Don’t get too Amp’ed up!
Changing the culture around infants born to mothers with chorioamnionitis

To participate in our Live Polling during this presentation:

• Search for this session’s title in the mobile app using the search bar or in the agenda (by day & time).
• Select the session to open the session page and click Live Polls.
• Answer the question(s) under Live Polls by selecting your desired answer(s).
• Select Finish to submit your answer(s).
Disclosures

We have NO financial relationships to disclose or Conflicts of Interest (COIs) to resolve

We will NOT be giving you the magic answer for how to manage infants born to mothers with chorioamnionitis

We will NOT be telling you the best way to screen infants for early-onset sepsis

Objectives

• Review common approaches to management of infants born to mothers with chorioamnionitis
• Develop individual goals to facilitate improvement in current clinical practice at home institution
• Identify potential barriers and solutions for implementing institutional change
Outline

Part 1
• Audience Participation: Management Style
• Review EOS Background and Common Management Approaches
• Small Group #1: Case Review and Discussion

Part 2
• Audience Participation: Experience with Institutional Change
• Two Experiences with Management Changes
• Small Group #2: Develop Goals and Identify Barriers

Part 1
Management Styles
Polling Instructions

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Poll #1

1 hour old, ex-39+3 week AGA male born by NSVD. Pregnancy uncomplicated. Prenatal labs reassuring including GBS negative. Delivery notable for maternal fever of 38.8 C and diagnosis of chorioamnionitis. Rupture of membranes 10 hours PTD. APGARs 8 and 9. Infant’s initial vital signs are within normal limits. The RN pages you to ask what orders you want. You:

(A) Obtain CBCd, blood culture, start empiric antibiotics, consider lumbar puncture
(B) Obtain CBCd, blood culture (but do not start antibiotics)
(C) Plug into the neonatal sepsis calculator
(D) Monitor with serial clinical exams
(E) Other
The technique that best describes your institution’s current management of infants at risk for early onset sepsis is:

(A) Follow the CDC/AAP guidelines
(B) Use labs to determine management
(C) Use the Neonatal Sepsis Calculator
(D) Monitor with serial clinical exams
(E) Hybrid
(F) There is no uniform practice (individual physician variation)
Neonatal Early Onset Sepsis (EOS)

• Onset of sepsis during first 72 hours of life

• Low-incidence, high-consequence disease
  EOS incidence 0.4-0.6 cases per 1000 live births for all term and late preterm infants
  But, in those infected → potential for significant morbidity and mortality

• ~5-10% of well appearing term and late preterm infants often started on antibiotics due to risk factors alone (including chorioamnionitis)

• Yet, even in these “higher-risk” infants, incidence of EOS is still low
Risk of Sepsis in Chorio-Exposed Infants

• Recent reports → 2,495 chorio-exposed term and late preterm infants
• Risk EOS → 4.0 per 1000
• Treating >250 infants for every one case of culture positive sepsis
• EOS cases → most symptomatic
• If well-appearing → risk even lower (higher NNT)

Consequences to Treatment

• Potential admission to Neonatal ICU
• Potential separation of mother-infant
  - Disruption of maternal bonding
  - Decreased breastfeeding
• Laboratory draws
• IV placements
• Exposure to IV antibiotics
  - Antimicrobial Resistance
  - Alteration of Gut Microbiome
  - Risk of developing asthma, allergic/autoimmune diseases
How Can We Identify Those Infected?

Wide Variation in Practice

- Recent survey of 81 nurseries in BORN network
- Chorioamnionitis most common factor used to identify risk for EOS and biggest driver of starting antibiotics

<table>
<thead>
<tr>
<th>Scenario</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC GBS prevention guidelines (2010)</td>
<td>36 (45.5)</td>
</tr>
<tr>
<td>AAE Committee of Fetus and Newborn Statement (2013, 2014)</td>
<td>12 (15.2)</td>
</tr>
<tr>
<td>Sepsis risk calculator®</td>
<td>11 (13.8)</td>
</tr>
<tr>
<td>Locally derived management protocol®</td>
<td>10 (12.7)</td>
</tr>
<tr>
<td>No site-specific protocol; management per provider discretion</td>
<td>10 (12.7)</td>
</tr>
<tr>
<td>Monitoring based on clinical exam</td>
<td>2 (2.5%)</td>
</tr>
</tbody>
</table>

