Maternal History and Risk Factors

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6/1/2018

What to Know/Study

- Effects of maternal medical complications
  - Hematologic
  - Hypertension, Renal disease
  - Infections
- Problems associated with amniotic fluid & membranes
  - Amniotic bands
  - Oligohydramnios, Polyhydramnios
  - PROM & Chorioamnionitis
- Significance of findings
  - AFP/Triple screen
  - Biophysical profile
  - Diagnostic ultrasound
  - Lung maturation studies
- Neonatal effects of maternal medications
  - Tocolytics, Analgesia, anesthesia
- Problems in labor-impact on the neonate
  - Breech & other
  - Malpresentation
  - Maternal hemorrhage, Meconium
  - OB emergencies (impact on neonate)
  - Abruptio placenta, Cord prolapse
  - Placenta previa
- Impact of methods of delivery on the neonate (forceps, vacuum, C/S)

Maternal Hematologic Issues

Anemia
- Low Hgb (<9mg/dL) associated with:
  - Decreased oxygen carrying capacity to fetus leading to:
    - Growth restriction
    - Prematurity
    - IUFD

- Thrombocytopenia
  - Most commonly from:
    - Preeclampsia
    - HELLP
  - Most worrisome when plts <50,000
  - Effect on fetus/newborn
    - IUFD
    - Transient thrombocytopenia
Maternal Preeclampsia/Hypertension

- Four categories
  - Preeclampsia/eclampsia
  - Chronic hypertension
  - Chronic hypertension with superimposed preeclampsia
  - Gestational hypertension

Hypertensive Disorders: Pre-E, Eclampsia, HELLP

- Usual management:
  - Hospitalization if severe
  - Medication to lower blood pressure
  - Magnesium Sulfate for seizure prophylaxis
  - BMZ if premature
  - Close observation of fetal well-being
    - Fetal Heart Rate monitoring
    - Biophysical Profiles
    - Fetal Growth

Potential Fetal/Neonatal Effects

- Fetal
  - Decreased uterine blood flow
  - Decreased placental perfusion
  - IUGR
  - Abruption
  - Intolerance of labor
  - Intrauterine fetal demise

- Neonatal
  - SGA
  - Prematurity
  - Emergent delivery
  - Hypotonia
  - Thrombocytopenia
Maternal Renal Disease

Maternal risks
- Superimposed preeclampsia
- UTIs
- Bacteremia
- Risks increase if dialysis or transplant patient

Fetal risks
- Growth restriction
- Infection

Neonatal risks
- Preterm delivery
- Hypperviscosity

Intrauterine Infections

TORCH(S)
- Toxoplasmosis
- Other
- Rubella
- CMV
- HSV
- Syphilis

Consider TORCH When a Baby Presents with:
- IUGR
- Hepatosplenomegaly
- Microcephaly
- Intracranial calcifications
- Conjunctivitis
- Hearing loss
- Rash
- Thrombocytopenia

Intrauterine Infections

Congenital Rubella
- Hearing loss 60%
- CHD: 45% (PDA, PPS)
- Cataracts 25%
- Microcephaly 27%
- IUGR (symmetric)
- Developmental delay
- Purpura "Blueberry muffin rash"

Toxoplasmosis
- May be asymptomatic at birth
- Classic triad of sx:
  - Chorioretinitis
  - Hydrocephalus
  - Cranial calcifications

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CMV

- Primary exposure during pregnancy carries up to 50% chance of transmission to fetus
- CMV causes viral placentitis in turn causing uteroplacental insufficiency
- 5-20% newborns infected with CMV are symptomatic at birth
- Symptoms include: petechiae, jaundice, hepatosplenomegaly, microcephaly, IUGR, chorioretinitis, thrombocytopenia and anemia
- Long term sequelae include: hearing loss, vision problems, and psychomotor developmental delay

Maternal Infections

Intrauterine HSV-Rare

Perinatally acquired HSV

- Sx may be non-specific as in early sepsis
- Lesions may be noted on Skin, Eyes, Mouth (SEM)

- Infection progresses rapidly to hypotension, DIC, shock

https://www.uptodate.com/contents/overview-of-torch-infections

Maternal Infections: Syphilis

- Stillbirth
- Preterm
- Low birth weight
- Non-immune hydrops
- Rhinitis “snuffles”
- Rashes
- Lymphadenopathy
- Radiographic bone abnormalities
- Hematologic issues
Problems with Amniotic Fluid and Membranes

- Amniotic Band Sequence
- Not genetic

Amniotic Fluid Index (AFI)

- Measurement total of the largest pockets of amniotic fluid in four different quadrants of the uterus
- If amniotic fluid index is less than 5 centimeters → oligohydramnios
- If it is ≥ 25 centimeters → polyhydramnios

Problems with Amniotic Fluid and Membranes

PROM: Premature rupture of membranes
- Spontaneous rupture of membranes at term gestation prior to the onset of labor

PPROM: Preterm premature rupture of membranes
- Spontaneous rupture of membranes before 37 weeks gestation without onset of labor
Problems with Amniotic Fluid and Membranes:

Chorioamnionitis

- Dysfunctional labor
- Foul smelling vaginal discharge
- Maternal fever
- Uterine tetany
- Uterine irritability
- Hemorrhage
- Endometritis
- Sepsis

