Canagliflozin

Case #	Age (Yrs)	Sex	T2D; T1D; Unknwon	Hospitalization (HO; OT)	Insulin	Metformin	Anti-hyperglycemic agents (AHA)	Time from SGLT2i-start to DKA	Height	Weight	BMI	Hemoglobin A1C	Blood Glucose (mg/dL)	pH	Other lab results	Notes
1	18	Male	T1D	OT	1	1	Metformin Insulin	Unknown	63.8"	78.1kg	30		180		Large urine ketones	
2	27	Female	T1D	HO; LT	1		Insulin	1 month			24	7.8%	150	6.89	Large urine ketones	• Insulin reduction • URI, usual ETOH • Peters case (Case #3)
3	28	Female	T1D	HO; LT	1		Insulin	1 month; 2 months		133 lb		8.0%	224; 221		Episode 1: Anion gap 22 mEq/L, positive serum and urine ketones Episode 2: anion gap 17 mEq/L, strongly positive urine ketones	• Peters case (Case #4) • Social alcohol use • Recurrent DKA (2 episodes)
4	28	Female	T1D	HO	1		Insulin		60"	160lbs			Euglycemia		Urinary ketones	• Insulin pump malfunction
5	30	Male	T1D	HO	1		Insulin		64"	129lb			147		Urine Ketones Anion Gap 24	• Rapid weight loss (13 lbs)
6	30	Female	T2D	HO, LT			None		66"	97.9kg		13.5%	252	7		
7	31	Female	T1D	HO	1		Insulin								Urine ketones	• ETOH abuse
8	35	Male	T1D	HO, OT	1		Insulin	Within 4 weeks	74"	227 lbs			<300		beta-hydroxybutyrate (BHB) 11.5; negative; then re-initiated cana: BHB increased again 4.69 (units unspecified) in 1 day	• Acute gastroenteritis, kidney injury
9	37	Female	T2D	OT		1	Metformin	Unknown		210 lbs			< 200	7.3	HCO3 18	
10	37	Female	T1D	HO, OT	1		Insulin; Symlin	Unknown	66"	170 lbs			116		HCO3 13 Serum ketones positive	• Gastroenteritis, dehydration
11	39	Female	T1D	HO, OT	1		Insulin	1 year				7.0%	233		Anion gap 24 mEq/L HCO3 9 mEq/L.	• URI possibly PNA • Peters (case)
12	40	Female	T1D	HO, LT				2 weeks			27	11.2%	220	6.9	HC03 6 mEq/L Anion gap 25 mEq/L Serum ketones positive	• Cough, mild asthma, fever • Basal insulin reduction 50%
13	41	Male	T1D	HO	1		Insulin		68"	199 lbs				7	HC03 9 mEq/L WBC 30,000	• Decreased total daily dose of insulin • Recovering from pancreatitis • DIA2004
14	42	Female	T1D	HO, LT	1		Insulin		159 cm	82 kgs			792	6.89	Anion gap (NR: 3 - 13) was 37 mmol/L HCO3 5 (NR: 24 - 28) mmol/L	• Insulin pump malfunction • DIA2004
15	43	Female	T2D	HO	1	1	Insulin; Metformin	1 week	65"	247 lbs			269	7.124	HCO3 of 8 Leukocytosis	• Reduction in insulin
16	44	Male	T1D	HO, LT	1		Insulin		70"	143 lbs			500		Anion gap 31 creatinine 2.3 HC03 of 8 WBC of 22	• Disconnected insulin pump (urgent care prior) • DIA2004
17	46	Male	T1D	OT	1	1	Insulin; Metformin		162cm	77kg	29	8.1%	179	7.25	WBC 5500/mL, HCO3 15.6mEq/L, lactic acid 2.1mM, blood total ketones 8480 micromol/L (acetoacetic acid 1383; hydroxybutyric acid 7097 micromol/L)	• Discontinued insulin
18	47	Male	T2D	HO		1	Metformin; Sulfonylurea						277		Highly positive serum ketones	
19	48	Male	T2D	HO	1		Insulin	Unknown	72"	289 lbs				7.2	HCO3 10 Positive urine ketones	
20	48	Female	T2D	HO, LT	1	1	Insulin; Metformin	Within 4 months	64"	171		10.3%	201	6.8		• Low carbohydrate diet
21	49	Female	T2D	HO, LT			Unknown					8.5%	Euglycemia*	7.03	Anion gap 34 HC03 5	
22	51	Female	T1D	HO, OT	1		Insulin	Unknown					240	7.18	Anion gap 27 mmol/l HC03 9 +4 urinary ketones and glucose	• No precipitating event identified
23	52	Male	T2D	HO		1	Glyburide; Metformin	Unknown					150		beta-hydroxybutyrate level 5.05	
24	52	Female	T2D	HO		1	Metformin	Unknown		165.3 lbs			167		Anion gap 19 Lactic acid 3.0 Creatinine 3.44	• Acute kidney failure, lactic acidosis • Recent URI
25	52	Female	T2D	HO, LT	1	1	Insulin; Metformin	Unknown	70"	167 lbs			69		CO2 10 meq/L Positive serum ketones	• Diffuse urticaria and nausea and vomitting after initiating SGLT2 inhibitor
26	55	Male	T2D	HO		1	Metformin	2 weeks		123 kgs			240	7.15	HCO3 12, lactic acid 3.9, WBC 12.8	• After initiation of SGLT2 inhibitor lost 25 lbs • "super-responder?"
27	55	Female	Unknown	HO					67"	140 lbs			140	6.97		
28	57	Male	T2D	HO, OT		1	Exenatide; Glipizide; Metformin; Sitagliptin; Pioglitazone			223 lbs			116	7.1	Anion gap 14, HCO3 6, serum ketones 6.3 mM (reference <0.4), lactate 8 mg/dL (reference <20), osmolar gap 21, urine ketone body 80 mg/dL.	
29	59	Female	T2D	HO			Glimicron; Victoza		160cm	67 kg		8.6%	286	7.03	Urine ketone body 14510 mg/dl	• Influenza A
30	61	Female	T1D	HO		1	Metformin					7.7%	272		HCO3 7, serum ketones positive	• Diagnosed with T1D following DKA

