Fetal Assessment

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Ultrasound
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Ultrasound Applications

• Identification of pregnancy
• Identification of multiple fetuses
• Determination of fetal age, growth, maturity
• Observance of polyhydramnios or oligohydramnios
• Detection of fetal anomalies
• Location of placenta and fetus for amniocentesis
• Determination of fetal position
• Determination of fetal death
• Examination of fetal heart rate, respirations, and movement
• Detection of incomplete miscarriages or ectopic pregnancies
Amniocentesis

• Obtaining of sample of amniotic fluid by needle insertion into amnion

• Complications:
  – Trauma
  – Infection
  – Hemorrhage
  – Death

• Complication rate <1%
Amniocentesis

- L/S Ratio – lung maturity
- Alpha-fetoprotein – neural tube defect or Down syndrome
- Bilirubin – hemolytic diseases
- Creatinine – fetal kidney maturity & function
- Presence of meconium – asphyxia or postmaturity
- Cytologic examination – genetic disorders
Chorionic villus sampling

- Sampling from the placenta in utero
- 1 – 3.5% complication risk
- Useful for sampling for possible genetic abnormalities
- Usually performed between 9 and 12 weeks gestation
Fetal Heart Rate Monitoring

• FHR monitoring methods
  – External abdominal transducer
  – Abdominal electrodes
  – Fetal scalp electrode

• Monitoring uterine contractions
  – Tocodynamometer – strapped to abdomen
  – Intrauterine pressure catheter
Fetal Heart Patterns

- **Baseline heart rate** – 10 minutes
  - Normal: 120-160 bpm

- **Variability**: normal awake fetus: 5-10 bpm
  - Reduced with CNS depression (hypoxia, immaturity, fetal sleep, narcotic or sedative use)

- **Bradycardia**: baseline <100 bpm (most concern related to asphyxia)
  - End-stage bradycardia: standard variability
  - Terminal bradycardia: no variability

- **Tachycardia**: baseline >180 bpm
Fetal Heart Patterns

- **Accelerations:** FHR >160 for < 2 minutes = positive sign
- **Decelerations:** FHR <120 for < 2 minutes may be threatening
  - Early or Type I decelerations: follow contractions = benign
  - Late or Type II decelerations: occur 10-30 seconds after the onset of contraction = asphyxia
  - Variable or Type III decelerations: independent of uterine contractions = compression of umbilical cord
Fetal Scalp pH Assessment

- Indicated in the absence of baseline variability, late decelerations with decreasing variability, and abnormal tracings.

- pH values
  - Normal $>7.25$
  - Slight asphyxia $= 7.2$ to $7.24$
  - Severe asphyxia $<7.2$
Delivery Date Estimation

- Estimated delivery date = Estimated date of confinement (EDC)
- By dates (Nagele’s Rule): 3 months subtracted from 1st day of last menstrual period then 7 days added = EDC
- Fundal height: Fundus of uterus measured
- Quickening: First sensation of fetal movement ~ 20 weeks
- Determination of fetal heartbeat: 8-20 weeks: doppler vs auscultation
Biophysical Profile

- Conducted during the last trimester
- Five tests over a 30 minute period
  - Fetal breathing: at least one episode of at least 30 seconds
  - Gross body movement: at least 3 body/limb movements
  - Fetal tone: one episode of extension/flexion of limbs or trunk
  - Reactive NST: at least 2 episodes of 15 bpm acceleration
  - Amniotic fluid volume: at least one pocket of 1 X 1 cm in two directions
- Normal score = 8-10
Other Test or Findings

- Meconium in amniotic fluid: may indicate asphyxia in utero and risk of meconium aspiration syndrome
- Cordocentesis: sampling of fetal umbilical blood
- Magnetic resonance imaging (MRI)