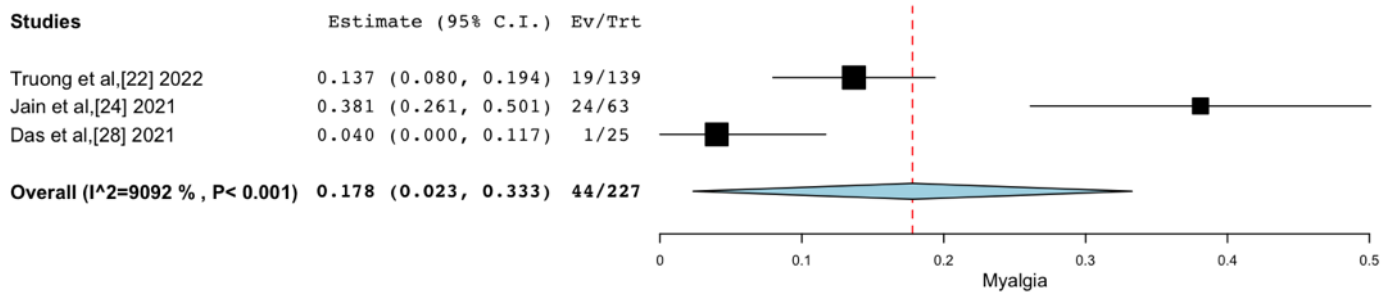
k. Headache



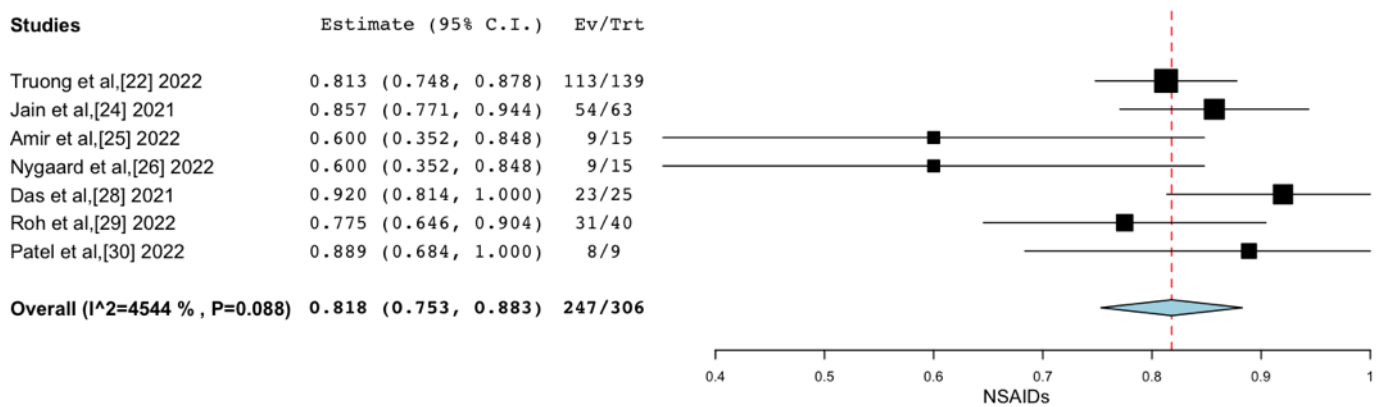
I. Dyspnea/ Respiratory distress



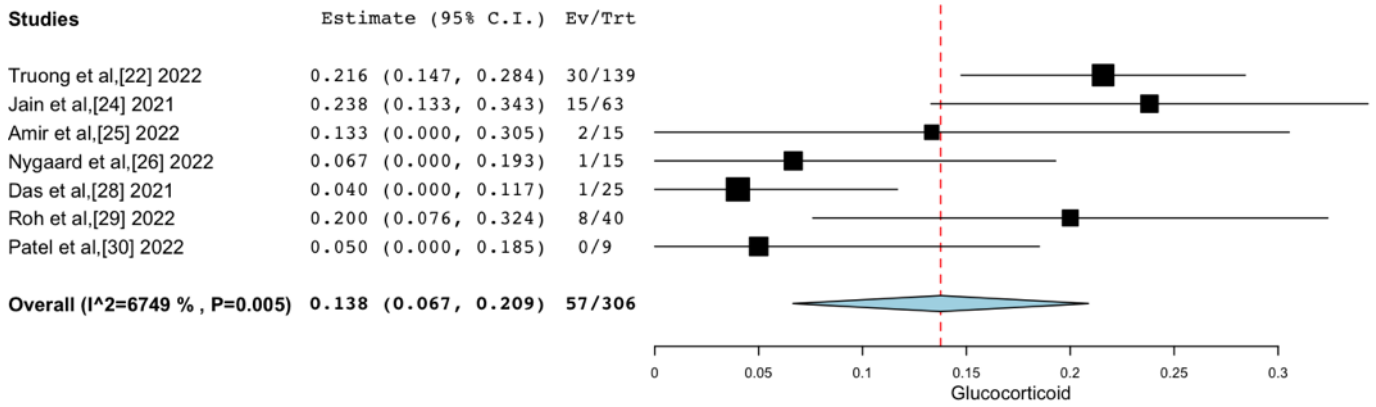
m. Myalgia



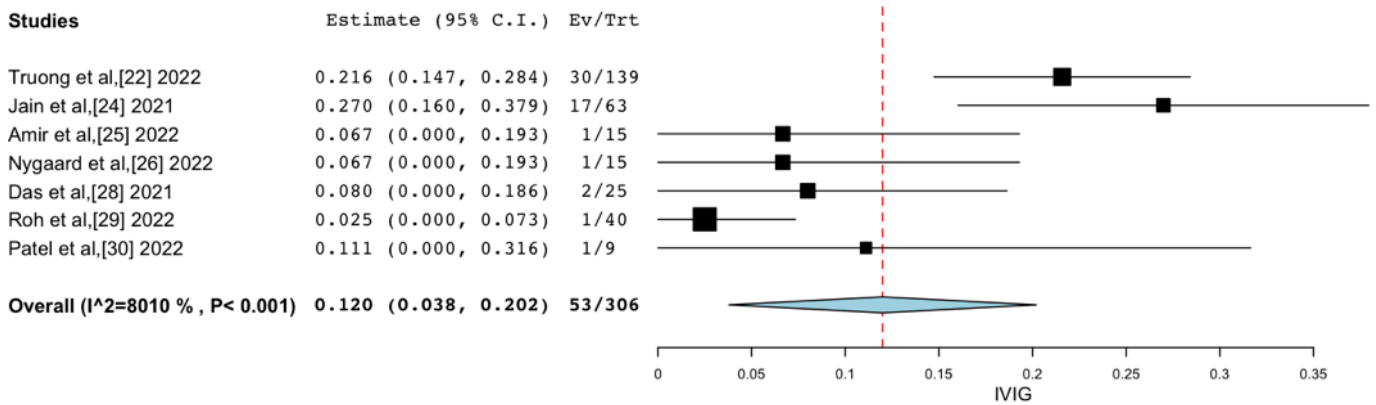
n. NSAIDs



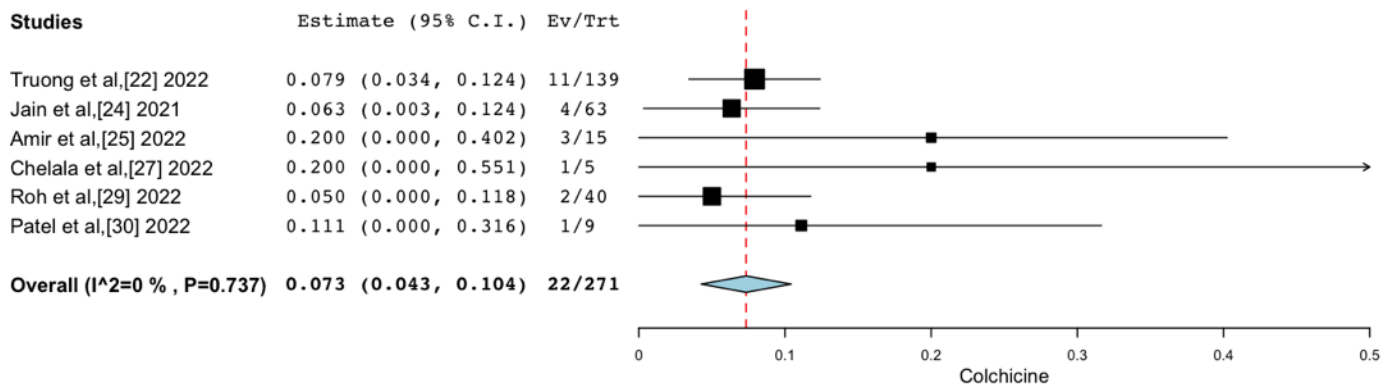
o. Glucocorticoid



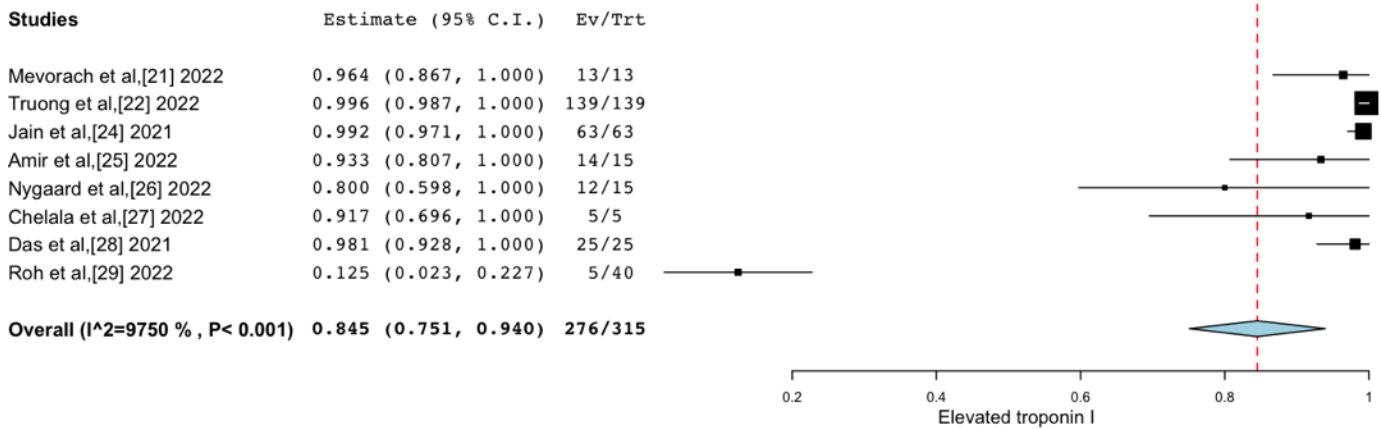
p. IVIG



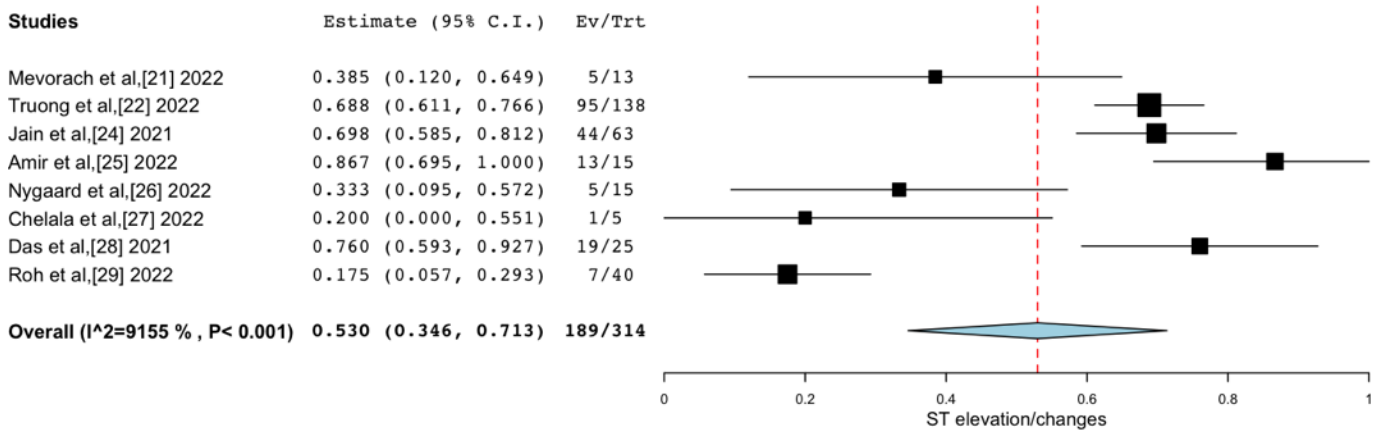
q. Colchicine



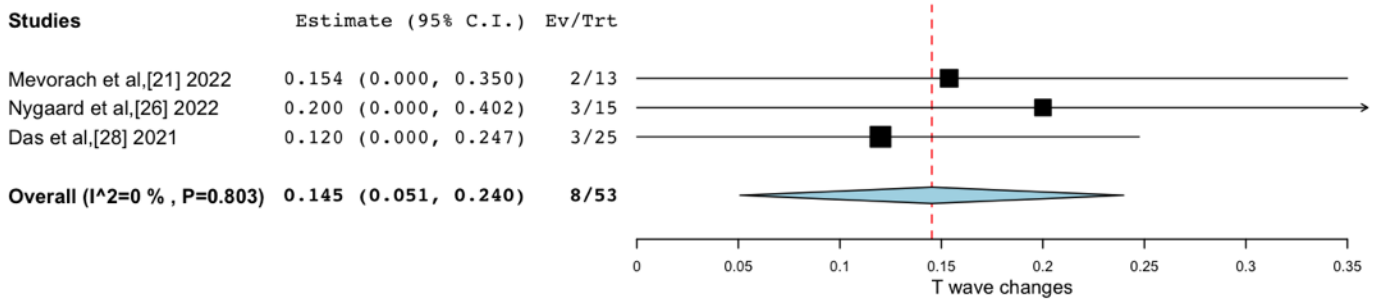
