Diabetic Ketoacidosis Order Set ADULT (over 18 years of age)

■ will be carried out as per protocol ☐ requires doctor to ☑ in order to be carried out Blanks ..... require MD input

INTERPROFESSIONAL

IMMEDIATE TREATMENT

■ Start two I.V.s #1 Normal saline #2 Saline lock
See below for further IV orders
■ 1:1 nursing x 8 hours then reassess
■ Cardiac monitoring for duration of protocol
■ Body Weight in kg: .....

■ ABGs, venous blood gases, serum glucose, serum ketones, electrolytes, urine R & M
☐CBC ☐creatinine ☐urea ☐HbA1c
☐urine culture ☐ blood culture ☐ ECG

Other.....

■Consult endocrinologist by telephone as needed

IF SEVERE DKA, STABLIZE AND TRANSFER TO A SITE WITH ICU
Severe DKA = Glucose greater than 13.9, Arterial pH less than 7.0, serum bicarb less than 10, ketones in urine and serum, Anion gap greater than 12, and patient in stupor or coma

AT ONE HOUR

■Serum glucose and venous gases every hour

■ BP, T,P,R SpO2
■ neuro vitals

FIRST 24 HOURS

■ Serum glucose and venous gasese every hour until pH is greater than 7.3

↓

Then, do lab comparison of glucose and switch to Glucometer ever hour until glucose is less than 12

↓

Then glucometer every 2 hours for 6 hours

■ Electrolytes every 2 hours for 8 hours then as ordered
■BP, T,P,R, SpO2 every hours for eight hours then as ordered
■Neuro vitals every hour if altered status on admit MD to reassess

■Fluid intake/output **every hour** for 24 hours then as ordered

ONGOING/ASSESSMENT

■ Once glucose is below 12 mmol/L for 6 consecutive hours, do glucometer every 4 hours

☐ Electrolytes every .....

☐ BP TPR SpO2 every.....

☐ Neuro vitals every .....

☐ Fluid balance / intake & output every .....

■ consult endocrinologist
■ consult Diabetes Education Team

FLUID RESUSCITATION

GOAL: REPLACE HALF of ESTIMATED FLUID LOSS OVER FIRST EIGHT HOURS THEN REMAINING HALF LOSS OVER THE NEXT SIXTEEN HOURS

■ **IV#1 Normal saline** at ..... mL/hour x 1 hr (15-20 mL/kg/hour x 1 hour, then 5-15 mL/kg/hr based on estimated fluid requirements)
■Record intake and output, calculate fluid balance
■ If has not voided within 20 minutes of initiation of treatment, catheterize for residual
☐ Consider indwelling catheter

←Note: usual fluid loss for DKA patient is 6 Litres

reassess IV #1 NEW RATE FOR : HOURS #2-8

.....mL/hour

■When blood glucose less than or equal to 12 mmol/L

change IV #1 to D5W in N/S at ..... mL/hour

reassess IV #1 NEW RATE FOR HOURS 9-24

..... mL/ hour

■NPO if vomiting/decreased level of consciousness
■Offer sips of sugar containing clear fluids as tolerated
■Regular Diabetic Diet only after 24 hours of resuscitation
☐ Reassess IV #1 (N/S) rate change to .....

POTASSIUM

GOAL: POTASSIUM (K) BETWEEN 4 -5 mmol/L

			Ongoing Potassium Replacement	
Initial K greater than 5.2 **OR** no urine output established	**In IV #1 N/S add:** ■NO KCl	■Recheck K in one hour from first check and every hour as needed	K 3.4 to 4.5 mmol/L	■40 mEq/L KCl in N/S
Initial K between 3.4 to 5.2, AND urine output established	■40 mEq/L in N/S (0.9%)		K 4.5 to 5.0	■20 mEq/L KCl in N/S
Initial K less than 3.3	■40 mEq/L in N/S (0.9%) and HOLD INSULIN INFUSION	MD to reassess K every hour and restart INSULIN when K+ is greater than 3.3	If K rises again to greater than 5.2 mmol/L	■HOLD KCl and reassess in 2 hours i.e. infuse saline only through this IV site

INSULIN

GOAL: INSULIN INFUSION FOR AT LEAST 24 HRS BLOOD SUGAR DECREASES BY 3 to 4 mmol/L/hr

■If patient on a personal insulin pump, discontinue prior to treatment
■ **IV#2 saline** lock until insulin infusion begins
■Prepare solution and hang:

Regular Insulin 50 units in 500 mL D5W

(Humulin R, Novolin ge Toronto, Regular)

(10 mL=1 unit)

FIRST: Program pump for weight based dosing at 0.1 UNITS/KG/HOUR
NEXT: program pump to deliver bolus of the solution already hanging, as follows:

0.1 x patients weight in kg. = units for infusion bolus

0.1 x ..... = ...units
kg Calculation by (initials)

Program IV pump to deliver this bolus over 8 minutes. [If weight based dosing on pump, and patient is over 100 kg, pump will require up to 8 minutes.] **Rate may seem very high for those 8 min PUSH START BUTTON. DO NOT PUSH RAPID BOLUS BUTTON or pump will revert to 33 minutes**
NEXT: Continuous weight based insulin at 0.1 units/kg/hiour until blood glucose is less than 12 mmol/L
Once Glucose is below 12 for six consecutive hours, adjust insulin as per table to the right.

* blood sugar that falls more rapidly than the goal 3 to 4 mmol/L per hour, requires MD intervention

Once glucose by glucometer with good lab comparison, is below 12 mmol/L for 6 consecutive hours, glucometer can be done every four hours

■ **ONGOING:** Adjust insulin drip as follows:

Glucose in mmol/L	Rate of insulin drip	Further Comment
Less than or equal to 4 mmol/L	■HOLD insulin drip ■Recheck glucose in 30 minutes then Resume drip as per table	■Give 25 mL of D50% IV push
4 to 8.9 mmol/L	■Decrease rate by 0.05 units/kg/hour	If current drip at 0.05, then reduce by 50%(never off)
GOAL GLUCOSE: 9 to 11.9 mmol/L	Return to /maintain 0.1 units/kg/hour	
12 to 15.9 mmol/L	■Increase rate by 0.05 units/kg/hour	
Greater than 16 mmol/L	■Increase rate by 0.1 units/kg/hour	Glucometer every 2 hours
Greater than 20 mmol/L	Bolus of 0.1 units/kg over 8 minutes	Glucometer every hour

ONCE STABLE: i.e.

Se Glucose less than 12 mmol/L
AND pH greater than 7.30
AND Negative ketones
AND Anion gap less than 10 mmol/L
AND Insulin drip has been x 24 hours

Next steps:

■ **GLUCOMETER FOUR TIMES A DAY**
■ **START/RESTART BASAL AND BOLUS INSULINS AS FOLLOWS:**

1. for patients previously on insulin:

a) restart basal s/c insulin (lantus/levemir/NPH) two hours before discontinuing IV insulin infusion.

and **DAILY** (every 24 hours)

b) restart bolus s/c insulin (novorapid/humalog/ apidra) dose at next meal

2. for patients newly diagnosed or home dosing unknown

a) Calculate basal insulin requirements (lantus/ levemir/NPH) as follows:

0.25 x patients weight in kg = units of insulin for basal dose

..... X 0.25 = ...units
kg Calculation by (initials)

Give this dose 2 hours prior to discontinuing insulin infusion and **DAILY** (every 24 hours)

b) calculage bolus insulin requirements (novorapid/humalog/ apidra) by mulitiplying

0.25 x patients weight in kg = units of insulin for basal dose

..... X 0.25 = ...units
kg Calculation by (initials)

THEN
Divide by three to obtain dose needed at each meal
Start at patient's next meal

BICARBONATE

GOAL: pH GREATER THAN 7.05

■If pH of Arterial Blood Gases is less than 7.0 administer Bicarbonate Therapy:
Remove 100 mL from 500 mL bag of 0.45% NaCl and add 100 mL of 8.4% Sodium Bicarbonate (total 100 mEq)
Run at 250 mL/hour x 1 hour thru IV #1 N/S
Reassess in one hour

NEVER MIX IV BICARBONATE WITH IV INSULIN

■Recheck ABGs and electrolytes at one hour from first check
■Stop Bicarbonate infusion when pH greater than 7.05

■Recheck ABGs and electrolytes every hour until bicarbonate infusion discontinued

Physician Signature with Date/time

Reference: Diabetes Flowsheet and DKA Carepathway
Reference: Diabetes Management Team, Groves Memorial Community Hospital