31	61	Female	T2D	HO		1	Metformin		150cm	73kg		16.0%	405		Urine ketones 40 (units unspecified)	• Complained of malaise • Recent addition of GLP1 analog • Weght loss > 10kg in 4 months
32	62	Male	T2D	HO			None	18 days		88.6 kg		10.5%	571		Urine ketones	• Weakness, 'rousable' vomitting, thirst • Abscess • DIA3011
33	85	Female	T2D	OT			None	3 days	62"	110 lbs					Urinary Ketones Platelet count 533	• Dehydration
34			Unknown	HO									230		HCO3 critically low Anion gap very high	• Nausea and vomitting
35		Female	T1D	OT	1		Insulin				32	6.7%	105		Urine ketones	• Exercise • Insulin stopped
36		Female	T1D		1		Insulin						< 200		Urine ketones	
37			T2D		1		Insulin	3 weeks							Positive ketones Anion gap acidosis Lactate 8	• Atkins diet
38			T2D												Beta-hydroxybutyrate 11	
39		Female	Unknown					A few days					90		High anion gap acidosis	

Dapagliflozin

Case #	Age in Years	Sex	Indication (T1D; T2D; unknown type)	Hospitalization	Metformin	Insulin	Anti-hyperglycemic agents	SGLT2i start to DKA	Presenting BG (mg/dL) [*by report]	Hemoglobin A1C	Urinary Ketones (+ or mmol/L)	pH	Other lab results	Co-existing/predisposing illness
1	34	Male	Unknown	HO, LT	1	1	Gliclazide; Metformin; Insulin Lantus	7 mo	187		7.8	6.9	HCO3: 5.7 mmol/L Base Excess: (-27.4mmol/L)	▪ History of laparotomy for bowel obstruction
2	35	Male	Unknown	HO, OT, LT	1	1	Metformin; Gliclazide; Insulin		176			6.9		▪ ETOH history
3	36	Female	Unknown	LT	1	1	Insulin; Metformin		106		15.6	7.34	HCO3: 19 mmol/L Base Excess: (-4.9 mmol/L) Lactate: 0.8mmol/L	▪ DKA 4 days post-op Whipple procedure
4	40	Female	T2D	HO, LT		1	Insulin Levemir; Novolog	3 months	267			7.08	Base Excess: (-16.4 mmol/L)	▪ URI ▪ Upon re-initiation of SGLT2i, recurrent DKA
5	48	Female	T2D	LT			Pioglitazone; Teneligliptin				4+		Normal Lactate 0.7 mmol/L	▪ URI and fever
6	51	Male	T2D	HO	1		Gliplizide: Metformin		157		+		Normal Lactate	▪ Recurrent DKA after insuiln gtt stopped
7	64	Female	T2D	HO	1	1	Insulin; Glimepiride; Alogliptin; Metformin		198		4+	7.134		▪ Stopped basal insulin
8	65	Female	T1D	DE	1	1	Insulin Humalog; Lantus; Metformin	2.3 months	411			6.8	Anion gap 33 mmol/L Base excess (-33 mmol/L) HCO3 4.2 mmol/L Lactate 6.4 mmol/L	▪ History of renal impairment ▪ Death attributed to lactic acidosis
9	69	Female	T2D	LT	1		Metformin					6.91	Lactate > 20 mmol/L	▪ Peri-surgical ▪ Lactic acidosis ▪ Acute kidney injury
10	70	Female	T2D	HO			Glimepiride :Sitagliptin; Miglitol		450	12%		7.2	HCO3 10.1 mmol/L Serum ketones 15250 mcmol/L B-hydroxybutyric acid 11440 mcol/L	
11	77	Male	T2D	HO, OT	1		"Glufast"; Sitagliptin; Metgluco; Pioglitazone; Miglitol; Voglibose	2 weeks	188	8.60%	3+	7.3	Serum ketones 9740 mcmol/L Lactate 7.2	▪ Weight loss 10kg; smoker; Alzheimers ▪ Physician suspected DKA

Empagliflozin

Case #	Age in Years	Sex	Indication (T1D; T2D; unknown)	Anti-hyperglycemic agents (AHA)	Hospitalization	Time from SGLT2i-start to DKA	BMI	Hemoglobin A1C	Blood glucose level (mg/dL)	pH	Other lab results	Co-existing/predisposing illness
1	43	Female	Type 1 diabetes mellitus	Insulin	HO, OT		30			7.1	Anion gap 50 mmol/L	▪ Suspected flu ▪ Severe dehydration

