

## Housestaff Guideline

### Diabetes DKA Management Detail

#### Admission:

- Admit children with DKA either to the general floor or PICU depending on the severity of illness.
  - Automatic ICU admission if: pH < 7.1, BG > 1000, Age ≤ 36 months
  - If overweight and BG > 600: calculate serum Osm to rule out HHS (Osm should be < 330)
- Admit using the Pediatric DKA order set
- Review doses with endo on call

#### IV Fluids:

*Patient has (hopefully) already received NS boluses in the ED, and should generally stay on NS throughout the time on IV insulin*

*May come from the ED with "two bags" NS without dextrose and D10 NS; both should have 20mEq Kphos + 20mEq Kacetate added.*

- **Rate:** Suggested start at 1.5 x maintenance (with understanding that some patients may require up to 2xM or 3000/m<sup>2</sup>)
  - Consider fluid status and obesity.
    - If obese, please calculate rate based on BSA (1500/m<sup>2</sup> = maintenance)
    - If received more than 20ml/kg prior to starting insulin drip, consider subtracting bolus from daily total
- **Fluid selection:**
  - **When to include potassium:**
    - **If K+ > 5.5:**
      - Measure K+ hourly, if rising, evaluate for renal failure
    - **If K+ 3.5-5.5:** continue with IV fluids from ED that have 20mEq Kphos + 20mEq Kacetate per liter
    - **If K+ < 3.5 on arrival:** Start NS + 60 mEq potassium (30 mEq Kacetate + 30mEq Kphos)
  - **When to include dextrose:**
    - **If plasma glucose > 400 mg/dL:** continue fluid resuscitation with NS + K only
    - **If plasma glucose 300 – 400 mg/dL:** and BG is falling, consider changing mix of fluids to 75% and 25% rate NS and D10NS, respectively
    - **If plasma glucose < 300 mg/dL:** consider change of fluids to 50% and 50% NS and D10NS, respectively

### **Starting Insulin and Adjusting Glucose Infusion:**

- **Insulin drip:**
  - Start at 0.1 units/kg/hr for children >3 yo
  - Start at 0.05 u/kg/hr for children ≤ 3
- **Insulin SubQ:**
- Give home Lantus dose or 0.25 units/kg at HS on admission
- **Diet:** NPO while on insulin drip
- **Goals:** correct hyperglycemia, correct acidosis, correct ketosis (over time)
  - Goal is to decrease serum glucose levels by 50-75 mg/dl/hr
  - Continue insulin drip, and dextrose infusion, to maintain BG 100-200 until Bicarb > 18-20 or pH ≥7.3 , at this point may discontinue insulin drip, and remove dextrose from IV fluids
- **Monitoring dextrose infusion:**
  - If BG <150 but patient is still acidotic (HCO<sub>3</sub> ≤ 16): switch all IVF to D10 bag
  - If BG is falling too fast (close to 100 mg/dL/hr) and patient still acidotic: switch all IVF to D10 bag If BG <150 or falling too fast, and patient no longer acidotic (Bicarb >16): can decrease insulin drip **by 20-30%** or increase rate of D10
  - If BG falling too slowly: can increase insulin drip **by 10%** every 1 hr until BG is dropping 50-75 mg/dl/hr while monitoring hydration status

### **Lab monitoring and interpretation:**

- **Built into order set**
  - Glucose Q1H while on insulin gtt- can be POC
  - Venous pH, renal panel q2h x 4 – will need to re-order these if want to continue ; Magnesium q4 X2
    - **Hypophosphatemia:** Almost all patients will have low phos, the IV fluids have KPhos added. Since severe hypophosphatemia can cause muscle weakness and respiratory depression, replace phos with oral supplementation as needed once off insulin drip.
    - **Hypomagnesemia:** If mag is low, potassium may be refractory to replacement. Consider IV Mag replacement if <1.2.
    - **Hypokalemia:** Start cardiac monitoring if potassium is <3 mEq/L
    - **Acidosis:** Studies have shown increased intracranial acidosis and cerebral edema from sodium bicarb administration in children with DKA. Please do not give sodium bicarbonate.
  - Monitor urine ketones via dipstick qvoid until negative X3
- **Additional testing:** remember to screen for causes of acute DKA (e.g. *infection*, poorly controlled DM)

### ***Transition to subcutaneous insulin:***

- **Basal:** Start SQ Lantus (0.25 units/kg) x 1 the night of admission (in addition to insulin gtt) to ease transition to subQ insulin in AM
- In the morning, if *glucose has normalized to 100-200 mg/dL* and *HCO<sub>3</sub> is ≥18* can consider transition to SQ insulin therapy alone as below
  - Write for Diabetic diet
  - Write the SubQ insulin orders
  - When food comes, check BG, count CHO and give short acting insulin dose
  - Once patient has finished meal (and has no emesis), then OK to stop insulin drip and dextrose-containing IV fluids
  - May need to continue IVF (without dextrose) for electrolyte repletion, may also consider oral electrolyte supplementation