r. Elevated troponin I



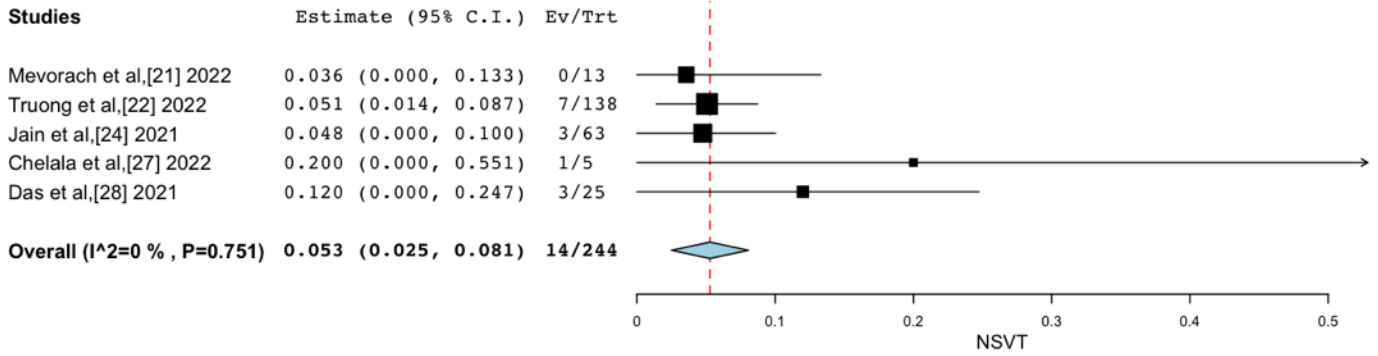
s. ST elevation/changes



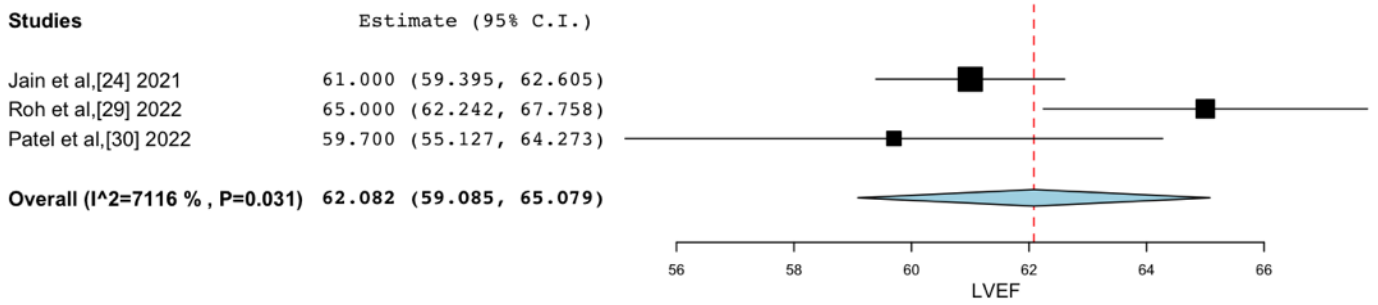
t. T wave changes



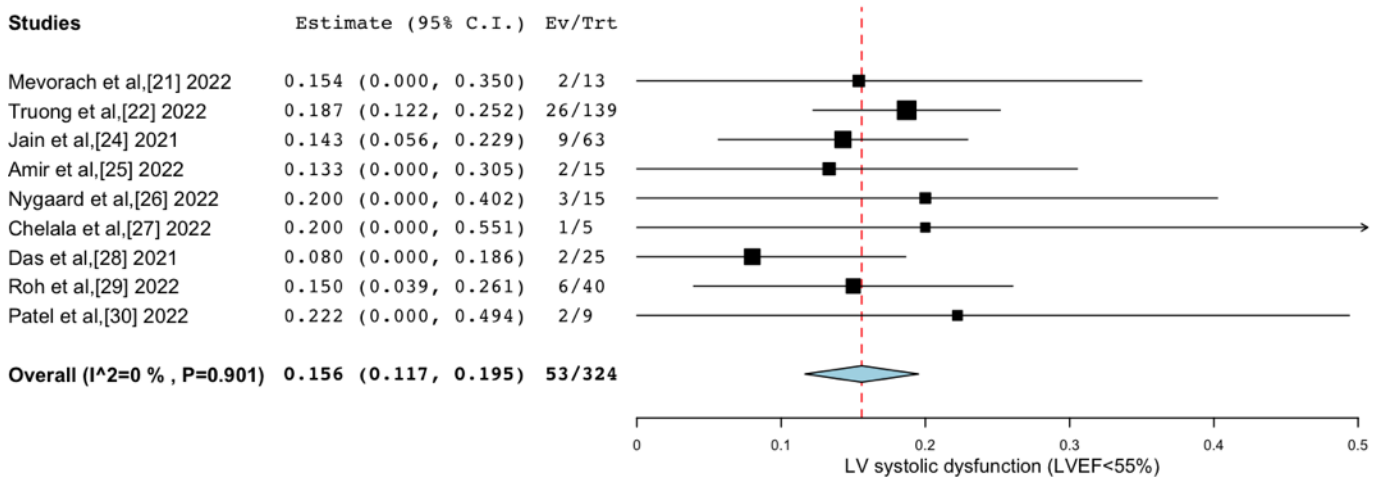
u. NSVT



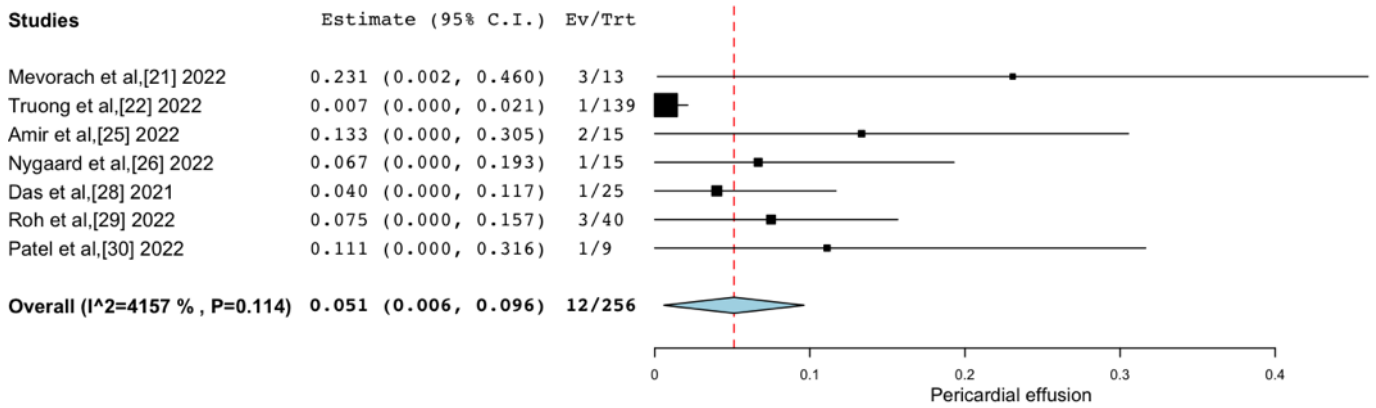
v. LVEF



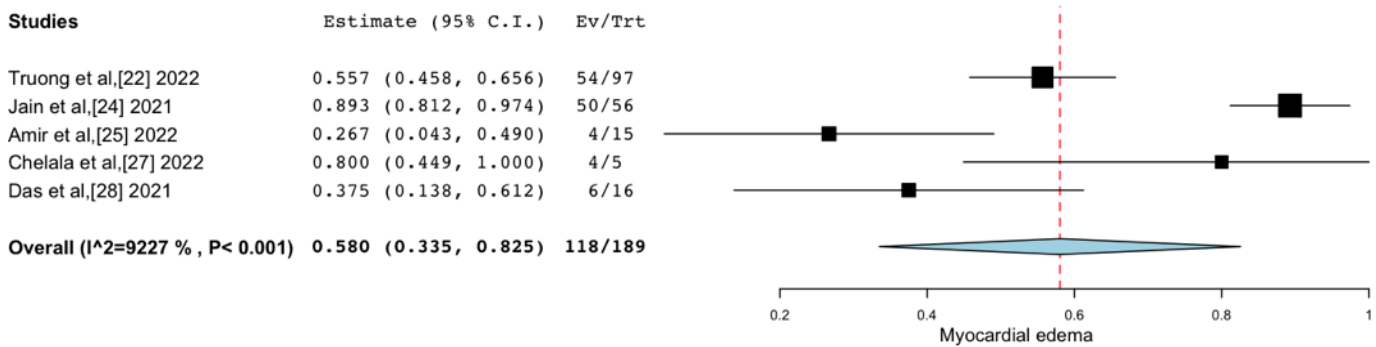
w. LV systolic dysfunction (LVEF<55%)



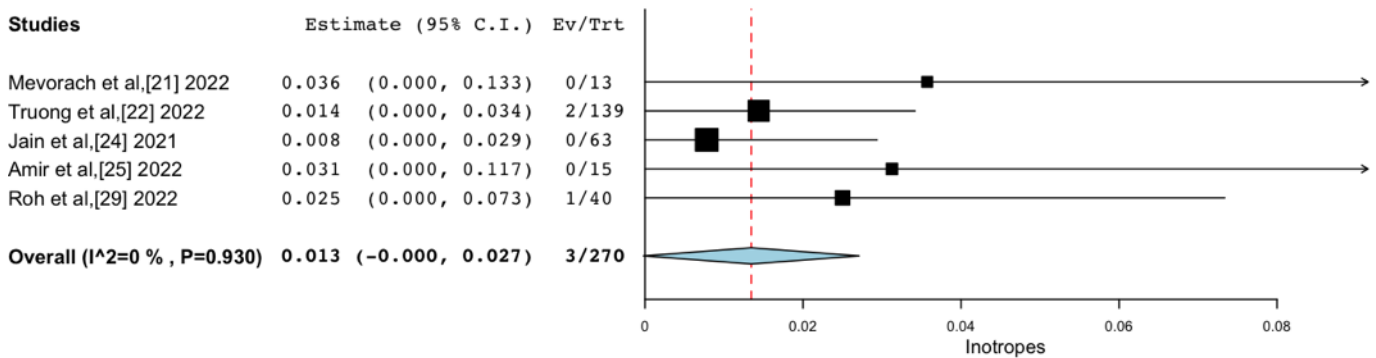
x. Pericardial effusion



y. Myocardial edema



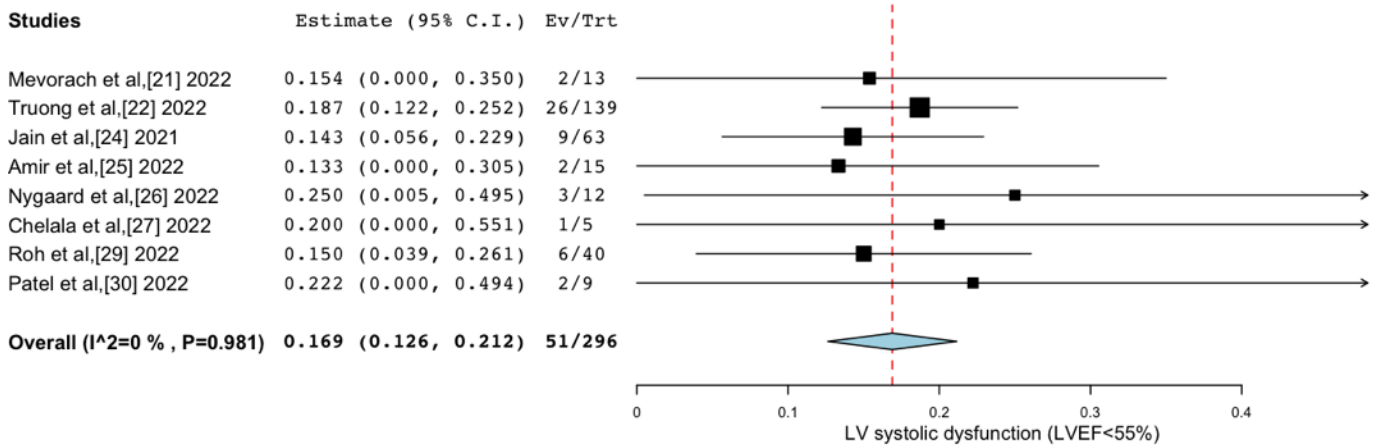