Need for Updated Approach

**Anticipated Updated COFN Statement on EOS**

- Separate statements for 1) preterm 2) late preterm/term infants
- Include 3 options
  1) **Traditional approach:** AAP/CDC guidelines  
     (if risk present, treat)
  2) **Integrative approach to risk factors:** Kaiser Neonatal Sepsis Calculator  
     (if risk exceeds threshold, treat)
  3) **Serial clinical examinations:** identify infants with clinical signs of illness early  
     (if symptoms, treat)
- Each approach has challenges
- Selection of management requires assessment of available resources, capabilities and risk contexts for *each center*
Common Management Techniques

1) **CDC/AAP guidelines and Lab Testing**
2) Neonatal Sepsis Risk Calculator
3) Monitoring Based on Clinical Exam
4) Other

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**#1: 2010 CDC Guidelines**

- Risk Based
- Yes/No dichotomous classifications
- High weight given to chorioamnionitis
  - If Yes = Antibiotic Treatment

![Flowchart Diagram](Link to Flowchart)
#1: 2012 AAP Guidelines

Evaluation of asymptomatic infants ≥37 weeks with risk factors for sepsis

**Risk Factors**
- Chorioamnionitis

**Diagnostic Tests**
- Blood culture at birth
- WBC/Diff ± CRP at age 6–12 h

**Antibiotics**
- Broad-spectrum antibiotics

**Management**
- Blood culture positive
  - Continue antibiotics
  - Lumbar puncture
- Blood culture negative
  - Infant remains well
  - Lab data abnormal
  - Continue antibiotics if mother received antibiotics during labor and delivery
- Blood culture negative
  - Infant remains well
  - Lab data normal
  - Discontinue antibiotics and discharge by 48 hours


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#1: CDC/AAP Guidelines

How Well do Yes/No Risk Factors Perform at Finding Infected Infants?

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>% Infected Infants Identified</th>
<th>% Population with Risk Factor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrapartum Temp &gt; 100.4°F (i.e. chorio)</td>
<td>30%</td>
<td>4.7%</td>
</tr>
<tr>
<td>ROM ≥ 18 h</td>
<td>23%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Intrapartum Temp &gt; 100.4°F F and/or ROM ≥ 18 h and/or GBS prophylaxis-specific abx &lt;4h and/or Broad-spectrum antibiotics</td>
<td>47%</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

At best, pick up ~50% of infected infants but would need to screen/treat 16% of all infants

Slide and calculations courtesy of Adam Frymoyer, MD

#1: Labs (CBC)

- Difficult to ‘rule-in’ infection based on CBC
  - 25-35% of infants without infection will have an abnormal CBC
- Difficult to ‘rule-out’ infection based on CBC
  - 25-50% of infected infants will have a normal CBC

*Put another way... for every 1,000 ‘high’ risk infants tested*

- 261 abnormal CBCs
- 259 uninfected
- 2 infected

PPV <1%
#1: Labs (CRP)

- Only 5-10% of infants with abnormal CRP have proven infection
- ‘Rule-out’ infection?
  - >99% of infants with 2 normal CRPs at 12h and 36h do not have infection
  - But by this time, baby has essentially ruled-out based on clinical status alone

![Graph showing the relationship between maximum serum C-reactive protein level and positive predictive value.](Benitz WE, et al. Serial serum C-reactive protein levels in the diagnosis of neonatal infection. Pediatrics 1998;102:E41.)

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#1: CDC/AAP Guidelines and Lab Testing

**Pros**
- Simple and directive
- Few cases “missed”
- Supported by large organizations
- Comfortable
- Numbers! Feels objective
- Can use labs in conjunction with other methods

**Cons**
- Variation in OB diagnosis of chorio
- Minimal flexibility of guidelines
- Large NNT
- Low PPV of labs
- Risks of PIV, antibiotics, lab draws
- Maternal separation
- Costs of labs, treatment, hospitalization
Common Management Techniques

1) CDC/AAP guidelines and Lab Testing
2) **Neonatal Sepsis Risk Calculator**
3) Monitoring Based on Clinical Exam
4) Other

#2: Neonatal Sepsis Calculator

![Neonatal Sepsis Calculator](https://neonatalsepsiscalculator.kaiserpermanente.org/)

[http://kp.org/eoscalc](http://kp.org/eoscalc)

[https://neonatalsepsiscalculator.kaiserpermanente.org/](https://neonatalsepsiscalculator.kaiserpermanente.org/)
#2: Neonatal Sepsis Calculator

- Risk factors are continuous instead of yes/no
- What drives calculator risk score

1) Maternal Temp  58%
2) GA  17%
3) ROM  13%
4) Intrapartum Antibiotics  10%
5) GBS status  2%

https://neonatalsepsiscalculator.kaiserpermanente.org/
#2: Calculator: Maternal Fever


