WRNMMCB Pediatric Diabetic Ketoacidosis

Clinical Practice Guideline

1. **Suspect DKA**
    - Defined based on following parameters:
        - Glucose >200 mg/dL **AND**
        - Venous pH <7.30 or HCO3 <15mEq/L **AND**
        - Ketonemia and ketonuria

2. **Initial Evaluation**
    - Include H&P, vitals, weight (kg) and labs to include:
        - Glucose, electrolytes, calcium, magnesium, phosphorus
        - Urinalysis
        - Blood ketones (i.e. Acetone)
        - CBC
        - pH (i.e. VBG)
        - Cultures, as indicated
        - EKG, if indicated (i.e. if serum potassium delayed)

3. **Standard supportive measures per ED policy**
    - Peripheral IV x 2 placement, continuous cardiorespiratory monitoring, PALS measures.

4. **Volume Expansion**
    - Initial Volume Expansion
        - Typically 10mL/kg NS over 1 hour.
            - May repeat if persistent hypotension and/or poor perfusion.
        - If in shock, consider initial 20mL/kg NS rapid bolus.
    - Subsequent Fluid Therapy
        - NS + 40 mEq/L potassium (20 mEq/L KCL + 20 mEq/L Kphos or 40 mEq/L KCl) at 1.5x maintenance therapy based on weight (kg).
        - May transition to ½ NS + 40 mEq/L potassium after 4-6 hours of subsequent fluid resuscitation.

5. **Insulin Therapy**
    - Start insulin infusion 1-2 hours after starting fluid therapy as above.
    - Regular insulin 0.1 unit/kg/hour
        - Dilute 250 units regular insulin in 250mL NS, 1 unit = 1mL
    - Dose should remain at 0.1 unit/kg/hour until resolution of DKA, however if marked sensitivity to insulin occurs, dose may be decreased to 0.05 units/kg/hour or less provided that metabolic acidosis continues to resolve.
    - Do not bolus IV insulin – increases the risk of cerebral edema.

6. **Monitoring**
    - Maintain q1 hour blood glucose, vitals, intake/output and neurological checks.
    - Recommend q2 hour serum glucose, electrolytes, calcium, magnesium, phosphorus and pH.
    - Aim to keep blood glucose at 150-250mg/dL
        - Add Dextrose 5% to IV fluid when serum glucose falls to 250-300 mg/dL
        - Add Dextrose 10% or 12.5% if necessary to keep blood sugars 150-250 mg/dL
    - Bicarbonate administration is not routinely recommended due to risk of paradoxical acidosis.

7. **Cerebral Edema**
    - A patient developing cerebral edema may exhibit any of the following clinical signs during the first 24 hours of DKA treatment: headache, change in level of consciousness/ responsiveness, unequal or dilated pupils, papilledema, delirium, incontinence, vomiting, bradycardia, increase in blood pressure (diastolic >90mm/Hg), abnormal respiratory pattern or respiratory arrest or sudden onset of polyuria (development of diabetes insipidus as a result of pituitary necrosis).
    - If cerebral edema is suspected, the following treatment should be employed immediately:
        - Reduce rate of IV infusion by one-third.
        - Elevate head of bed.
        - Hypertonic Saline (3%) 1 mL/kg over 15 minutes
        - Alternatively, give Mannitol 0.5-1 g/kg IV over 20 minutes and repeat if there is no initial response in 30 minutes to 2 hours.
        - Consider intubation and maintain pCO_2 35-40 mm Hg. Hyperventilation (to a pCO_2 <22 mm Hg) has been associated with poor outcome and is not recommended.
        - After treatment for cerebral edema has been started obtain a head CT to exclude other possible intracranial causes of neurologic deterioration (i.e. thrombosis, hemorrhage).

8. **Transport Guidance**
    - Call WRNMMCB PICU at 301-400-2010 for admission, to arrange PALS level transport, and for further guidance

References:

2009 ISPAD Guidelines Chapter 10 (DKA): (Available for download http://www.ispad.org/FileCenter.html?CategoryID=5)

Clinical Practice Guideline Disclaimer Statement*: "This Clinical Practice Guideline is designed to provide clinicians a framework for evaluation and treatment of DKA. This Clinical Practice Guideline is not intended to establish a protocol for all patients with a particular condition not is it intended to replace a clinician's clinical judgement. A clinician's adherence to this Clinical Practice Guideline is voluntary. It is understood that some patients will not fit the clinical conditions contemplated by this Clinical Practice Guideline and that the recommendations contained in this Clinical Practice Guideline should not be considered inclusive of all proper methods or exclusive of other methods of care reasonably directed to obtaining the same results. Decisions to adopt any specific recommendation of this Clinical Practice Guideline must be made by the clinician in light of available resources and the individual circumstances presented by the patient."*