Sitagliptin

Case Number	Age (Yrs)	Sex	T2D; T1D; Unknwon	Anti-hyperglycemic agents (AHA)	Height	Weight	BMI	Hemoglobin A1C	Blood Glucose (mg/dL)	pH	Other lab results	Co-existing/predisposing illness
1	48	M	T2D	Sitagliptin					154		insulin 6.0 µUnits/mL, hyponatraemia at 122 mEq/L, hypochloraemia at 51 mEq/L, hypokalaemia at 2.7 mEq/L.	Ketosis, hyperchloraemia, overdose, metabolic alkalosis, hypernotraemia, hypokalaemia, altered state of consciousness, vomiting, blood pressure decreased.
2	67	F	T2D	Sitagliptin, Metformin						7.03	Hyperkalaemia at 9 mmol/L, lactatemia at 7.9 mmol/L, an acute renal failure with MDRD clearance at 7 mL/min.	Lactic acidosis, arterial hypertension, non-insulin-dependent diabetes mellitus, diabetic neuropathy, chronic renal insufficiency and obesity.
3	57	M	T2D	Sitagliptin, Metformin	180 cm	80 kg				< 7	Lactate < 10 mmol/L	Lactic acidosis, alcohol abuse, nicotine abuse, hypertension and diabetes nephropathy.
4	64	F	T2D	Sitagliptin, Metformin						7	PO2 at 130 mmHg, PCO2 at 16.4 mmHg, bicarbonate at 6.1 mmol/l, potassium at 6.3 mmol/l, sodium at 133 mmol/l, creatinine at 39.16 mg/l, urea at 0.90 g/l and lactate at 1000	Lactic acidosis, pemphigoid.
5	80	F	T2D	Sitagliptin, Metformin			18.6	5.60%	336	6.68	HC03 2.9; lactic acid, 14.7 mmol/L (264.5 mg/dL)	Lactic acidosis
6	62	F	T2D	Sitagliptin, Metformin						7.29	HC03 8.7 mmol/L, anion gap 35.5 mEq/L, lactic acid of 21.4 mmol/L	Lactic acidosis, chronic atrial flutter, chronic heart failure, and heparin-induced thrombocytopenia.
7	79	M	T2D	Sitagliptin, Metformin								Lactic acidosis, renal failure acute, and hypovolaemic shock.
8	U	F	T2D	Sitagliptin, Buformin						6.72	Lactate of 30 mmol/L, blood buformin level which had been markedly high at 3, 790 ng/mL (Cmax of 260-410 ng/mL) on arrival decreased to 940 ng/mL after hemodialysis.	Lactic acidosis
9	35	M	T2D	Sitagliptin, Metformin, Ipragliflozin				11.40%	186	7.17; 7.40	U-Ketone was 3+;, HC03 of 4.6 mEq/mL, total blood ketone body was 13,016 mcmol/L; acetoacetic acid was 2,857 mcmol/L; and 3-hydroxybutyric acid was 10,159 mcmol/L.	Ketoacidosis, dehydration
10	53	F	Unknown	Sitagliptin, Metformin						7.27	lactate 8.1 mmol/L.	Lactic acidosis, intentional Metformin overdose
11	70	F	Unknown	Sitagliptin, Metformin								Lactic acidosis, dehydration, acute kidney injury
12	45	F	Unknown	Sitagliptin, Metformin					293	6.91; 7.17	lactate 18.1 mmol/L, acetaminophen and salicylate not detected, and ethanol 80 mg/dL. anion gap 33; lactate 24.5 mmol/L; WBC 34.2; Hgb 7.1; ethanol 53 mg/dL; AST 541; and ALT 134. hemodialyzed on hospital days 1 and 2 for lactic acidosis.	Lactic acidosis, alanine aminotransferase increased, body temperature decreased, respiratory rate increased, aspartate aminotransferase increased, overdose,death
13	75	M	T2D	Sitagliptin, Metformin								Lactic acidosis, hyperkalaemia, overdose, acute kidney injury, cardiac arrest, coma