z. Inotropes



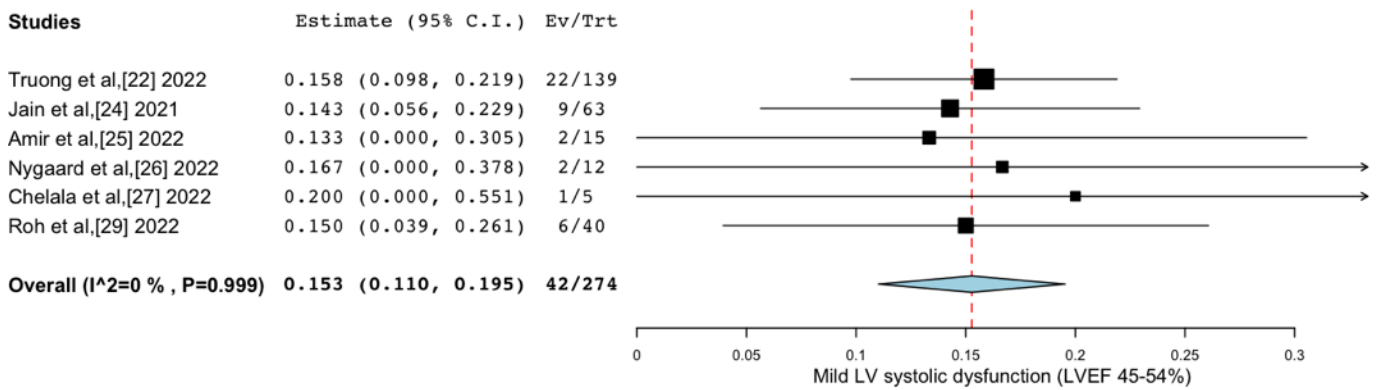
Abbreviations: IVIG, intravenous immune globulin; LV, left ventricular; LVEF, left ventricle ejection fraction; NSAIDS, Non-steroidal anti-inflammatory drugs; NSVT, Non-sustained ventricular tachycardia.

eFigure 2. Forest Plots of Subgroup Analysis Including Studies With Only Patients With Myocarditis

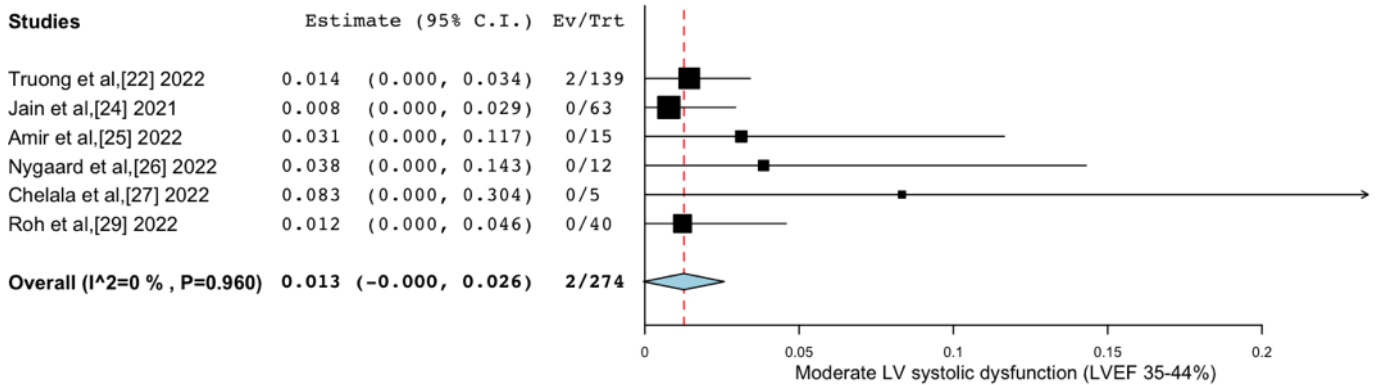
a. LV systolic dysfunction (LVEF<55%)



