OB Levels of Care and Thresholds of Viability

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Objectives

- Discuss
  - "Levels of Care"
  - Standard definitions
  - Equitable health care/geographic distribution
    - appropriate antepartum, intrapartum, postpartum care

Historical

- Timely access to risk appropriate care
Neonatal and Obstetrical Care
- March of Dimes 1976
- Report Titled
  - “Toward Improving the Outcome of Pregnancy”
  - Maternal/neonatal 3 levels
  - Recommended referral to three levels
  - Better able to handle

State Organized Regional Perinatal Care
- Designated regional centers
- Education/transport service

1980s – Weakening/Deregulation
- Increased newborn morbidity/mortality
- Increased cesareans
- Reluctance to transfer
  - Fee for service
  - Loss of business/referral
  - No transport team
  - Lack of knowledge of interventions

1980s – Weakening/Deregulation
- Keep high-risk newborns
- Without maternal level of care
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**Risk Appropriate Maternal Transfer**
- Increased mortality/morbidity VLBW in Level 1, 2 facilities
- Only neonatologists
- 38% vs. 23%, OR 1.6

**Regionalization**
- Focus on neonatal care
- Increase outcome

**Recent Milestones in Neonatology**
- Regionalization – March of Dimes
- Surfactant Replacement Therapy
- Inhaled Nitric Oxide
- Neonatal Resuscitation Program
- Vermont-Oxford and NICHD Networks
- Family-Centered Care

**Preterm Birth Outcome Calculator**
- NICHD Neonatal Research Network (NRR): Extremly Preterm Birth Outcome Data
- Based on the following characteristics:
  - Gestational Age (Less Obstetric Estimation) or Completed Weeks (18–34)
  - Birth Weight (less than 10th percentile)
- Estimated outcomes for infants in the birth sample are as follows:

<table>
<thead>
<tr>
<th>NICHD Neonatal Research Network (NRR)</th>
<th>Extremely Preterm Birth Outcome Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early or Late-Onset Neonatal Echocardiographic Evaluation (80%)</td>
<td>90%</td>
</tr>
<tr>
<td>VLBW (Less Than 10th Centile)</td>
<td>10%</td>
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https://www.nichd.nih.gov/about/org/der/branches/ppb/programs/epbo/Pages/epbo_case.aspx
Uncertainties in Dating
- Early ultrasound
- LMP
- IVF
- Later ultrasound

Question
- At what gestational age should a mother be transferred to a higher level facility?
  - 20 weeks
  - 21 weeks
  - 22 weeks
  - 23 weeks
  - 24 weeks

Scope of Issue
- 4 million deliveries per year
- 40% deliveries @ <500 deliveries
- 20% deliveries at 500-1000
- Basic and Level 1 care
New Call – Refocus on Maternal Care
- Maternal health
- Fetal evaluation
  - Clinical systems
  - Fetal/maternal conditions

The Fetus
- Focus/define high risk and systems to manage
  - Fetal evaluation
    - rural state
    - financial pressure

Maternal Mortality Worsen
Ranked 60th
- 1987 – 2009
  - 7.2 – 17.8/1000
  - 405 preventable
  - Uncommon Events
    - shock/blood loss
    - renal failing
    - PE
    - ARDS
  - Increased morbidity also

Define Increased Pregnancy Risk/Designation
- Fetal growth restriction <37 weeks
- Diabetes
  - Insulin or no insulin
- Hypertension
- 34 weeks severe preeclampsia
- Preterm Labor
  - PPROM
Define Increased Pregnancy Risk/Designation
- Vasa previa, placenta previa, repeat cesarean section, anterior placenta
- Anomalies
- Maternal
  - Cardiac
  - Renal
  - Obesity
  - Etc

Obstetrical Complications
- Generally uncommon
- Sometimes risk factors
- Hopeful thinking sometimes fails

California Study

<table>
<thead>
<tr>
<th>Unmet Criteria</th>
<th>Met (%)</th>
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<tbody>
<tr>
<td>Perform cesarean section in 30 minutes</td>
<td>64%</td>
</tr>
<tr>
<td>Pediatrician available</td>
<td>56%</td>
</tr>
<tr>
<td>Radiology within 12 hours</td>
<td>80%</td>
</tr>
<tr>
<td>NICU/maternal match</td>
<td>35%</td>
</tr>
<tr>
<td>52/53 Higher NICU/low MFM</td>
<td></td>
</tr>
</tbody>
</table>

Institution Economics
- Keep high-risk neonate
- Inadequate maternal level of care
Maternal Care
- Testing BPP
- Fetal movement
- Fetal tone
- Fetal activity
- Fetal breathing

Maternal Care
- Rule out anomalies

Maternal Care
- Capability of continuous monitoring

Maternal Care
- Doppler flow
  - Cord
  - Middle cerebral artery
Maternal Care
- Timing of delivery

What Are the Levels of Care?
- Birth Center
- Level 1
- Level 2
- Level 3
- Level 4

Level of Care – Birth Center
- Low-risk singleton, vertex
- Meet unexpected
- Agreements
  - Hospital
  - Physician
- Data, QI, medical consultation