14	38	F	T2D	Sitagliptin						7.3	pH: 7.3, arterial blood partial pressure of oxygen (pO2) 71, and arterial blood partial pressure of carbon dioxide (pCO2) 49.	Acidosis, acute kidney injury, respiratory disorder
15	73	F	T2D	Sitagliptin, Metformin								Lactic acidosis, acute kidney injury, obesity
16	66	F	T2D	Sitagliptin								Lactic acidosis, abdominal pain, pancreatis acute
17	53	M	T2D	Sitagliptin, Metformin						6.86	Hypoglycemia at 0.49 g/1 , hypothermia at 33.7C. The blood gases found a hyperlactataemia at 26 (normal value = 0.5 to 2.0) and an unknown renal failure at 788 micromol/1.	Lactic acidosis, cardio-respiratory arrest, acute kidney injury, drug interaction, overdose
18	68	F	Unknown	Sitagliptin, Metformin						7.03	Creatininemia was at 391 micromol/l, and lactic acidosis was discovered: veinous lactates at 10.87 mmol/l (normal between 0.5 and 2.20) and arterial lactates at 14.41 mmol/l (normal between 0.3 and 1.30). Hyperkaliemia at 7.77 mmol/l	Metabolic acidosis, drug interaction
19	59	M	T2D	Sitagliptin, Metformin , Metformin, Gliclazide						7.05	pCO2 11 mmHg, bicarbonate (HCO3) 3.0 mmol/L (arterial blood). K 6.97 mmol/L, HCO3 3.1 mmol/L, MDRD 10.05 ml/L. Lactic acid 2.95 mmol/L,	Lactic acidosis, metabolic acidosis, calculus ureteric, hydronephrosis, hypotension, pulmonary oedema, renal failure
20	65	F	T2D	Sitagliptin, Metformin						7.35	creatinine at 326 mol/L, digoxin level in blood was measured at 6.47 nmol / L (normal value inferior to 2 nmol/L). creatinine 211 mol/ L, pH 7.35, pO2 13.5 kPa, pCO2 2.56 kPa, HCO 3 10.3 mmol / L, lactate 7.39 mmol / L	Lactic acidosis, acute kidney injury, drug level above therapeutic
21	58	F	Unknown	Sitagliptin, Metformin, Glimepiride, Dapagliflozin							Ketones 4.4	Ketoacidosis, blood glucose increase
22	45	F	Unknown	Sitagliptin, Metformin					101; 293	6.91; 7.17	bicarbonate:6, BUN:15, creatinine:1.3 glucose was 101. Lactate 18.1 mmol/L; acetaminophen and salicylate not detected;	Lactic acidosis, unresponsive to stimuli, faecal incontinence, completed suicide, hypotension, overdose, dysarthria
23	71	F	Unknown	Sitagliptin, Metformin					155	7.25; 7.26; 6.89	Creatinine (CR) 2, UREA 108, PH 7.25, HCO3 17. Blood lactic acid (LACT) 93	Lactic acidosis
24	64	F	Unknown	Sitagliptin							UDS positive for benzodiazepines	Acidosis, agitation, anuria, atrial fibrillation, blood pressure systolic decreased, completed suicide, dialysis, heart rate decreased, hypertension, mydriasis, nodal rhythm, tachycardia, thrombocytopenia, toxicity to various agents, ventricular extrasystoles
25	39	M	T2D	Sitagliptin, Metformin								Lactic acidosis, suicide attempt, dilated cardiomyopathy, hyperuricemia, depression, and schizophrenia.
26	65	M	T2D	Sitagliptin, Metformin					121	6.84; 7.38	pH : 6.84 (N 7.35 - 7.45), blood lactic acid 12.6 mmol/l (N 0.5-2.0 mmol/l),	Metabolic acidosis