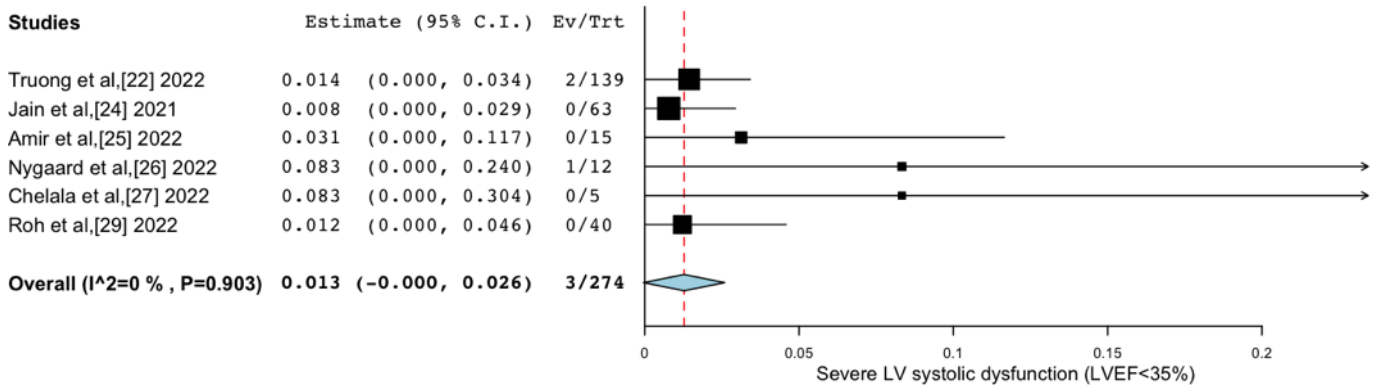
b. Mild LV systolic dysfunction (LVEF 45-54%)



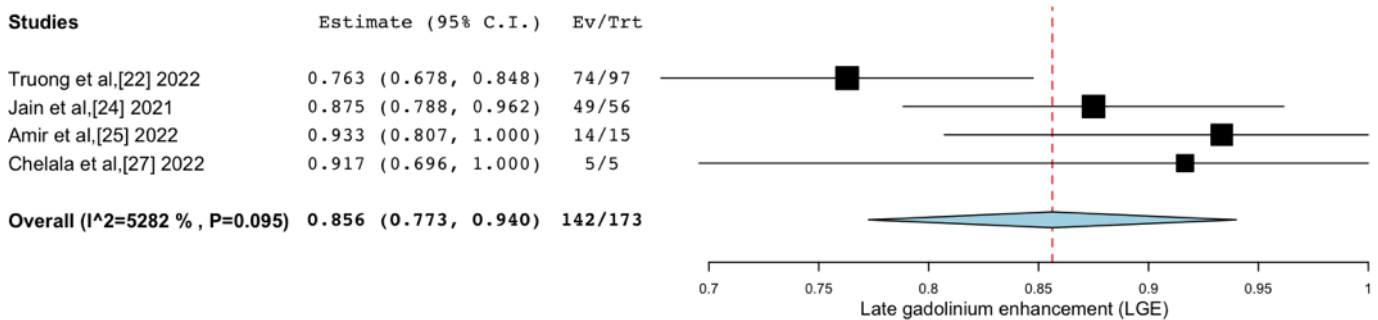
c. Moderate LV systolic dysfunction (LVEF 35-44%)



d. Severe LV systolic dysfunction (LVEF<35%)

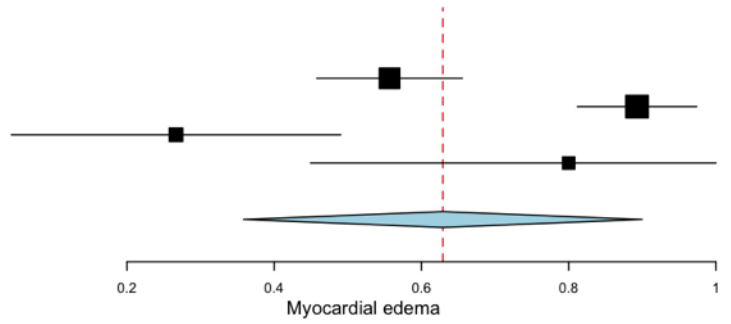


e. Late gadolinium enhancement (LGE)



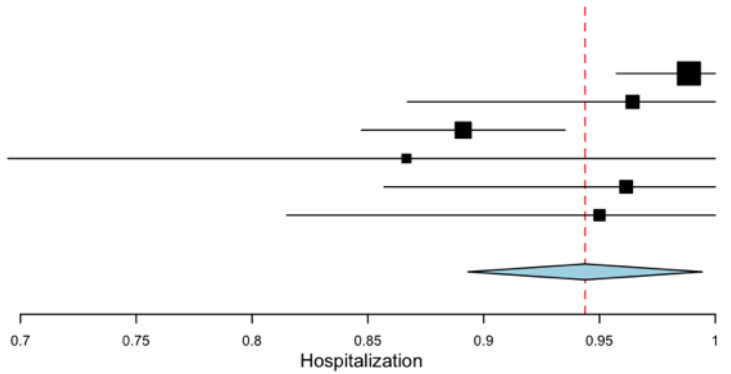
f. Myocardial edema

Studies	Estimate (95% C.I.)	Ev/Trt
Truong et al,[22] 2022	0.557 (0.458, 0.656)	54/97
Jain et al,[24] 2021	0.893 (0.812, 0.974)	50/56
Amir et al,[25] 2022	0.267 (0.043, 0.490)	4/15
Chelala et al,[27] 2022	0.800 (0.449, 1.000)	4/5
Overall (I²=9317 %, P< 0.001)	0.629 (0.358, 0.900)	112/173



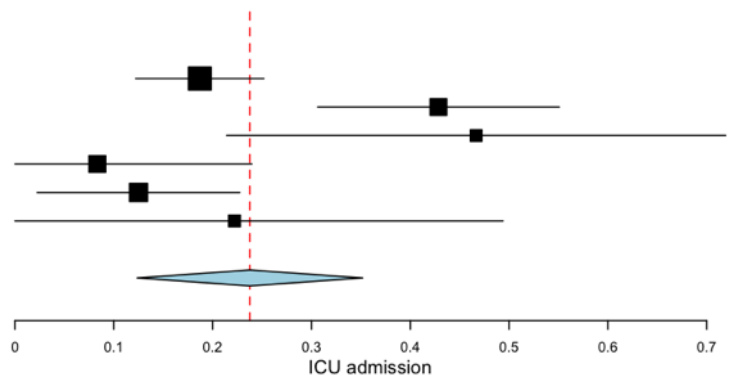
g. Hospitalization

Studies	Estimate (95% C.I.)	Ev/Trt
Li et al,[19] 2022	0.989 (0.957, 1.000)	43/43
Mevorach et al,[21] 2022	0.964 (0.867, 1.000)	13/13
Foltran et al,[23] 2022	0.891 (0.847, 0.935)	172/193
Amir et al,[25] 2022	0.867 (0.695, 1.000)	13/15
Nygaard et al,[26] 2022	0.962 (0.857, 1.000)	12/12
Patel et al,[30] 2022	0.950 (0.815, 1.000)	9/9
Overall (I²=6324 %, P=0.018)	0.944 (0.893, 0.994)	262/285

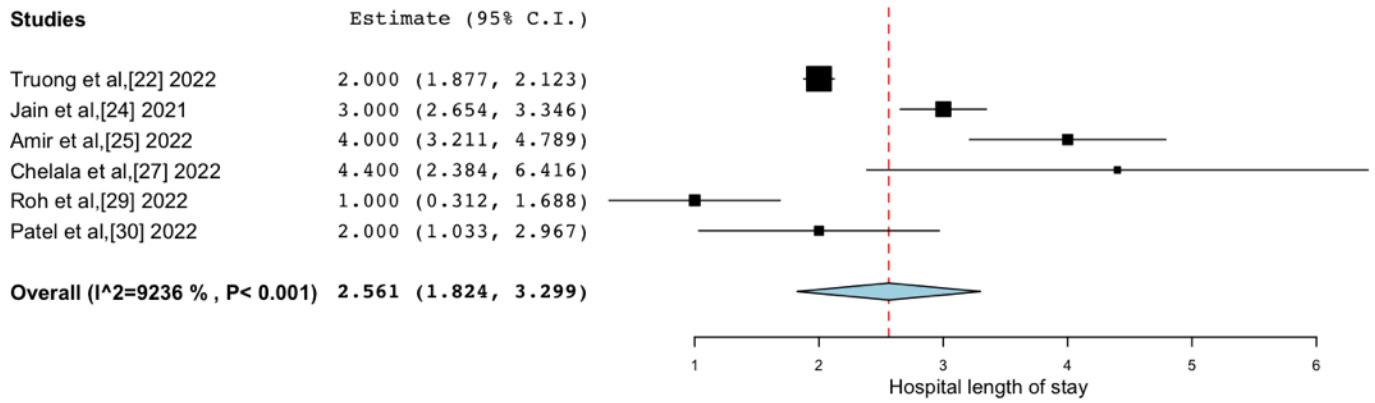


h. ICU admission

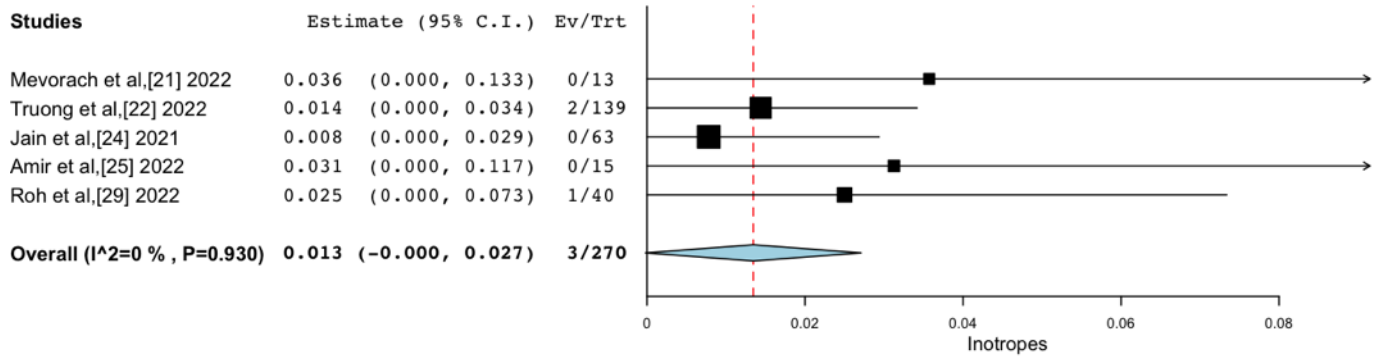
Studies	Estimate (95% C.I.)	Ev/Trt
Truong et al,[22] 2022	0.187 (0.122, 0.252)	26/139
Jain et al,[24] 2021	0.429 (0.306, 0.551)	27/63
Amir et al,[25] 2022	0.467 (0.214, 0.719)	7/15
Nygaard et al,[26] 2022	0.083 (0.000, 0.240)	1/12
Roh et al,[29] 2022	0.125 (0.023, 0.227)	5/40
Patel et al,[30] 2022	0.222 (0.000, 0.494)	2/9
Overall (I²=7718 %, P< 0.001)	0.238 (0.124, 0.352)	68/278