Level of Care – Level 1
- Uncomplicated pregnancy
- Manage unexpected
- Perform cesarean section
- Basic
  - Imaging
  - Labs
  - Blood bank
Level of Care – Level 1
- Appropriate
- Twins at term
- Trial of labor
- Cesarean section
- Preeclampsia without severe features
- Data/QI

Level of Care – Level 2
- Appropriate high-risk antepartum
- Ultrasound imaging, CT, MRI
- Manage unexpected
- Maternal-Fetal Medicine
  - Telemedicine okay
- Anesthesia
  - OB
- Medical/surgical consultant

Level of Care – Level 2
- Appropriate
- Some premature
- Previa
- Preeclampsia
- Not accreta
- Data/QI

Level of Care – Level 3
- More complex
- Maternal-Fetal/obstetrical
- Advanced imaging
- QI/Data
- System leadership
- Medical/surgical consultation
- Maternal-Fetal Medicine
  - Telemedicine okay
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Level of Care – Level 4
- Maternal-Fetal Medicine care team
- Severe complications
  - Cardiac
  - Renal
  - Pulmonary
  - Hypertension
  - Unstable
    - e.g. transplants, ECMO

Levels of Care
- RNs play a big role

Case SB
- 25 year old Gravida 2 Para 1 being seen at a rural access hospital.
- Prenatally fetal multi cystic kidney identified along with contralateral reflux.
- Recommendation made to deliver at higher level facility.
- Obstetrician declined citing patient’s desire to deliver at home hospital and lack of justification for delivery at higher level facility
- Request made that obstetrician review case with local Pediatric Support Person

Case SB
- Patient delivered at rural hospital.
- Difficult delivery secondary to enlarged fetal abdomen.
- Concern raised over neonatal renal function
- Newborn transferred to Tertiary care facility
Multicystic Kidney

Placenta Previa diagnosed at 28 weeks following bleeding episode.

Cesarean planned at a Level 1 hospital at 39 weeks.

Patient presented with significant bleeding at 37.5 weeks.

Emergency cesarean performed.

Case AT

Patient had post-partum atony.

Patient life flighted to a "Level 2" facility and underwent an emergency hysterectomy.

IR was not available.

Patient in ICU from hemorrhagic shock complications.
Case MB

- 30 year old, Gravida 4 Para 3 status post three prior cesareans.
- Patient with known previa possible accreta diagnosed at outlying institution.
- Admission planned at higher level facility with delivery at 35 weeks.
- Experienced Surgeons
- IR team
- Large Blood Bank
- Obstetrical Massive hemorrhage protocol activated

Case MB

- Patient presented to a Level 1 facility at 24 weeks in with increasing pressure.
- Found to be 5 to 6 cm dilated and "contracting".
- Diagnose of preterm labor was made.
- Patient felt to be nonviable.
- After several hours and no change in cervix oxytocin was begun and membranes were ruptured.
- After several more hours MFM was contacted.

Case MB

- Patient was transferred to higher level of care facility.
- Patient received antibiotics (GBS status unknown), magnesium sulfate for neuroprotection, betamethasone for prematurity.
- NICU consulted and advised patient.
- Patient remained pregnant for three more weeks and was eventually delivered at 27 to 28 weeks following spontaneous onset of labor.

Placenta Accreta
Placenta Percreta

Case JM

- 35 year old Gravida 2 Para 1 with relatively uncomplicated pregnancy admitted to "Level 2" facility for preterm labor at 34 weeks of gestation.
- Recent ultrasounds notable for mild polyhydramnios.
- Over the course of a few days the patient eventually delivered a fetus at 34 to 35 weeks gestation.

Newborn had immediate respiratory issues.
Upon further evaluation was found to have a diaphragmatic hernia.
Infant was life flighted to Boston for ECMO.
Review of films revealed undiagnosed diaphragmatic hernia

Diaphragmatic Hernia
Case CD
- Patient presented to “level 2 Facility” for PPROM at 32 weeks.
- After confirmation of PPROM patient was followed expectantly.
- Given the weekend, NSTs were performed.
- No BPP was obtained.
- Late in the weekend, the patient developed a fever and chorioamnionitis was diagnosed.
- An attempt at induction was made however the patient required a primary cesarean for fetal intolerance of labor.
- A septic newborn was delivered.

Oligohydramnios

Case RH
- 39 year old Gravida 2 Para 1 presented to local hospital with bleeding.
- A clinical abruption was diagnosed.
- Phone call made to MFM.
- Given bleeding and questionable tracing, either immediate delivery at local hospital or further close observation at local institution was recommended.
- Follow up phone call after 1 hour was requested.
- Within 10 minutes of phone conversation mother was in ambulance on way to higher level facility.
- Upon arrival 34 week stillbirth was diagnosed in an actively bleeding mother.

Abruption
OB Levels of Care and Threshold of Viability

Maine
- Birth Centers
- Level 1/rural access
- Level 2
- Level 3/4

Summary
- Integrated system
- Maternal levels of care
- Education
- Transport
- Telemedicine

Best Outcome Closest to Home