27	59	F	Unknown	Sitagliptin, Metformin , Metformin, Diamicron					70	6.59	pH 6.59, pC02 at 32, lactate at 20 mmol / l, renal insufisance with creatinemia at 731 micromol / l and hyperphosphatemia. Plasma metformin concentration was at 47.5 microg / l and intra erythrocyte at 16. 7.	Lactic acidosis, coma, diarrhoea, general physical health deterioran, renal failure, respiratory distress, vomiting
28	74	M	T2D	Sitagliptin, Metformin						6.8; 7.4	blood bicarbonate 4, pH 6.8, potassium was at 5.8, INR was at 5.29 and lactate was at 17.	Metabolic acidosis, acute kidney injury, cardiac failure, cardiac arrest
29	53	F	Unknown	Sitagliptin, Metformin						7.27	Lactate 8.1 mmol/L	Lactic acidosis, intentional overdose, toxicity to various agents

Saxagliptin

Case Number	Age (Yrs)	Sex	T2D; T1D; Unknwon	Anti-hyperglycemic agents (AHA)	Insulin	Blood Glucose (mg/dL)	pH	Other lab results	Co-existing/predisposing illness
1	68	M	Unknown	Metformin, Saxagliptin					Ketoacidosis, pain in extremity, paraesthesia
2	56	F	T2D	Saxagliptin, Metformin					Lactic acidosis, sepsis
3	68	M	T2D	Saxagliptin, Metformin, glargine	Yes				Lactic acidosis, acute prerenal failure, gastroenteritis
4	63	F	T2D	Saxagliptin, Metformin, Humalog, Levemir, Lantus	Yes	342		Serum creatinine 2.6 mg/dL, BUN 37 mg/dL, anion gap 22 mEq/L	Diabetic ketoacidosis, dehydration, diarrhoea, nausea, pain, renal impairment, vomiting
5	50	M	Unknown	Saxagliptin, Metformin					Acidosis, malaise, renal disorder