Chorioamnionitis: Potential Fetal Effects

- Fetal tachycardia
- Fetal intolerance to labor
- Poor neurologic outcome, but why?
- Frequency highest in preterm deliveries with PROM
  - < 27 weeks (41%)
  - 28-36 weeks (15%)
  - Term (2%)

Mechanisms of Hypoxia/Asphyxia

Acute
- Placental abruption, vasa previa, maternal hemorrhage, uterine rupture

Intermittent
- Contraction, cord compression

Chronic
- Maternal: hypertension, preeclampsia, asthma, diabetes, lupus, renal disease, pulmonary edema
- Fetal: anemia, infection
FHR Patterns Consistently Associated with Newborn Acidemia

- Absent variability and
- Recurrent late decelerations
- Recurrent variable decelerations
- Absent variability and
- Tachycardia
- Bradycardia (< 80 bpm)
- Sinusoidal pattern

Parer et al. 2006

VEAL CHOP and FHR

- Variable deceleration
- Early deceleration
- Acceleration
- Late deceleration
- Cord Compression
- Head Compression
- O.K!
- Placental Insufficiency

Rh Isoimmunization

- Rh negative mother who has been exposed to Rh positive blood cells and now carrying Rh + fetus
- Fetal cells enter the maternal circulation, stimulating an antibody response
- Maternal antibodies cross the placenta and destroy fetal red blood cells
- Severity generally increases with subsequent affected pregnancies
  - First exposure (first pregnancy), usually not affected
Rh Isoimmunization

RhOGAM
- Coats the antigens of the fetal cells in the circulation
- Masks the Rh+ cells from the maternal immune system, preventing sensitization
- Given at 28 weeks gestation, at delivery, and for any event that may transfer cells (amniocentesis, miscarriage, abdominal trauma, etc.)

Twins
- Di/Di
- Mono/Di
- Mono/Mono

Antenatal Testing: Triple and Quad Screen

**Triple Screen**
- Measures presence of:
  - AFP
  - HCG
  - Estriol
- Done at 15-20 weeks gestation
- Screens for:
  - Trisomy 18, 21
  - Neural tube defects
  - Gastrochisis

**Quad Screen**
- Measures presence of:
  - AFP
  - HCG
  - Estriol
  - Inhibin A (more specific for Down’s)
- Done at 15-20 weeks gestation
- Screens for:
  - Trisomy 18, 21
  - Neural tube defects
Testing for Lung Maturity

- Lamellar body count
  - Direct measure of surfactant production
  - By Type II pneumocytes
  - >30,000-50,000 per microliter = maturity
- Phosphatidylglycerol
  - Produced at 32 wks
  - > 2% suggests maturity
- L/S ratio (Lecithin/Sphingomyelin)
  - Ratios equal at 30-33 weeks
  - "L" amt increases "S" doesn't
  - Ratio 2:1 suggests maturity

Antenatal Testing: Non-Stress Test (NST) and Biophysical Profile (BPP)

NST looks for presence of:
- 2 FHR accels >15 bpm lasting > 15 secs in 20 minute timeframe

Maternal Medications and Effect on Fetus

- NSAIDS/Indomethacin
  - Decreased AFI
  - Premature closure of the PDA in utero
- Magnesium Sulfate
  - Decreased FHR Variability
  - Decreased muscle tone
  - Decreased calcium
- Betamethasone
  - Decreased FHRV and BPP scores

- Anesthesia/Analgiesia
  - Respiratory depression
  - Fetal bradycardia
  - CHD depression
- Terbutaline
  - Increased growth
  - Elevated HR
Fetal Position and Risk

- Breech
  - Hypoxia
- Shoulder dystocia
  - HIE
  - Brachial plexus injury
  - Fractured clavicle

Perinatal Emergencies

- Abnormal Placentation
  - Previa
  - Accreta
  - Percreta
  - Increta
- Uterine Rupture
- Abruption

Abnormal Placentaion: Previa

- 2nd and/or 3rd trimester bleeding
- Complete bedrest
- Possible hospitalization until delivery
- Cesarean for previa
- Anemia
- IUFD
How Much Can She Bleed?

- No autoregulation of uterine blood flow, the vessels are maximally dilated during pregnancy
- Blood flow through the uterus/placenta is approximately 700 mL/min at term

Uterine Rupture

- Uterine rupture: complete disruption of all uterine layers, including the serosa
- Life-threatening for both mother and fetus with risk of:
  - Severe hemorrhage
  - Bladder laceration
  - Hysterectomy
  - Neonatal morbidity related to intrauterine hypoxia
- Uterine dehiscence: incomplete uterine scar separation where the serosa remains intact
  - Not usually associated with hemorrhage or adverse maternal or perinatal outcomes

Abruption

- Occurs when the placenta prematurely separates from the wall of the uterus
- Can be complete or partial
Cord Prolapse

- Risk factors
  - Polyhydramnios
  - Malpresentation (esp. footling breech)

- Risk to baby
  - Asphyxia
  - HIE

Instrumentation and Effect on the Neonate

- Vacuum
  - Scalp swellings
  - Subgaleal hemorrhage
  - Skin breakdown
  - Neuro sequelae

- Forceps
  - Skin breakdown
  - Bruising
  - Skull fracture
  - Nerve injury