Rationale: Abnormalities of fetal growth carry increased risks for morbidity and mortality. Monitoring fetal growth is an important aspect of prenatal care.

Intended Learning Outcomes:

A student should be able to:

• Define macrosomia and fetal growth restriction
• Describe etiologies of abnormal growth
• List methods of detection for fetal growth abnormalities
• Describe the management of fetal growth abnormalities
• List the associated morbidity and mortality of fetal growth abnormalities

TEACHING CASE

CASE: A 20 year-old G 2P1 African-American woman is referred to you from her family physician for an obstetrics consultation. She is currently 35 0/7 weeks based on a certain LMP with regular 28 day cycles. At her last prenatal visit, her fundal height measured 30 cm. In taking her history about her prior delivery, she tells you that she delivered 3 weeks before her due date, but that her baby was small, weighing 2400 grams. She does not report any other pregnancy complications. She smokes 2 packs of cigarettes a day and has gained 8 pounds during this pregnancy.

Physical Exam: BP 110/70; fundal height is 30 cm. Fetal heart tones are present

Obstetrical Ultrasonography Report:

Fetal number: Single
Position: Cephalic
Placenta: Anterior
Amniotic fluid volume: Normal
Fetal biometry:

- **BPD:** 82.9 mm = 33.3 ± 3.1 weeks
- **HC:** 299.7 mm = 33.2 ± 3.0 weeks
- **AC:** 274.0 mm = 31.5 ± 3.0 weeks
- **FL:** 58.0 mm = 30.3 ± 3.0 weeks
- **Humerus:** 51.2 mm = 29.9 ± 2.8 weeks

Estimated fetal weight = 1700 ± 308 grams, less than the 10th percentile at 34.9 weeks

**Fetal Anatomy:** Normal

**Umbilical artery Doppler Flow:** S/D ratio = 2.66 (normal)

**COMPETENCY-BASED DISCUSSION & KEY TEACHING POINTS:**

Competencies addressed:
- Patient Care
- Medical Knowledge
- Systems-based Practice

1. **How do you interpret the ultrasound?**
   - It is important for the student to distinguish between the commonly used fetal and infant growth descriptors:
     - **Intrauterine growth restriction (IUGR):** an estimated fetal weight less than the 10th percentile for gestational age
     - **Macrosomia:** an estimated fetal weight of 4000-4500 grams or greater
     - **Large for gestational age:** birth weight above the 90th percentile for gestational age
     - **Small for gestational age:** birth weight below the 10th percentile for gestational age
     - **Low birth weight:** birth weight < 2500 g
   - Based on the sonographic findings, the fetus qualifies for a diagnosis of IUGR.

2. **What can you tell the patient is the possible etiology of the IUGR?**
   - **IUGR** is a descriptive term for a condition that has numerous potential causes. These causes can be characterized as maternal, fetal, and placental factors:
     - **Maternal Factors:**
       - Medical conditions (hypertension, renal disease, diabetes, vascular/autoimmune disease)
       - Substance use and abuse (tobacco, alcohol, cocaine)
       - Infections (viral, protozoal)
       - Teratogen exposure
     - **Fetal Factors:**
       - Small constitutional size
       - Genetic & structural abnormalities
       - Multifetal gestation
     - **Placental Factors:**
       - Primary placental disease (chorioangioma, mosaicism)
       - Abnormal placentation (previa, abruption, hematoma)
3. The patient asks you why the fetal growth problem was not detected earlier. What are the methods to screen and diagnose fetal growth disorders?

- A review of the pregnant patient’s medical and obstetrical history is needed to determine whether she is at risk for abnormal fetal growth. Fetal anatomic survey will also screen for fetal and placental findings.
- The key screening tool for fetal growth disorders in low risk women is assessment of uterine size by fundal height measurement. However, fundal height assessment is not accurate as a diagnostic tool.
- Ultrasonography is the gold standard to assess fetal weight.

The 4 standard fetal growth measurements include:

- Biparietal diameter
- Head circumference
- Femur length
- Abdominal circumference
- Umbilical artery doppler velocimetry
- Abnormal umbilical dopplers (absent or reversed end diastolic flow) can help predict fetuses at increased risk of poor fetal outcome

4. What would you tell the patient are the potential consequences of IUGR?

- The primary concern regarding IUGR is an increase in perinatal morbidity and mortality. The risk of stillbirth is dependent on gestational age and the primary etiology. In addition, both intrapartum and neonatal complications may increased, depending on the gestational age at delivery.

- Intrapartum:
  - Increased risk of fetal heart rate abnormalities
  - Cesarean delivery
  - Low Apgar scores
  - Cord blood acidemia

- Neonatal:
  - Polycythemia
  - Hyperbilirubinemia
  - Hypoglycemia
  - Hypothermia
  - Apneic episodes

- Longterm:
  - Largely dependent on the etiology of the IUGR and the gestational age at delivery
  - Lifelong increased risk of cardiovascular disorders

5. How would you approach managing this patient?

- Once IUGR is suspected/confirmed, serial sonographic assessments to monitor fetal growth is indicated every few weeks.
- If the pregnancy is remote from term, periodic antenatal fetal testing is indicated (Biophysical profile [BPP], modified BPP, Non-stress test, are all acceptable)
- The timing of delivery should be based on the results of the antenatal testing, fetal growth pattern, dopplers, and gestational age.
REFERENCES

