Diagnosis and Management of Preterm Labor and Birth

SHANNON LEIGH SON, MD
FELLOW, MATERNAL-FETAL MEDICINE
UNIVERSITY OF UTAH HEALTH
Disclosure

- I have no conflicts to disclose
Objectives

At the end of this lectures, listeners can expect to be able to:

- Determine which patients are at increased risk of preterm birth
- Develop an effective strategy in evaluating patients with concern for preterm labor
- Manage patients with preterm labor
- Understand how preterm birth may be recurrent
- Conceptually understand management recommendations for future pregnancies
Why do we care?

- 9.63% of neonates are born preterm
  - 2.76% born at <34 weeks
  - 50% of these births were preceded by preterm labor

- Preterm labor is the leading cause for antenatal admission

- Incredible health care cost antepartum, intrapartum, and postnatally.
Why do we care?

- Preterm birth is the leading cause of neonatal mortality
  - 70% of neonatal deaths
  - 36% of infant deaths
  - 25-50% of long term neurologic impairment
Definitions

- Preterm labor (PTL)
  - Gestational age (GA) <37 weeks
  - Regular uterine contractions with change in cervical exam (dilation or effacement). -OR-
  - Regular contractions and an exam of at least 2cm dilation on presentation

- Preterm birth (PTB)
  - Delivery <37 weeks GA
Pathogenesis

- Stress (medical, social, maternal/fetal) → early hormonal activation
- Infection/inflammation—may account for 25-40%
  - Not just intrauterine infections!
  - The earlier the birth, the more likely it was related to infection
- Abruptio (decidual hemorrhage)
- Uterine anomalies or distension
- Cervical insufficiency
- Genetics
Historical risk factors

- Demographics
  - Race and Ethnicity, socioeconomic status, education, extremes of age, single marital status

- Obstetric history
  - History of preterm birth (and what happened since then?)
    - Recurrence risk: 15-50% depending on etiology and number of affected pregnancies
    - Short inter-pregnancy interval
Historical risk factors

- Maternal medical conditions
  - Low pre-pregnancy BMI, nutrient deficiencies, thyroid disease, asthma, hypertension, diabetes
  - Anxiety or stress, substance/tobacco use

- Pregnancy characteristics
  - Multifetal gestation
  - Placental issues
  - Uterine/cervix issues
Who is going to actually have a preterm birth?

- This is tough!
- <10% of women with a diagnosis of PTL deliver within 7 days.
- Let’s collect some more information
Start with a thorough history

- Medical history
- OB history
- GYN history
- Current pregnancy complications
- Current symptoms
Physical Exam

- Vital signs
- Sterile speculum exam
  - Components both visual and specimen collection
- Cervical exam
  - It isn’t just about the dilation
- Palpation of contractions, evaluate for tenderness
- Fetal heart rate tracing and tocometer
Ultrasound Utility

- Abdominal Ultrasound
  - Unknown or unclear GA
  - Unknown placental location
  - Fetal position
  - Evaluation of fluid

- Transvaginal ultrasound
  - Cervical length-utility diminishes with higher GA
Fetal fibronectin

- Fetal fibronectin-mixed opinions
  - Not useful as an isolated test
  - Most useful when only used with a cervical length 2-3cm
  - False positives possible if semen in vagina, recent SVE, or blood in vagina
Lab tests depend on the differential diagnosis:

- Urinalysis
- Wet prep
- Gonorrhea/chlamydia
- CBC
- +/- fFN
Management of PTL

- It depends on the gestational age!
- If viable (24 0/7*)
  - Monitoring
    - Admission for observation
  - Intervention
    - Corticosteroid administration (Betamethasone) (<36 6/7)
    - Magnesium sulfate (<32 0/7 GA)
    - Tocolysis (<34 0/7)
  - Consultation
    - Maternal-Fetal Medicine depending on the context
    - Neonatalology
Corticosteroid administration

- This is the #1 thing to improve neonatal outcomes in PTB
  - Respiratory distress syndrome RR 0.66; 95% CI 0.59-0.73
  - Intracranial hemorrhage RR 0.54; 95% CI 0.43-0.69
  - Necrotizing enterocolitis RR 0.46; 95% CI 0.29-0.74
  - Death RR 0.69; 95% CI 0.58-0.81
Corticosteroid administration

- Medication: Betamethasone 12mg IM q24 hours for 2 doses

- Standard criteria:
  - 23 0/7-34 0/7 with anticipated delivery within 7 days

- Updated recommendation based on ALPS trial:
  - 34 0/7-36 6/7 with anticipated delivery within 7 days and have NOT already received a steroid course
Corticosteroid administration

- Consider a rescue dose if:
  - ≥2 weeks since the last dose (some consider 1 week)
  - <34 weeks GA
  - At risk of delivery within the next 7 days

- Cochrane review in 2015 evaluated 10 trials, 5700 neonates
  - Additional dose(s) of corticosteroids resulted in:
    - Respiratory distress syndrome (RR 0.83 95%CI 0.75-0.91)
Magnesium Sulfate

- Exposure to magnesium sulfate has been shown to:
  - ↓ Risk of cerebral palsy (RR 0.71, 95% CI 0.55-0.91)

