**Diabetic Ketoacidosis(Uploaded on 9/24/2023)**

**Criteria for PICU Admission (any of the following)**:

Venous pH < 7.25 or serum CO2 < 14 and vomiting.

Venous pH < 7.2 or serum CO2 < 12 regardless of vomiting

Altered mental status

Severe vomiting/dehydration

Glucose > 700

**THERAPY TIMELINE:**

***1st hour:***

NPO. NG tube if unconscious.

IV, D-stick

* **Labs**: Chem 8, Mg, Phos, CBC, VBG
  + For new onset, also: Anti glutamic acid decarboxylase, anti islet cell and anti insulin antibodies, anti tissue transglutaminase IGA, total IGA, anti TPO antibodies, anti thyroglobulin antibodies, freeT4 and TSH.
  + If type of diabetes uncertain for new onset, add serum insulin and c-peptide.
* **IV Fluids:**
  + 10 mL/kg 0.9% NaCl fluid bolus over 60 minutes
  + If poor perfusion or shock is present, hand push fluid bolus and consider additional bolus if shock not resolved
* **Insulin:** Goal of therapy is to resolve the ketoacidosis – insulin is necessary to do this.

Start insulin therapy provided BS > 200 mg/dl (see below)

* Order insulin drip (100 units Regular insulin / 100 mL Normal Saline)

***2nd hour:***

* Contact Peds Endo and PICU
* Start 2nd IV (for blood withdrawal)
* Repeat dextrose stick
* Continue 0.9% NaCl at 1 ½ times maintenance
* If available, start insulin drip (may be piggy backed into IV fluids)
* Correct electrolyte abnormalities

***3rd hour:***

* By 3rd hour, patient should be in ICU
* Start / continue insulin drip
* Change fluids to contain potassium (see below)

**If serum glucose falls < 200 mg/dL despite 10% dextrose in the IV fluids, rate of insulin administration may be decreased to 0.075 – 0.05 units/kg/hr**

**2 Bag System to Allow Rapid Titration of Dextrose:**

Each bag contains 0.45% NaCl + the appropriate amount of potassium.

The bags **differ** as follows:

**Bag A:** 0.45% NaCl + 20 mEq/L KCl + 20 mEq/L Kphos

**Bag B:** Contains D10% + 0.45% NaCl + 20 mEq/L KCl + 20 mEq/L Kphos

**Potassium concentration:** Add equal amounts of KCl and Kphos

If K < 5: Add 20 mEq KCl/L + 20 mEq Kphos/L

If K > 5: Decrease the total K+ in the fluids to 20 mEq/L

If K > 5.5: Omit the K+ from the fluids

**Dextrose:** Add when serum glucose is < 350 mg/dL. The rate should be periodically adjusted to

maintain the blood sugar in the 150-300 mg/dL range

Increase dextrose by increasing the rate of Bag B and decreasing the rate of Bag A.

Decrease dextrose by decreasing the rate of Bag B and increasing the rate of Bag A.

Table: Two bag system method: calculating delivered dextrose.

|  |  |  |  |
| --- | --- | --- | --- |
| **Desired Dextrose**  **Delivery Concentration** | **Total Rate (as %) of Bag A (D0)** | **% Total Rate of Bag B (D10)** | **Glucose** |
| D0 | 100 % | Off | > 350 |
| D5 | 50% | 50% | 250-350 |
| D10 | Off | 100% | < 250 |
|  |  |  | < 150  \*Decrease the insulin drip  with the PICU attending |

**Sodium bicarbonate** is almost never necessary in the treatment of DKA.

Any consideration of bicarbonate administration requires the input of the Endo or PICU attending.

**Neurological Complications**

* + Every patient with DKA is at risk for cerebral edema.
  + Signs and symptoms – change in mental status, bradycardia, hypertension, dilated or unequal pupils, respiratory failure, incontinence, vomiting after initial improvement
  + For neurologic deterioration consider mannitol (0.5 – 1 gram/kg) and head CT

If intubation is necessary use strict increased ICP precautions