i. Hospital length of stay



j. Inotropes



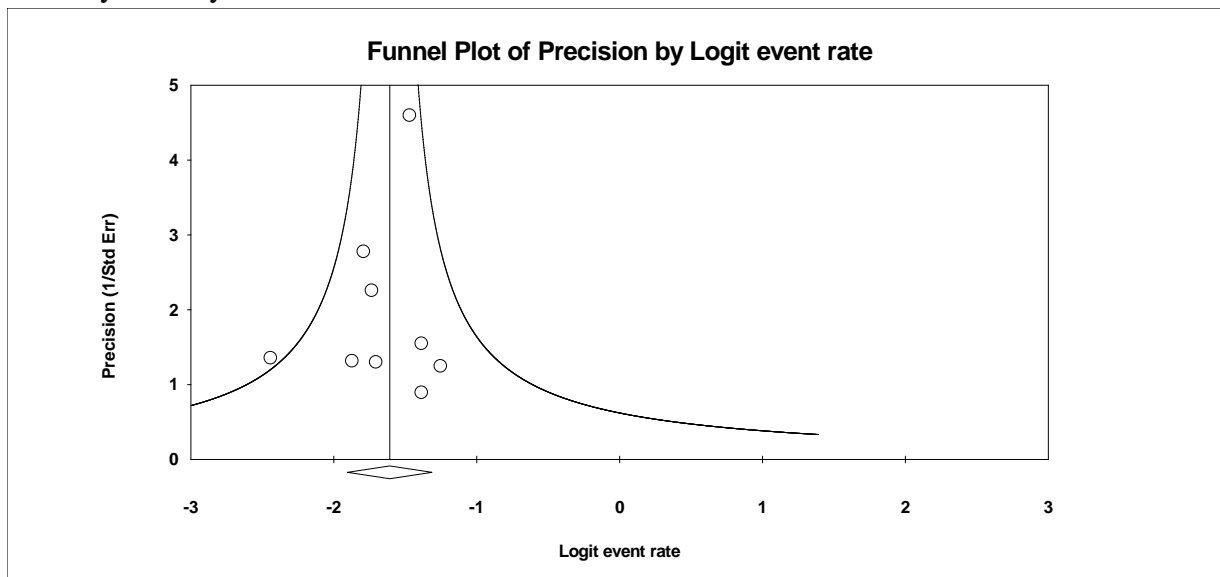
Abbreviations: ICU, intensive care unit; LV, left ventricular.

eFigure 3. Risk of Bias Summary

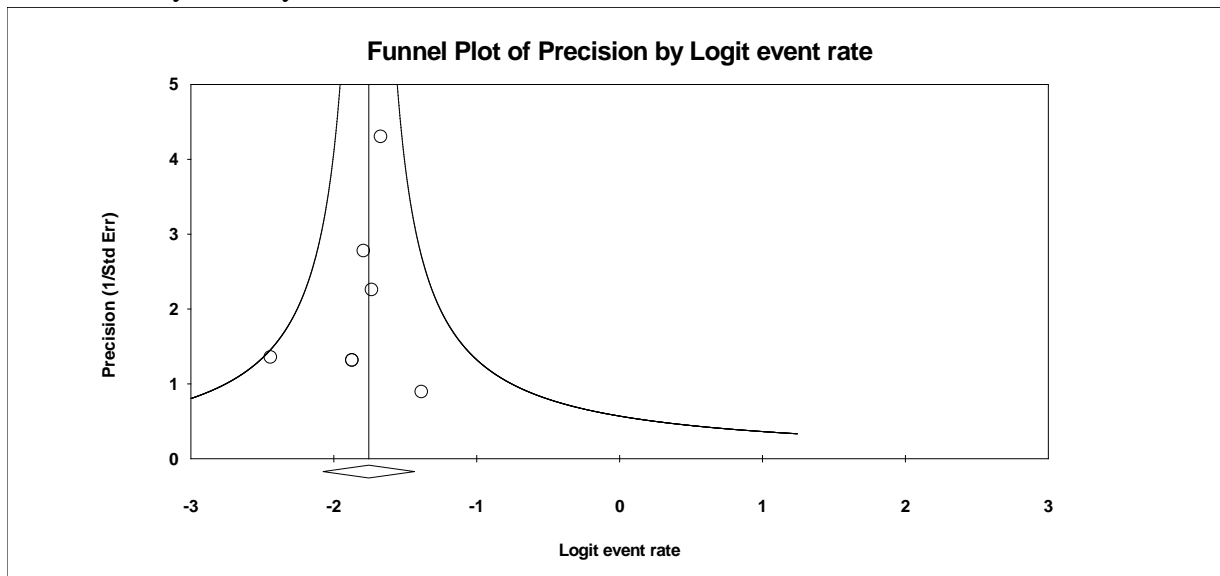
	Was the study's target population a close representation of the national population in relation to relevant variables?	Was the sampling frame a true or close representation of the target population?	Was some form of random selection used to select the sample, OR was a census undertaken?	Was the likelihood of nonresponse bias minimal?	Were data collected directly from the subjects (as opposed to a proxy)?	Was an acceptable case definition used in the study?	Was the study instrument that measured the parameter of interest shown to have validity and reliability?	Was the same mode of data collection used for all subjects?	Was the length of the shortest prevalence period for the parameter of interest appropriate?	Were the numerator(s) and denominator(s) for the parameter of interest appropriate?
Li et al. ¹⁹	+	+	-	+	+	+	+	+	+	
Krug et al. ²⁰	+	+	-	+	+	+	+	-	+	
Mevorach et al. ²¹	-	+	-	+	+	+	+	+	+	
Truong et al. ²²	+	+	-	+	+	+	+	-	+	
Foltran et al. ²³	-	-	-	+	+	-	+	+	+	
Jain et al. ²⁴	+	+	-	+	+	+	+	-	+	
Amir et al. ²⁵	-	+	-	+	+	+	+	+	+	
Nygaard et al. ²⁶	-	-	-	+	+	-	+	+	+	
Chelala et al. ²⁷	-	-	-	+	+	-	+	+	+	
Das et al. ²⁸	-	+	-	+	+	+	+	-	+	
Roh et al. ²⁹	-	+	-	+	+	+	+	+	+	
Patel et al. ³⁰	-	+	-	+	+	+	+	+	+	