- Recommended for women with preterm labor at <32 weeks

- Contraindications:
  - Myasthenia gravis
  - Pulmonary edema
Magnesium Sulfate

Dosing:
- Typically a bolus followed by maintenance
  - Bolus: 4-6g IV
  - Maintenance: 2g/hr IV
- How long? When to stop? When to restart?
  - This is NOT well defined
    - Some hospitals give for 12 hours, others continue for 24 hours
    - Some hospitals restart at every hint at labor, others wait until delivery is imminent
Tocolysis

- May help to prolong pregnancy approximately 48 hours
  - Consider short term (48h) use if 24w-34w GA

- May help you get the patient transported, if needed, to a higher level of care
Tocolysis

- Contraindications (conditions that make prolonging pregnancy dangerous):
  - Fetal:
    - Demise, lethal anomalies, non-reassuring status
  - Maternal:
    - Pre-eclampsia with severe features, eclampsia, heavy vaginal bleeding with hemodynamic instability
    - Medication specific contraindications (see next slide)
  - Combined conditions:
    - Chorioamnionitis
    - PPROM*
# Tocolytic agents

<table>
<thead>
<tr>
<th>Nifedipine</th>
<th>Indocin</th>
<th>Terbutaline</th>
</tr>
</thead>
</table>

## Tocolytic agents

<table>
<thead>
<tr>
<th>Table 1. Common Tocolytic Agents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agent or Class</strong></td>
</tr>
<tr>
<td>Calcium channel blockers</td>
</tr>
<tr>
<td>Nonsteroidal anti-inflammatory drugs</td>
</tr>
<tr>
<td>Beta-adrenergic receptor agonists</td>
</tr>
<tr>
<td>Magnesium sulfate</td>
</tr>
</tbody>
</table>

- Rarely used
- Not used as a tocolytic!
Other potential treatments

- Bed rest
  - Has not been demonstrated to help and has been demonstrated to have maternal harm

- Adequate hydration
  - Probably doesn’t work but low harm
When do you discharge them?

(Assuming no further cervical change during the admission)

- After completion of betamethasone window (48 hours)?
- When they stop feeling contractions?
- When they achieve a particular gestational age?
- When they decide to move next door to the hospital?
- Never?
When do you discharge them?

- It is complicated!

- Through the betamethasone window is a good starting point

- Consider patient specific factors:
  - Gestational age
  - History
  - Concomitant medical conditions
  - Patient reliability
  - Proximity to the hospital
  - Closest hospital available to them—how early can they deliver?
What about next time?

- Ideally in a pre-conception (typically Maternal-Fetal Medicine) counseling visit discuss:
  - Patient experience with preterm birth
  - Pregnancy spacing-18-23months
  - Healthy habits

- What is the recurrence risk?
  - Remember, it depends on the etiology
  - Preterm labor after a trauma does not carry the same recurrence risk as a patient with an unprovoked preterm birth
She’s pregnant again-what now?

- Consultation with Maternal-Fetal Medicine early in pregnancy
  - Evaluation of appropriateness for serial cervical lengths, progesterone injections, cerclage

- Thresholds are institution dependent, particularly above 36 weeks GA

- Serial cervical lengths-Every 2 weeks from 16-24 weeks
  - Goal: early diagnosis of a shortening cervix that may benefit from cerclage

- 17-alpha-hydroxyprogesterone caproate-IM weekly from 16-36 weeks

- Healthy habits-weight, smoking
Recurrence Risk Estimates
What if the cervix shortens?

- If CL <25mm and patient is <24 weeks GA with a history of PTB, consider cerclage

- Cerclage in this population resulted in:
  - ↓Deliveries < 24 weeks GA (RR 0.44; 95% CI 0.21-0.92)
  - ↓Delivery <37 weeks (RR 0.75; 95% CI 0.60-0.93)
  - ↓Perinatal death (RR 0.54; 95% CI 0.29-0.99)
  - ↓Composite morbidity and mortality by 36% (16% vs 25%, RR 0.64; 95% CI 0.45-0.91)
Incidental short cervix without a history of preterm birth

- If CL ≤20mm and ≤24 weeks GA
  - Vaginal progesterone was associated with a 44% decrease in PTB <34w
  - Dosing: 200mcg vaginally daily
  - Some data to suggest pessary placement may ↓ PTB in this context
    - A larger study is ongoing to validate
ACOG Short Cervix Algorithm

Fig. 1. Algorithm for the management of short cervical length in the second trimester. ✍
Twins? Triplets?

- Very limited data

- Cerclage for short cervix may increase PTB
  - RR 2.2; 95% CI 1.2-4
Case 1

- 25 yo G2P0101 at 28 0/7 who presents to OBES for evaluation of intermittent contractions and spotting.

- What else do you want to know?

- What exam would you perform?

- What tests would you perform?

- What interventions would you offer?
Case 2

- 28yo G4P2103 at 33 3/7 who presents with spotting and on exam has a cervical exam of 2/thick/high, posterior but soft.

- What else do you want to know?

- What additional exam would you perform?

- What tests would you perform?

- What interventions would you offer?
Additional cases?
Questions?
References

Thank you!