Maternal hyperglycemia

- Fetal hyperglycemia → fetal hyperinsulinemia → fetal hypergly/insul

1. Congenital anomaly
2. Decreased early growth (0-20)
3. Hyperinsulinemia
   a. Jaundice
   b. Strok, RVT
1. NN hypoglycemia
2. Surfactant deficiency
3. Immature lr metabolism
   a. B. asphyxia
   b. Cardiomyopathy
   c. TTN
1. Macrosomia
   a. Polycythemia
   b. Stroke, RVT

Poor neurodevelopmental outcome
OVERVIEW

- 30-fold decrease in morbidity (65%).
- Today, 3-10% of pregnancies are affected by abnormal glucose regulation and control.
- 80-88% GDM
- 35% T1DM
- 65% T2DM
Complications

- If optimal care is provided, the perinatal mortality rate, excluding congenital malformations, is nearly equivalent to that observed in normal pregnancies.
Which baby is the infant of the diabetic mother?

A

B
Complications

- **Fetal macrosomia**: 15-45% of diabetic pregnancies. The infant appears puffy, fat, plethoric, and often hypotonic.
Complications

- Impaired fetal growth:
  - Impaired fetal growth may occur in as many as 20% of diabetic pregnancies (10%).
  - Maternal renovascular disease is the common cause of impaired fetal growth in pregnancies complicated by maternal diabetes.
Birth Asphyxia

- **Incidence**
  - 20 TO 30%

- **Primary Risk factors:**
  - Prematurity
  - Fetal growth disorders
  - Maternal vascular disease
  - Peripartum maternal hyperglycemia
    - Drives catabolism of the oversupply of nutrients
      - depletes fetal O2 stores $\rightarrow$ episodic fetal hypoxia
Complications

- **Pulmonary disease:**
  - respiratory distress syndrome
  - transient tachypnea of the newborn
  - persistent pulmonary hypertension of the newborn.
Complications

- **Metabolic and electrolyte abnormalities:**
  1. Hypoglycemia. (25-40%) (15-25%)
  2. Hypocalcemia /hypomagnesemia.
  3. Abnormalities of iron metabolism at birth. (65%)
Hypoglycemia

- **Management**
  - Early Oral Feeding.
  - Continuous infusion D10 @ 6 to 8 mg/kg/min
  - Careful attention to total fluid administration
    - Increase glucose concentration
  - Resolution of hyperinsulinemia
    - 24 to 48 hrs.
Complications

- Hematologic problems:
  - Thrombocytopenia
  - Hyperbilirubinemia
  - Polycythemia
Polycythemia

- Respiratory distress
- Cardiac failure
- Decreased renal function
- Renal vein thrombosis
- Necrotizing enterocolitis

- CNS damage
- Hypoglycemia
- Hypocalcemia
- Hypomagnesemia
- Hyperbilirubinemia
Congenital Malformations

- Hyperglycemia
- Hyperketonemia
- Oxygen-Free Radicals
Hyperketonemia

- β-hydroxybutyrate
  - Level related
  - Time-of-exposure related
  - Synergism with glucose
    - minimally teratogenic doses of both metabolites

- Long-term neurodevelopmental abnormalities
Congenital Malformations: The Laundry List
Congenital Malformations

Skeletal/CNS
- Caudal regression syndrome
  not considered pathognomonic
  occurs 600x more frequently among IDDM
- Neural tube defects
- Microcephaly
Caudal Regression Syndrome

- Spectrum of malformation
  - cessation of growth of rostral portion of spinal cord
  - abnormal neural, muscular, skeletal and vascular components

_Caudal Regression_ with limbs intact but malformed

_Sirenomelia_

Absence of hand limbs, external genitalia, anus and rectum; Potter sequence secondary renal agenesis
Congenital Malformations

Cardiac

- Hypertrophic Cardiomyopathy (30%)
- Transposition + VSD
- Ventricular septal defect
- Coarctation + VSD or PDA
- Atrial septal defect
Hypertrophic Cardiomyopathy

- 30% of IDM------5-10% HF
- Variable RV outflow obstruction
- LV outflow obstruction
  - asymmetric septal hypertrophy
  - proximity of the anterior leaflet of the MV to the septum
Hypertrophic Cardiomyopathy

- **Natural history**
  - Transient; resolution by 6 to 12 months
  - Most infants asymptomatic
  - Heart failure occurs in 5 to 10%
Hypertrophic Cardiomyopathy

- Treatment of heart failure
  - **Propranolol**
    - decreases HR and dynamic outflow obstruction
  - **Digoxin**—contraindicated
    - reduces LV volume
    - increase dynamic outflow obstruction
    - exacerbates heart failure
Septum
Congenital Malformations

Renal

- Hydronephrosis
- Renal agenesis
- Ureteral duplication
Congenital Malformations

**GI**
- Duodenal atresia
- Anorectal atresia
- Small left colon syndrome
Take home massages

1. Preconceptional reinforcement of education to diabetic mothers regarding the impact of glycemic control on the fetus.
2. Communication between perinatal team is crucial to determine fetus at risk for complication of diabetes during pregnancy.
3. Adequate glycemic control before and during pregnancy is crucial to improve pregnancy outcome.
4. The risk of hypoglycemia is not related to the weight of IDM

5. Adequate management of hypoglycemia is important to prevent neurodevelopmental abnormality.

6. Use inotropic agents to manage hypertrophic cardiomyopathy are contraindicated (B-blocker & diuretics)
Thank You for Being Patient Till the End