eFigure 4. Funnel Plots of the Clinical Characteristics and Outcomes

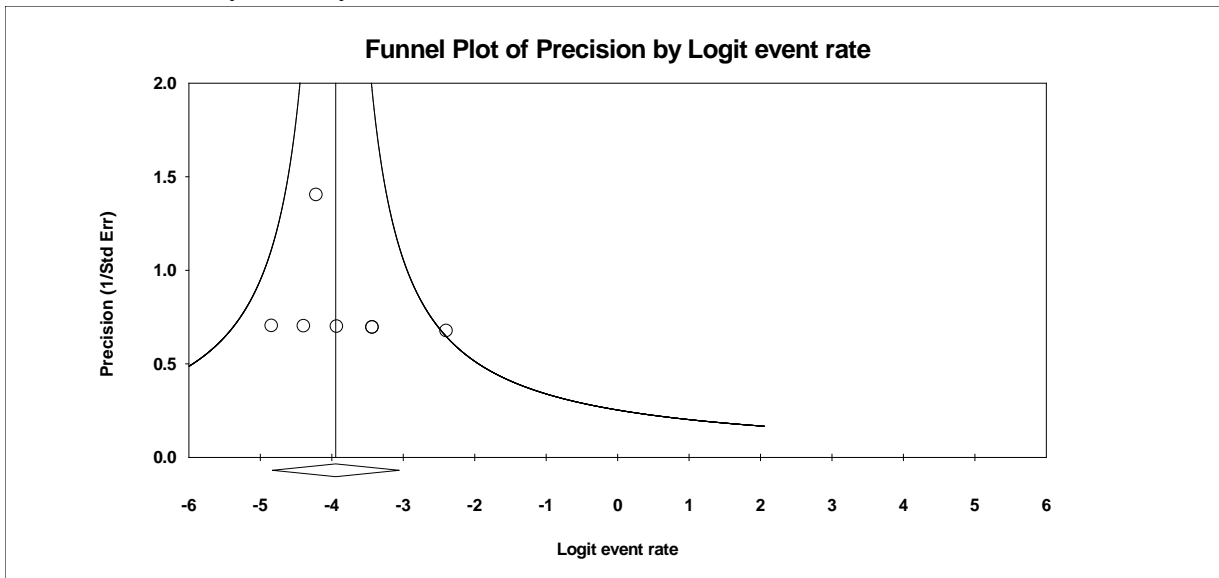
a. LV systolic dysfunction



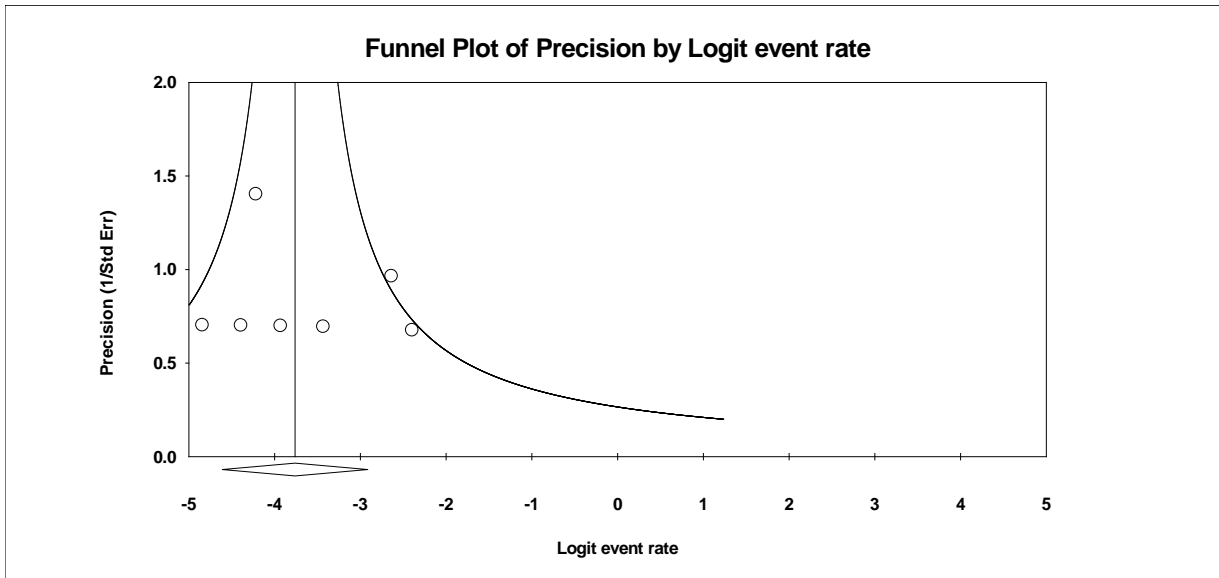
b. Mild LV systolic dysfunction



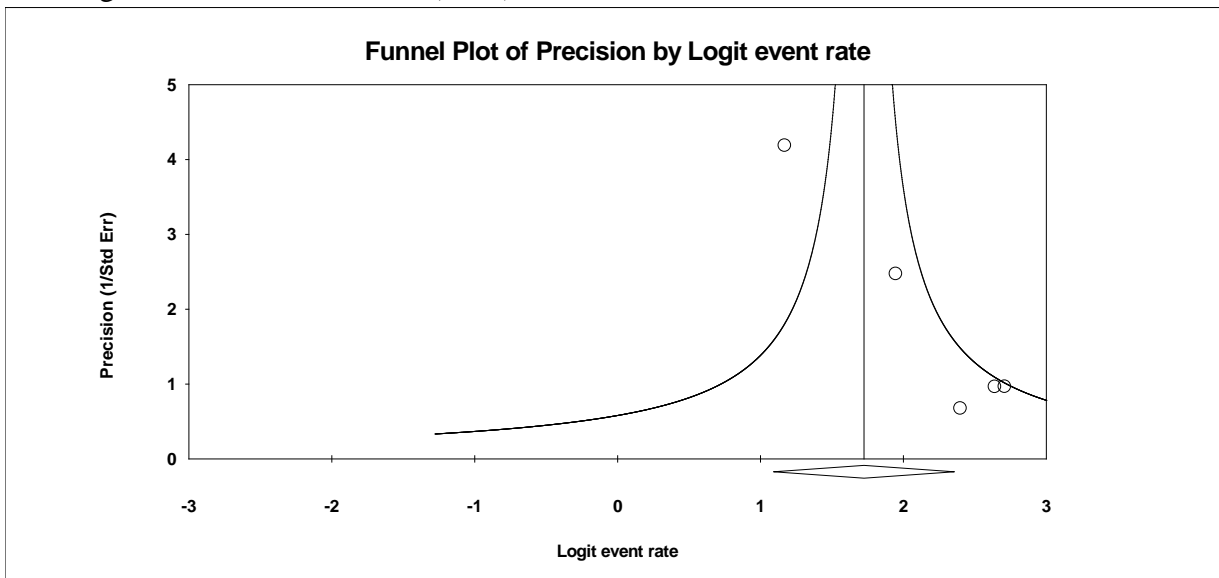
c. Moderate LV systolic dysfunction



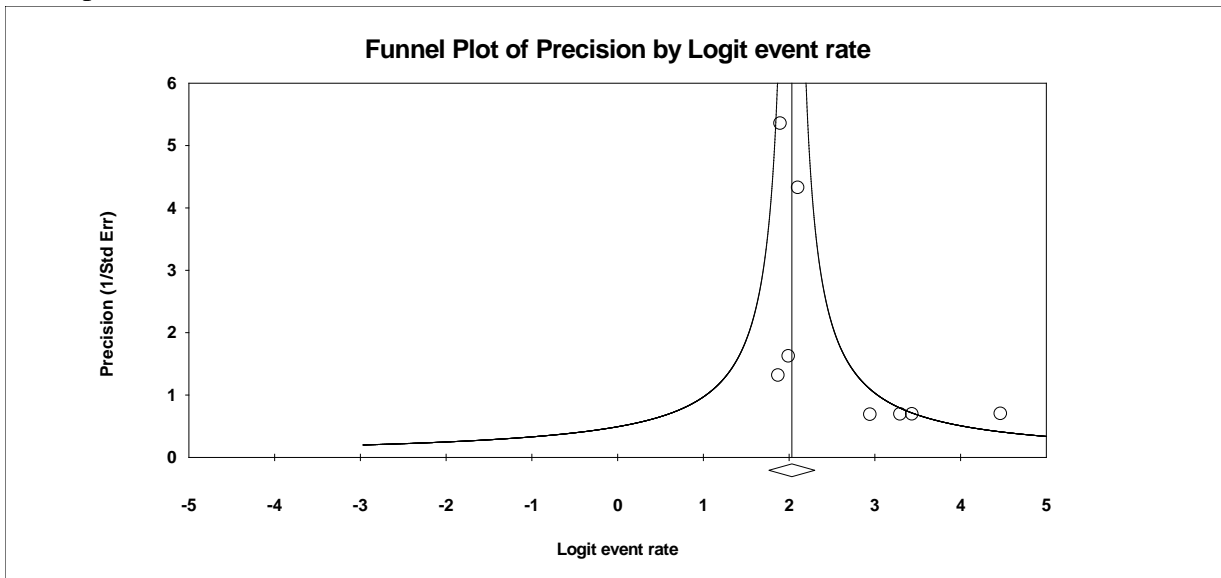
d. Severe LV systolic dysfunction



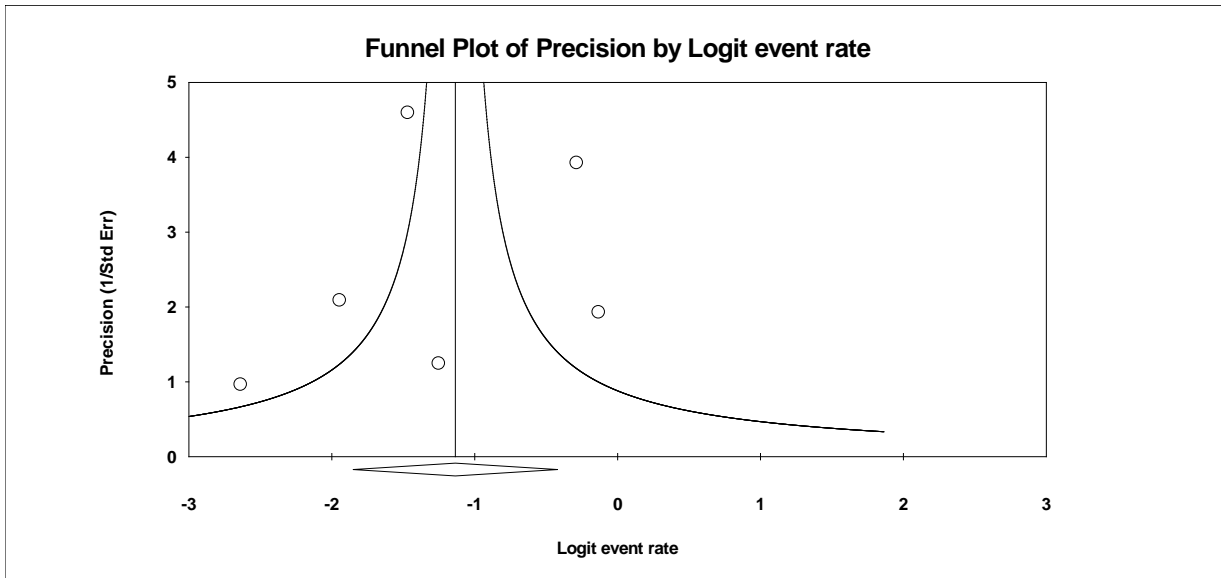
e. Late gadolinium enhancement (LGE)



