

COMPLICATIONS OF DM IN PREGNANCY

FLAME LECTURE: 29C

STELLER 1.27.24

DIABETIC COMPLICATIONS

HYPOGLYCEMIA

- ▶ **Causes:** incorrect dosing, incorrect type of insulin administered, insulin stacking, improper testing technique (not washing hands, squeezing fingertips), expired test strips, change in exercise/activity levels, illness
- ▶ **Symptoms:** irritability, hunger, sweating, anxiety, palpitations, clammy skin, trembling, confusion, headache, seizure, coma
- ▶ **Treatment:** 15:15 rule
 - ▶ Give 15g of fat free carbs and recheck in 15 minutes
 - ▶ If sugars or patient not responding, give glucagon

DIABETIC COMPLICATIONS

DKA EPIDEMIOLOGY

- ▶ One of the most dangerous complications and warrants immediate hospital admission
- ▶ More common in T1DM, however is happening with increasing frequency in T2DM
- ▶ Caused by relative or absolute insulin deficiency leading to severe hyperglycemia and glucosuria → osmotic diuresis → dehydration and electrolyte loss
- ▶ Also leads to lipolysis and hepatic oxidation of fatty acids which leads to ketosis and acidosis

DIABETIC COMPLICATIONS

DKA OVERVIEW

- ▶ In pregnancy, the scary thing is that DKA can occur with only mildly (or even high normal) glucose levels thus you must have a high clinical suspicion for DKA
- ▶ **Symptoms:** nausea, vomiting, poor oral intake or dehydration, weakness, polyuria, fever, hyperventilation (often accompanied by a fruity odor on the patient's breath), blurry vision, altered mental status, or maternal tachycardia
- ▶ **Precipitating factors:** emesis, infection, diabetic gastroparesis, poor compliance with therapy or insulin pump failure, use of β -sympathomimetic agents (for tocolysis) or corticosteroids, or physician management errors

DIABETIC COMPLICATIONS

DKA LAB FINDINGS

- ▶ Hyperglycemia – often > 300 mg/dL
- ▶ Acidosis – pH on ABG < 7.3 , anion gap > 12 mEq/L
 - ▶ This is 2/2 abnormal elevation of unmeasured anions such as ketones and lactic acid
 - ▶ Thus, also look for elevated serum/urine ketones (β -hydroxybutyrate)
- ▶ Serum bicarbonate is low; sodium, potassium, phosphate levels may be abnormal
- ▶ Serum creatinine may be elevated in setting of dehydration

DIABETIC COMPLICATIONS

DKA MANAGEMENT

- ▶ Volume replacement
 - ▶ Calculate fluid deficit
 - ▶ Simple: 100 mL/kg body weight (usually 4-10L)
 - ▶ Immediate resuscitation with 0.9% NaCl at 1000mL/hr x 1-2 hours (i.e., 1-2L immediately)
 - ▶ Then, decrease rate 250-500 mL/hr with goal of correct 75% of fluid deficit over a 24-hour period (i.e., often another 4-6L)
 - ▶ Once glucose < 250 mg/dL → switch from normal saline to 5% dextrose
- ▶ Place foley to tract strict I&Os; urine output goal > 0.5 mg/kg/hr

DIABETIC COMPLICATIONS

DKA MANAGEMENT

- ▶ Correction of electrolyte abnormalities
 - ▶ Replete K with a goal K between 4-5 mEq/L
 - ▶ Replete Phos to keep Phos > 1 mg/dL
 - ▶ *Can also replete Mag to keep Mag > 2 mg/dL*
 - ▶ Repletion of calcium and bicarb are controversial
 - ▶ Can add 1 amp (44 mEq) of bicarb to 1L 0.45% NaCl when pH < 7.1 or in settings of cardiac dysfunction/sepsis
- ▶ Notably regarding the fluid replacement
 - ▶ If hypernatremic, can use 0.45% NaCl (instead of 0.9%)
 - ▶ If hyperchloremic, can use a physiologic fluid like PlasmaLyte

DIABETIC COMPLICATIONS

DKA MANAGEMENT

▶ Correction of glucose

- ▶ Initiate regular insulin drip with bolus of 0.1 U/kg followed by 0.1 U/kg/hr rate
- ▶ If glucose doesn't fall by 50-75 mg/dL over first hour, consider doubling infusion rate
- ▶ Even upon normalizing serum glucose, continue at 1-2U/hr UNTIL ketosis and acidosis resolve
 - ▶ Because intracellular hypoglycemia is what is driving the counter-regulatory hormone activity

DIABETIC COMPLICATIONS

DKA MANAGEMENT

- ▶ Correction of glucose (cont'd)
 - ▶ Euglycemia is defined as a consistent fasting glucose of 60-90 mg/dL, pre-prandials of 60-105 mg/dL, one-hour post-prandials <140 mg/dL, two-hour post-prandials <120 mg/dL, and levels between 2-4AM of >60 mg/dL
 - ▶ The drip should not be discontinued until after the first subcutaneous dose of insulin is given once a new regimen has been decided upon
 - ▶ Once eating, if still on the drip, one should still give bolus insulin to cover the meal rather than just titrating the drip to chase post-prandial hyperglycemia
- ▶ Treat the provoking morbidity (i.e., sepsis, hyperemesis)

DIABETIC COMPLICATIONS

DKA MANAGEMENT

- ▶ If of a viable GA, continuous fetal monitoring should be initiated
- ▶ FHR abnormalities are common while mother/fetus are in an acidotic state
 - ▶ Thus, when considering a tracing to be non-reassuring, benefits and risks of proceeding with delivery should be carefully weighed, in that operative intervention can result in maternal death in an unstable patient
 - ▶ Further, neonatal morbidity is higher when the infant is delivered in a severely acidotic state
 - ▶ Fetal status will improve over next 4-8 hours as maternal metabolic status is corrected

DIABETIC COMPLICATIONS

HHS (Hyperosmolar Hyperglycemic State)

- ▶ HHS can have a similar presentation to DKA, however is typically characterized by extreme hyperglycemia (≥ 1000 mg/dL) and hyperosmolality (≥ 320 mOsm/kg) without ketoacidosis
- ▶ 60% of cases are caused by infection
 - ▶ Acute illness stress response decreases effectiveness of circulating insulin and leads to hypertonic osmotic diuresis and dehydration
- ▶ 25-50% of patient have neurologic findings

DIABETIC COMPLICATIONS

HHS MANAGEMENT

- ▶ Management is very similar to DKA!
- ▶ Treat underlying cause, provide aggressive intravenous hydration, insulin therapy, and electrolyte replacement

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