Educational Topic 24: Preterm Labor

Rationale: Prematurity is one of the most common causes of neonatal morbidity and mortality. The reduction of preterm births remains an important goal in obstetric care.

Intended Learning Outcomes:
A student should be able to:

• Identify the modifiable and non-modifiable risk factors and causes for preterm labor
• Describe the signs and symptoms of preterm labor
• Describe the initial management of preterm labor
• List indications and contraindications of medications used in preterm labor
• List the adverse outcomes associated with preterm birth
• Describe the counseling for reducing preterm birth risk

TEACHING CASE

CASE: An 18-year-old African-American, G2P0101 woman who is 12 weeks pregnant, presents to your prenatal clinic for a new patient visit. Before you walk into the room to see the patient, you look through her records and note that she delivered her last pregnancy just 12 months ago. Beginning at 24 weeks in her previous pregnancy, the patient presented numerous times to Labor and Delivery reporting contractions, and was sent home each time with a diagnosis of “Braxton-Hicks contractions.” She eventually presented at 28 weeks gestation and was diagnosed with preterm labor. She delivered at 29 weeks. The neonate’s course was complicated by intra-ventricular hemorrhage and respiratory distress syndrome. The child now appears to have cerebral palsy and chronic lung disease due to bronchopulmonary dysplasia.

COMPETENCY-BASED DISCUSSION & KEY TEACHING POINTS:
Competencies addressed:
• Patient care
• Medical knowledge
• Interpersonal and communication skills
• Professionalism
• Systems-based practice and management
1. What are the risk factors for preterm labor, and which ones does this patient have?

   • The diagnosis of preterm labor generally is based on clinical criteria of regular uterine contractions accompanied by a change in cervical dilation, effacement, or both or initial presentation with regular contractions and cervical dilation of at least 2 cm between 20 0/7 - 36 6/7 weeks of gestation. Preterm birth related to spontaneous preterm labor should be distinguished from preterm birth that is iatrogenic due to maternal or fetal complications. Risk factors for spontaneous preterm labor include:
     • Prior history of preterm birth (highest risk)
     • African-American race
     • Low pre-pregnancy BMI
     • Preterm uterine contractions
     • Premature rupture of membranes (PROM)
     • Incompetent cervix
     • Shortened cervix on transvaginal ultrasound
     • Infections
       ▪ Urinary
       ▪ Vaginal (BV)
       ▪ Intra-amniotic
     • Excessive uterine enlargement
       ▪ Polyhydramnios
       ▪ Multiple gestation
     • Uterine distortion
       ▪ Leiomyomas
       ▪ Septate uterus, uterine didelphis, and other anomalies
     • Placental abnormalities
       ▪ Abruptio placentae
       ▪ Placenta previa
     • Maternal smoking (associated with PROM)
     • Substance abuse
     • Inflammation
     • Decidual hemorrhage
     • Pathologic uterine distension
   • This patient history is notable for a number of risk factors for preterm labor, namely:
     • Prior history of preterm birth
     • African-American race
     • Low maternal weight
     • Short interpregnancy interval
     • The physiology of labor initiation is not completely understood. Once fetal maturity is reached, there is activation of the maternal and fetal hypothalamus/pituitary/adrenal axis that leads to the initiation of parturition. It has been proposed that fetal inflammatory response can contribute to the onset of preterm labor.

2. What characteristics distinguish Braxton-Hicks contractions from true labor contractions?

   • *Braxton-Hicks contractions:* The uterus undergoes irregular and sporadic contractions that are usually painless or of mild intensity. The frequency of these contractions increases in the last 4 to 8 weeks of pregna-
These contractions are not associated with progressive cervical dilation and effacement, and often is referred to as false labor. These contractions often resolve with rest, hydration, and/or sedation.

- **True Labor Contractions:** As compared to Braxton-Hicks contractions, true labor contractions occur at regular intervals, progressively increase in frequency and intensity, and are associated with cervical dilation. True labor contractions will not resolve with sedation.

3. **What should you counsel the patient regarding the signs and symptoms of preterm labor?**

- Distinguishing true preterm labor from false labor or Braxton-Hicks contractions is challenging and depends primarily on prompt patient evaluation. Efforts to develop models or tests to predict preterm labor have thus far been unsuccessful; therefore, when in doubt it is advisable to have patient come in for evaluation. The primary method for identifying preterm labor is by screening for maternal signs and symptoms as summarized below:
  - Menstrual-like cramps
  - Low, dull backache
  - Abdominal pressure
  - Pelvic pressure
  - Abdominal cramping (with or without diarrhea)
  - Increase or change in vaginal discharge (mucous, watery, light bloody discharge)
  - Uterine contractions, often painless

4. **What recommendations, if any, would you discuss with this patient regarding prevention strategies to reduce the risk of preterm delivery in this pregnancy? To reduce the risk of neurodevelopmental disorders and other morbidity associated with preterm labor in this fetus should she experience preterm labor?**

- Intramuscular or vaginal progesterone, begun in the second trimester, has been shown to decrease the rate of preterm birth in women who previously experienced a preterm birth. Evidence does not currently exist to recommend one route of progesterone delivery over the other in preventing preterm delivery.
- Magnesium sulfate administered to the mother, prior to an anticipated preterm birth, reduces the risk of cerebral palsy in surviving infants; thus if delivery before 34 weeks gestation is anticipated, consideration should be given to administration of magnesium sulfate.
- Antibiotics should be administered during preterm labor as prophylaxis against Group B strep sepsis in the neonate.
- A course of antenatal steroids (betamethasone or dexamethasone) should be administered to the mother diagnosed with preterm labor in an effort to enhance fetal lung maturity and decrease the risk of necrotizing fasciitis and intracranial bleeds in the neonate.

5. **If the patient does experience PTL in this pregnancy, what recommendations would you make regarding treatment and management?**

- Fetal fibronectin testing (negative) and cervical length (greater than 2.5 cm) have good negative predictive value in deciding which patients do not require treatment for preterm labor.
- There is no clear first line tocolytic medication; however, current medications in use include magnesium sulfate, nifedipine, indomethacin, and beta-mimetics. The primary benefit of tocolytics appears to be delaying delivery in order to complete a course of antenatal steroids and transport the mother to a tertiary care facility for adequate care of the premature newborn. The risks of tocolytics include:
  - Magnesium (maternal flushing, decreased reflexes, muscle weakness, pulmonary edema and fetal lethargy, hypotonia, respiratory distress and bone abnormalities if used > 7 days)
• Nifedipine (maternal hypotension)
• Indomethacin (maternal nausea, esophageal reflux, gastritis, emesis and possible platelet dysfunction and fetal in utero closure of ductus arteriosus with > 48 hour use and possibly patent ductus arteriosus for neonate)
• Beta-mimetics (maternal tachycardia, hypotension, tremor, shortness of breath, chest discomfort, pulmonary edema, hypokalemia and hyperglycemia and fetal tachycardia)

6. What are the potential adverse outcomes of preterm birth for the fetus?
• Respiratory distress syndrome
• Intraventricular hemorrhage
• Necrotizing enterocolitis
• Sepsis
• Neurologic impairment
• Seizures
• Long term bronchopulmonary dysplasia
• Developmental abnormalities including cerebral palsy

REFERENCES


ACOG Practice Bulletin 127, June 2012.

ACOG Practice Bulletin 130, October 2012.

ACOG Committee Opinion 455, reaffirmed 2013.

ACOG Committee Opinion 120, June 2011.