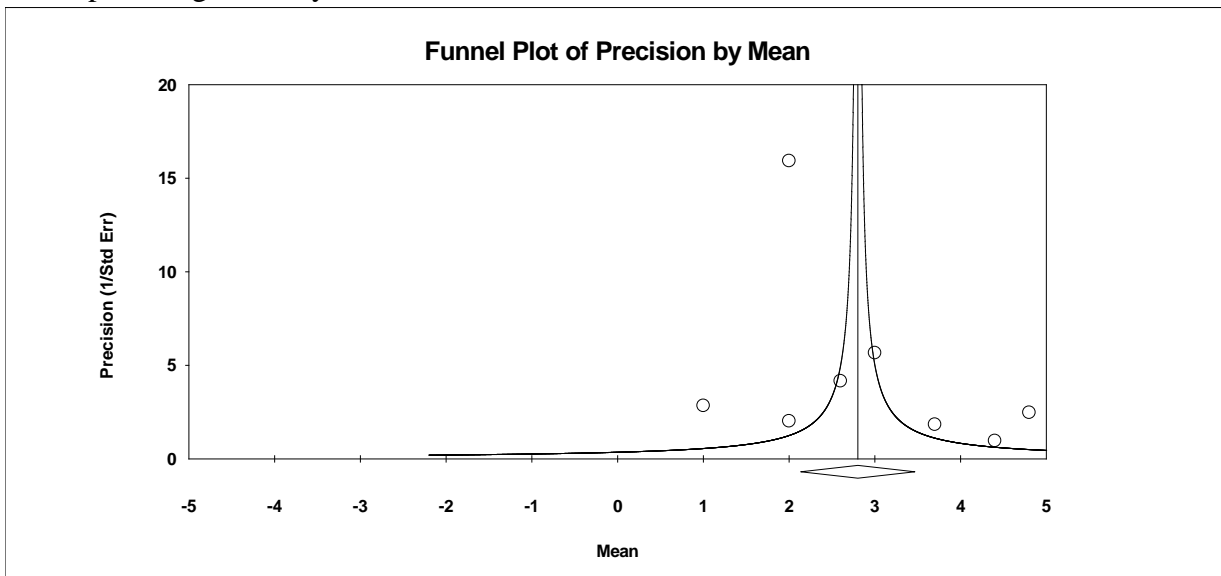
f. Hospitalization



g. ICU admission



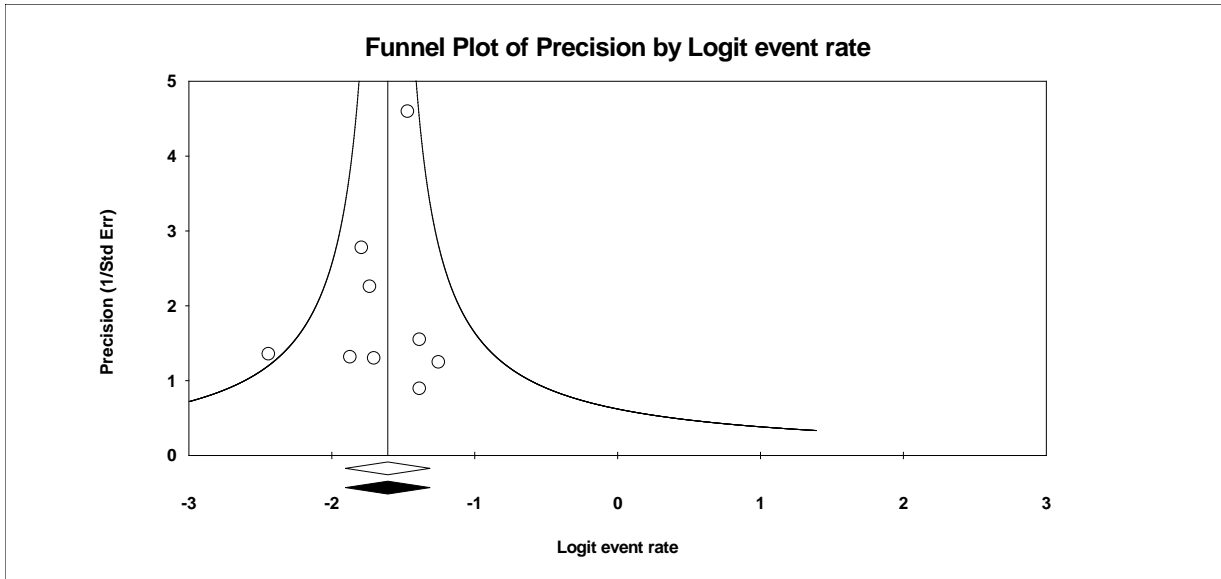
h. Hospital length of stay



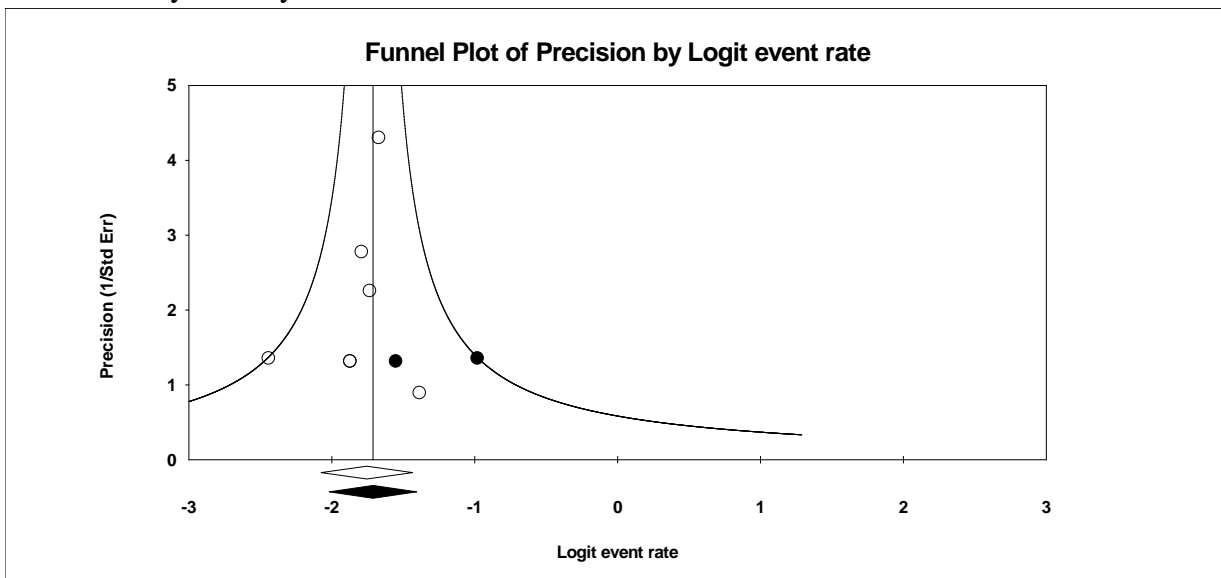
Abbreviations: ICU, intensive care unit; LV, left ventricular.

eFigure 5. Adjusted Funnel Plots of the Clinical Characteristics and Outcomes From the Trim-and-Fill Analysis

