*CLINICAL PATHWAY:*

# Diabetic Ketoacidosis PICU Management

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.

**Inclusion Criteria:** patient of any age presenting with potential Diabetic Ketoacidosis(DKA)
*[Consider if history of*: weight loss, vomiting, abdominal pain, polyuria, polydipsia, nocturia; *Consider if exam findings of:* tiredness, Kussmaul respirations, dehydration, mental status changes, abdominal pain (can be severe and present as acute abdomen)]
**Exclusion Criteria:** well- appearing, HCO3 >18 mmol/L

## INITIAL MANAGEMENT

Establish DKA diagnosis (defined by pH <7.3, HCO3 <15 mmol/L, blood sugar >200, ketones – blood or urine)
**Note: Hyperglycemic Hyperosmolar Syndrome (HHS) is a spectrum with DKA, and may not have acidosis and ketones, but will have severe hyperglycemia and dehydration. Discuss care with PICU/Endocrine.*

**LABS:**
- Chem 10, Blood gas, CBC w diff , HbA1C, STAT B-hydroxybuterate, UA
- **Repeat Chem 7/VBG after initial NS bolus**

*If newly diagnosed diabetes, add:*
- Free T4, TSH, islet cell antibody, insulin antibody, glutamic acid decarboxylase antibody
- Consider C-peptide if BMI >95$^{th}$ percentile

**FEN:**
- Make NPO
- Give 0.9% NS bolus 10-20 mL/kg over 30-60 min
  - *Additional fluid bolus only if signs of shock (hypotension, tachycardia, delayed cap refill, oliguria)*
  - *Caution needed when using depressed mental status as marker of shock, as it may represent cerebral edema*
  - *Large volume fluid resuscitation may be associated with increased risk of cerebral edema*
- Post bolus: start NS at minimum of 1.5x maintenance until appropriate fluids (per PICU/Med Surg care) become available

**NURSING CARE:**
- Establish PIV x2
- If oliguria present, insert foley catheter
- Strict I&O
- Bed Rest

*** PICU admission considerations:**
- Persistent, severe metabolic acidosis with serum HCO3 <12 mmol/L after initial NS bolus
- Persistent hypokalemia or hyperkalemia with serum K+ <3 mmol/L or >6 mmol/L
- Altered mental status with GCS <11 after initial therapy
- Persistent signs of poor cardiac output, unresponsive to initial rehydration

**HCO3 <12 mmol/L** after 1$^{st}$ or 2$^{nd}$ boluses

See PICU admission considerations*

Admit to **PICU** and follow PICU management below
- Order Regular insulin 1 unit/mL
  - Infusion rate: 0.1 unit/kg/hour
  - DO NOT GIVE BOLUS INSULIN
- Continue NS IV infusion (minimum 1.5x maintenance)

**HCO3 ≥12 mmol/L** after 1$^{st}$ bolus

Proceed to **Med/ Surg Management**

### Monitoring

- Hourly neuro assessment
- If pH <7.3, K+ >6: continuous monitoring
- Strict I&O

**Always monitor for Cerebral Edema and notify the PICU attending if s/s present!**

**Signs/Symptoms:**
HA, change in neuro status (restlessness, irritability, drowsiness), inappropriate slowing of HR or rise of BP

**Treatment:**
(1) **Hypertonic Saline** (3%) 1.25 – 2.5 mEq/kg (2.5-5 ml/kg) IV (over 5 min for acute herniation; over 10 min for increased intracranial pressure) OR **Mannitol** 0.25 g/kg over 30 minutes (can be repeated every 6-8 hours)
(2) Ensure pt on 0.9% NS fluids
(3) If GCS <11 after therapy, consider ET intubation
(4) Consider head CT
*** Do not give sedating meds outside the setting of intubation (may lead to rise of PCO2 and herniation)**

Therapy should always precede imaging!

***If no improvement in mental status, repeat:***
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### Labs

- Serum glucose q1hr
- Serum lytes q2hr
- Blood gas q2hr if pH <7.25
- Mg/Phos q8hr

HCO3 ≥15 X2?

No → Ongoing PICU care

Yes → Proceed to **DKA resolution and ongoing management**

### Insulin

- Continue insulin infusion at 0.1 unit/kg/hr

### Fluids

**Rate:**
- Minimum of 1.5x maintenance (max 2x maintenance)

**Base Fluid Type:**
- 0.9% NS
- May switch to 0.45% NS after 24 hours or if Na >150 with normal mental status

**Amount of glucose added to fluid:**
*(use two bag protocol)*
*[Bag A: no dextrose; Bag B: D10W]*
- If glu >300: run Bag A at 100%
- If glu 200-300: run Bag A at 50%; run Bag B at 50%
- If glu <200: run Bag B at 100%

**Amount of K+ added to fluid:**
*(divide equally between KPhos and KCl)*
- If K+ <3 mmol/L: 60 mEq [call PICU]
- If K+ 3-5 mmol/L: 40 mEq
- If K+ 5-5.5 mmol/L: 20 mEq
- If K+ >5.5 mmol/L, no void, or urine rate <1 mL/kg/hr: no K+ added

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