

➤ **DKA Diagnosis and Eligibility for Sub Q Insulin Protocol**

Does patient meet all three criteria for DKA?:

1. Hyperglycemia - Serum Glucose > 250 mg/dL
2. Ketosis - Positive serum Beta Hydroxy Butyrate (BHB) or Urine Ketones
3. Acidemia- ABG/VBG pH<7.3 or bicarbonate \leq 18mEq/L

➤ **Exclusion for Sub Q Protocol and need for Insulin Drip:** Pregnancy, Altered Mental Status, Acute CHF Exacerbation, Acute Coronary Syndrome, ESRD or CKD Stage 4 or 5, Acute Liver Failure or Cirrhosis, Anasarca, Weight>120 Kg

➤ **SQ Insulin dosing**

1. Start Lantus Insulin STAT and continue Q 24 hr (unless dose within 6 hours)

- On Home Insulin: START 1.2* Basal Insulin dose
- Not on Home Insulin
 - 1) BMI \leq 30, GFR \leq 30 (not on high dose steroids) – START 0.2 units/Kg Lantus
 - 2) BMI >30, GFR>30 or (on high dose steroids) - START 0.3 units/Kg Lantus
- Call endocrine consult to verify calculated basal insulin doses over 50 Units

2. Start Humalog Insulin. Loading dose and subsequent Q4 hr dosing (STOP when anion gap normalized)

- Insulin Humalog - 0.2 Units/Kg loading dose stat
- Maintenance dose Q4 hr- FS \geq 250 mg/dl – 0.25 Units/Kg; FS<250- 0.15 units/Kg
- Call endocrine consult for modified dosing if hypoglycemia occurs. Hold doses for FS<70.

➤ **Fluid and Electrolyte Management-**

Fluids are the mainstay of DKA treatment and need to be given ASAP.

Assess volume status and give 0.5- 1L of NS bolus upfront, thereafter at lower rate of 200- 400cc/hr

- **Mild Hypovolemia-**
If corrected serum Na <135, start 0.9% NS at 250- 500cc/ hr
If corrected serum Na \geq 135, 0.45% NS at 250- 500cc/hr
- **Severe Hypovolemia-** Anticipate ICU level of care
- **Volume overload with Cardiopulmonary compromise-** Discontinue iv fluid therapy

Hypoglycemia or Hypernatremia- for FS<250, or corrected Na >135, start D51/2 NS at 150- 250cc/hr

Serum potassium replacement

- If K< 3.3mEq/L- **Hold SQ Insulin until K administered**, give 60mEq/l KCl, check EKG
- If K= 3.3- 3.5 mEq/L, administer 40mEq/L KCl
- If K = 3.6- 5.1 mEq/L, administer 20mEq/L KCl
- If K>5.5- do not give any KCl. Recheck serum K Q2-4 hrs until K>5.2

If Serum Phosphate < 2, replace with iv Sodium Phosphate or Potassium Phosphate

If Serum Magnesium <2, replace with iv Magnesium Sulfate

➤ **Principles of DKA monitoring**

- Basic Metabolic Panel, patient assessment of mental status should be done every 4 hrs.
- Insulin dosing is based on Q4 hr glucose from finger stick or venous blood

After DKA has resolved, resume routine diabetes inpatient care

- If patient is eating, patient or staff should check point of care (POC) blood glucose before meals and bedtime (AC and HS) and order prandial Insulin
- If the patient is NPO or on TPN or TEN, check POC blood glucose Q4-6 hrs.
- Ensure that patient has a daily basal Insulin dose ordered

Other useful calculations:

• Anion gap (Normal 10-14 mEq/L) = (Na+) – [(Cl-) +(HCO3-)]
• Corrected Na+= measured Na + 1.6(serum glucose- 100)/100
• Free Water Deficit= [dosing factor (0.6 male ,0.5 female)*body weight (Kg)]*[serum Na/140)- 1]

Reference

Guillermo E. Umpierrez Treatment of Diabetic Ketoacidosis With Subcutaneous Insulin Aspart
Diabetes Care Aug 2004, 27 (8) 1873-1878; DOI: 10.2337/diacare.27.8.1873

Modified from Montefiore SQ Insulin DKA protocol

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