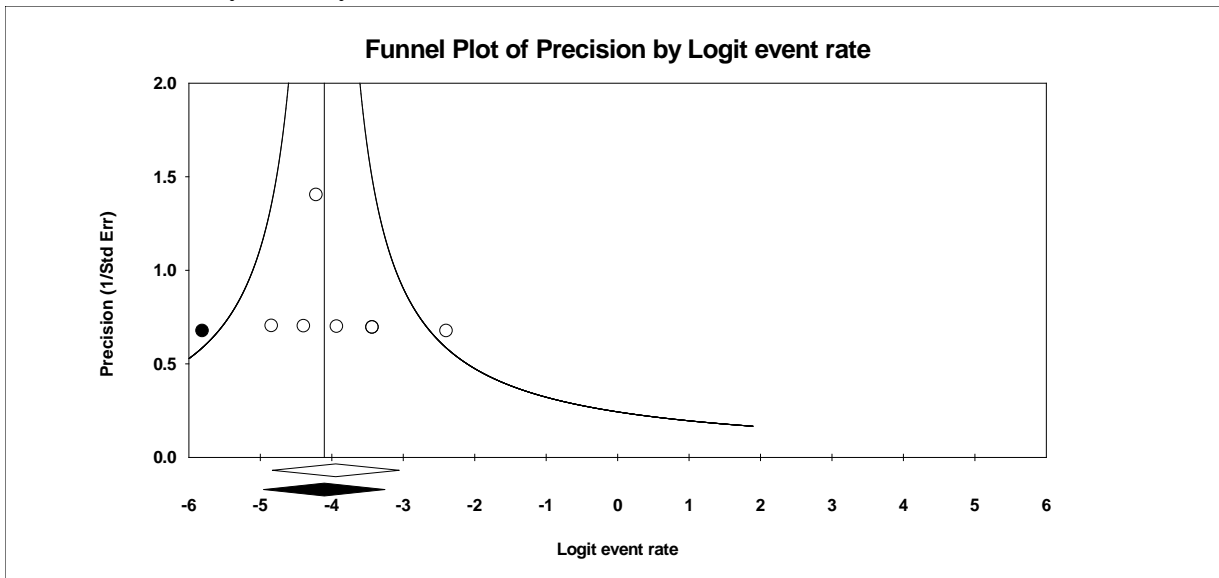
a. LV systolic dysfunction



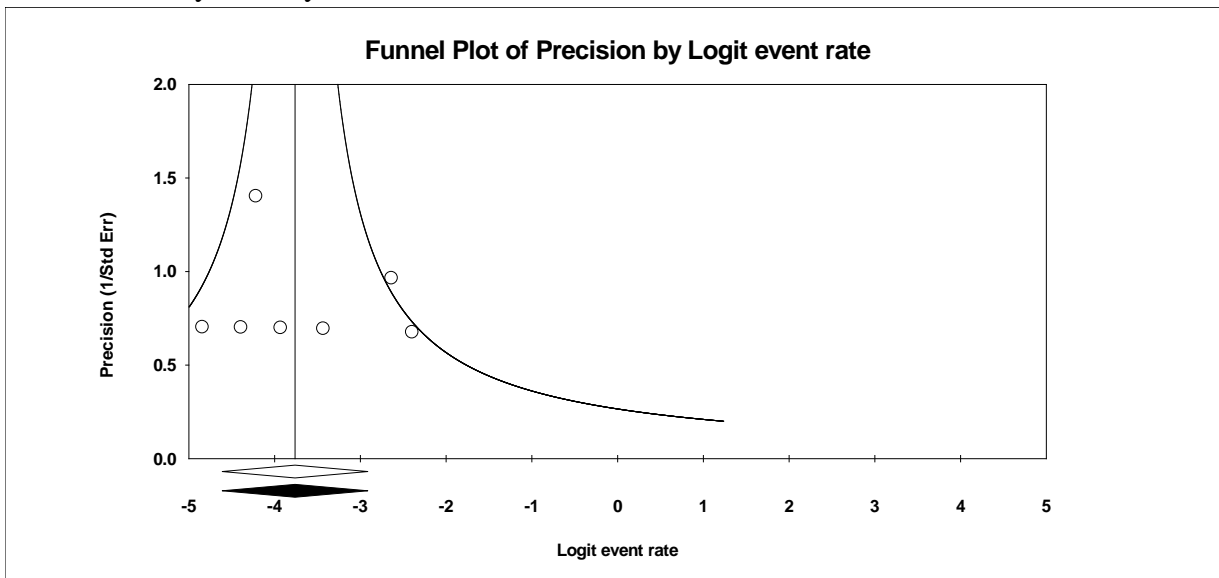
b. Mild LV systolic dysfunction



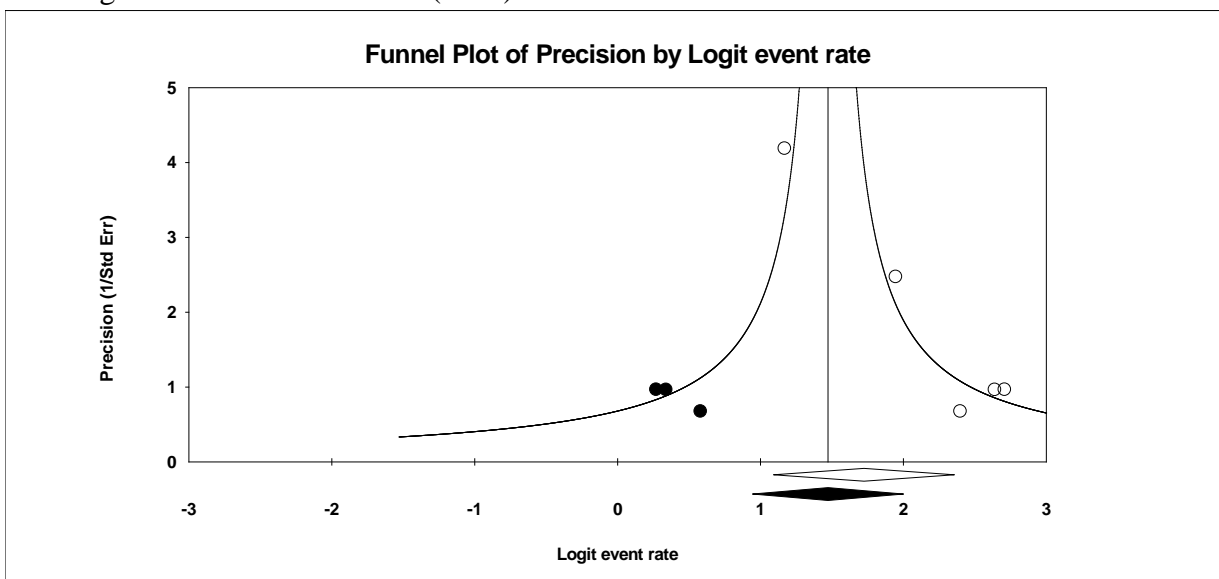
c. Moderate LV systolic dysfunction



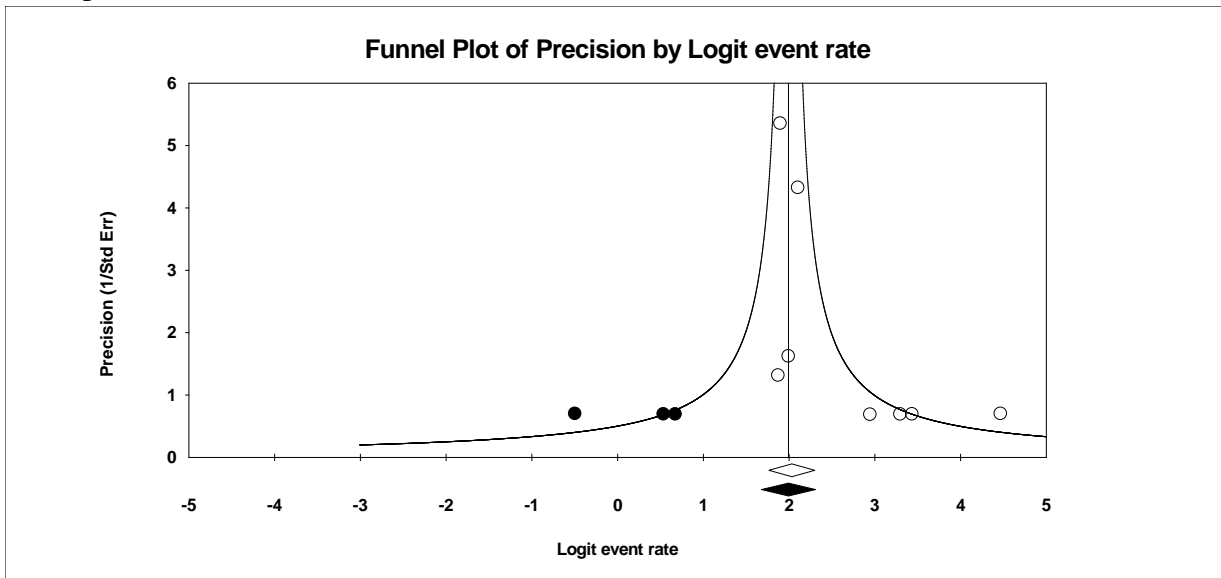
d. Severe LV systolic dysfunction



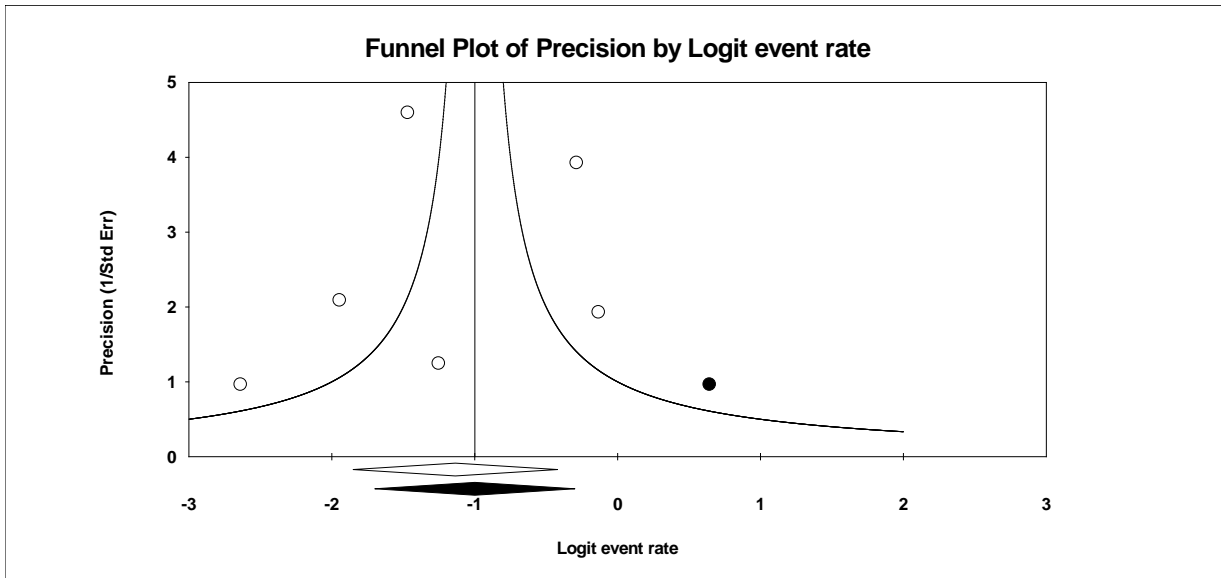
e. Late gadolinium enhancement (LGE)



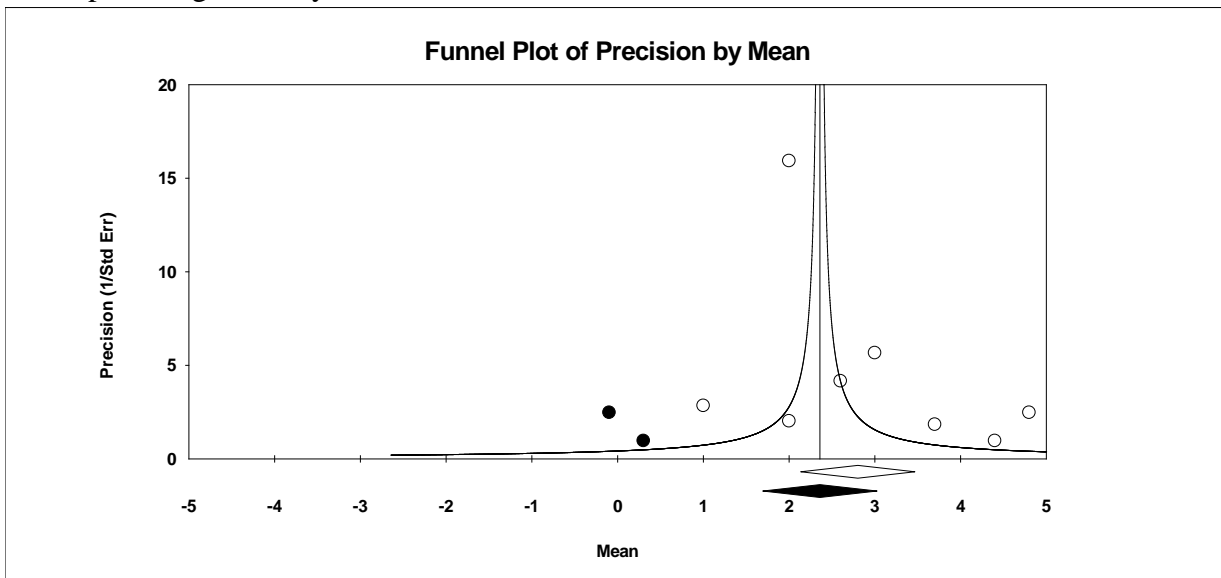
f. Hospitalization



g. ICU admission



h. Hospital length of stay



Abbreviations: ICU, intensive care unit; LV, left ventricular.