DIABETIC KETOACIDOSIS PATHWAY

Inclusion Criteria

DKA is defined as:
- Hyperglycemia > 200mg/dL
- pH < 7.3 or HCO3 < 18 mEq/L
- Ketosis in blood or urine

Exclusion Criteria
- Blood glucose > 1,000 mg/dL
- **CORRECTED** serum sodium < 130 or > 150
- Hemodynamic instability
- Concern for cerebral edema

Suspected DKA
Signs/symptoms: vomiting, abdominal pain, rapid/deep breathing, lethargy, confusion, fruity scented breath, hyperglycemia

Emergency Department
- Triage level 2 & notify provider
- Obtain STAT EPOC on arrival
- VS and neuro checks Q1H

EPOC results indicate DKA? — No → Manage off pathway

Yes

Resuscitation Guide for 2 bag system:
- Weight < 30 kg = 1.5x maintenance
- Weight > 30 kg = 2x maintenance

Considerations:
- Use recently documented pre-illness weight if available
- For obese patients, consider maintenance rate in context of ideal body weight

Calculation ideal body weight for adolescents: 22 x height (m^2)

Emergency Department
- Utilize the ED DKA order set
- Obtain STAT BMP, VBG, and serum beta-hydroxybutryate while placing 2 PIVs (1 min, if possible place 2nd)
- If patient has an insulin pump, remove
- Infuse 20mL/kg up to 1L LR bolus over 1 hour
- NPO
- Evaluate and treat any co-morbid diagnoses
- Repeat blood glucose Q1H
- Repeat BMP +/- VBG Q2H
- After LR bolus completed, start insulin infusion and standard two bag (D/S) fluid resuscitation
  (D: D10 + ¾ NS + 20 K phos + 20 K acetate)
  (S: ¾ NS + 20 K phos + 20 K acetate)
- *If hypokalemia (K<3.5 mEq/L) – start potassium repletion during first hour of fluid resuscitation prior to imitating insulin infusion*
  (D: D10 + ¾ NS + 20 K acetate + 20 K phos)
  (S: ¾ NS + 20 K acetate + 20 K phos)
- *If hyperkalemia (K≥ 6 mEq/L):*
  (D: D5 + LR)
  (S: LR)

Cerebral Edema

Clinical findings concerning for cerebral edema:
- Severe headache and/or vomiting
- Irritability, lethargy, or change in mental status
- Elevated blood pressure and decreased heart rate
- Pupillary reflex changes or cranial nerve palsy
- Decorticate or decerebrate posturing

Activate emergency response

Transport Team
- DKA management per Transport protocol
- Review outside records, labs, and management

To determine appropriate disposition:
- Review initial BMP and VBG results
- Review current neurologic status

Does this patient meet ICU criteria?*

***Criteria for ICU Placement**

Based on initial BMP and VBG lab value and current neurologic status:
1. Severe DKA: pH < 7.1 or bicarbonate < 5
2. Mild or Moderate DKA
   - pH < 7.3 or bicarbonate <18 **AND** any of the following:
     - Significant headache
     - Mental status abnormalities or GCS < 14
     - Hemodynamic instability
     - Age < 24 months

Consider patient < 5 years of age and/or with **CORRECTED** serum sodium > 160

No — Yes

Admit to Med/Surg
- Use DKA order set
- VS and neuro checks Q2H
- Continue insulin infusion and 2 bag fluid resuscitation
- Repeat blood glucose hourly
  - If blood glucose falling by > 100 mg/dL/hr see DKA executive summary for recommendations
- Obtain BMP Q2H x2, then if improving, Q4H with a serum BHB
  - If hypo or hyperkalemia present see executive summary for recommendations
  - Obtain serum magnesium and phosphorus Q8H

Evaluate and treat any co-morbid diagnoses

Admit to PICU
- Management per Intensivist
- Patients with severe DKA should receive ICU level care for 12 hours or more before transfer to the floor.

If patient is improving with ICU care for 12H, transfer to Med/Surg is encouraged to avoid delays in the transition to SQ insulin.

Criteria for Transitioning off Insulin Infusion

Serum HCO3 > 15 and serum beta-hydroxybutyrate ≤ 1 mmol/L AND able to tolerate oral intake
OR
Serum HCO3 >17 with normal anion gap AND able to tolerate oral intake

Does patient have an insulin pump?

No

- Utilize DKA Transition order set
- Refer to Hospitalist for insulin dosing
- Order food
- Administer short (based on blood sugar and carb intake) and long acting insulin sub-q, allow patient to eat. In 30 minutes, after sub-q insulin, turn off insulin infusion and IVF. Start saline IVF, if ordered by Hosptialist team.

Yes

- Utilize DKA Transition order set
- Have parent sign waiver of liability specific to insulin pumps
- Have patient or parent replace pump site (use new insertion site, new insulin reservoir filled with new insulin)
- Refer to Hospitalist for insulin dosing
- Order food
- Start insulin pump basal rate and give first insulin bolus through pump (based on blood sugar and carb intake) and allow patient to eat
- In 30 minutes after insulin bolus, turn off insulin infusion and IVF. Start saline IVF, if ordered by Hosptialist team.
- Document on Insulin pump flow sheet

- Order blood glucose monitoring and labs (Refer to DKA transition order set)
- Coordinate education with Diabetes Educator as needed
- Consult Endocrinology
- Consult Dietitian and Social Work as needed
- Consult behavioral health as needed

Discharge Criteria
- Reason for DKA identified and addressed
- Patient and/or caretaker has demonstrated ability to complete diabetes education, perform self monitoring of blood glucose, independently calculate insulin doses, administer insulin, identify and treat hypoglycemia and ketonuria
- Appointments with Endocrine and PCP (if needed) scheduled
- All diabetes supplies and prescriptions filled as needed