#2: Calculating a Newborn’s Sepsis Risk

**FIRST STEP- Review maternal risk factors**

**DON’T STOP THERE**

- Examine the infant
- Monitor vital signs during the hospitalization
- If we are worried – may obtain laboratory work or a blood cx
- May reexamine infant

**Constantly updating the infant’s risk of sepsis**

Courtesy of Dr. Michael Kusniewicz
#2: Calculator: Physical Exam Findings

<table>
<thead>
<tr>
<th>Clinical Presentation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical illness</td>
<td>1. Persistent need for NCPAP/HFNC/mechanical ventilation (outside of the delivery room)</td>
</tr>
<tr>
<td></td>
<td>2. Hemodynamic instability requiring vasoactive drugs</td>
</tr>
<tr>
<td></td>
<td>3. Neonatal encephalopathy/Perinatal depression</td>
</tr>
<tr>
<td></td>
<td>• Seizure</td>
</tr>
<tr>
<td></td>
<td>• Appar Score @ 5 minutes &lt; 5</td>
</tr>
<tr>
<td></td>
<td>4. Need for supplemental O₂ &gt; 2 hours to maintain oxygen saturations &gt; 90% (outside of the delivery room)</td>
</tr>
<tr>
<td>Equivocal presentation</td>
<td>1. Persistent physiologic abnormality &gt; 4 hrs</td>
</tr>
<tr>
<td></td>
<td>• Tachycardia (HR &gt; 160)</td>
</tr>
<tr>
<td></td>
<td>• Tachypnea (RR &gt; 60)</td>
</tr>
<tr>
<td></td>
<td>• Temperature instability (&gt; 100.4°F or &lt; 97.5°F)</td>
</tr>
<tr>
<td></td>
<td>• Respiratory distress (grunting, flaring, or retracting) not requiring supplemental O₂</td>
</tr>
<tr>
<td></td>
<td>2. Two or more physiologic abnormalities lasting for &gt; 2 hrs</td>
</tr>
<tr>
<td>Well appearing</td>
<td>• No persistent physiologic abnormalities</td>
</tr>
</tbody>
</table>


#2: Likelihood Ratios for Clinical Presentation

<table>
<thead>
<tr>
<th>Clinical Presentation</th>
<th>LR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Appearing</td>
<td>0.36</td>
<td>0.31 - 0.41</td>
</tr>
<tr>
<td>Equivocal</td>
<td>3.75</td>
<td>2.83 – 5.00</td>
</tr>
<tr>
<td>Clinical Illness</td>
<td>14.5</td>
<td>10.2 – 21.2</td>
</tr>
</tbody>
</table>


Courtesy of Dr. Michael Kusniewicz
#2: Calculator: When to Treat??

- Ideally, Treat when benefit > *risks and costs of delaying treatment*.
- No randomized trials of benefits of timely treatment
- Acceptable risk: e.g. VBAC
  - 1/100 Uterine rupture
  - 1/10 Uterine ruptures will result in neonatal death or neonatal injury
  - 1/1000 Neonatal death or neonatal injury

---

#2: Calculator: Treatment Thresholds

- **Risk ≥ 1/1000 Live Births - NNT 1000**
  - *Culture and Observe*
  - Remain in Hospital until culture incubated 24 hours, vitals q 4 hours for 24 hours

- **Risk ≥ 3/1000 Live Births - NNT 333**
  - *Empiric Antibiotics*
  - In well appearing infants, need EOS risk @ birth 7.5/1000
#2: EOS Risk at Birth (Before Physical Exam)

- What about babies who are initially well appearing? Is routine monitoring good enough?

- **EOS risk @ Birth**
  - Risk ≥ 1/1000 Live Births – NNT 1000
    - Enhanced observation – vitals q 4 hours for 24 hours
    - Decrease the risk of missing infants who develop symptoms who had high EOS risk @ birth

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**Antibiotics in the 1st 24 hours**
**2010- 2016**

![Graph showing antibiotics use over years with control limits and learning period](image)

- **Learning Period**
- **EOS Calculator**

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*Internal Kaiser Permanente data with permission from Dr. Allen Fischer*
KHNPC: Readmissions for Positive Blood or CSF Culture in 1st week of life

<table>
<thead>
<tr>
<th>Time Period</th>
<th>N</th>
<th>Cases</th>
<th>Rate per 1000 births (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC Guidelines (Jan 2010 – Nov 2012)</td>
<td>95,275</td>
<td>5</td>
<td>0.05 (0.006-0.1)</td>
</tr>
<tr>
<td>Learning Period (Dec 2012 - June 2014)</td>
<td>52,815</td>
<td>1</td>
<td>0.02 (0-0.06)</td>
</tr>
<tr>
<td>EOS Calculator (July 2014 – Dec 2015)</td>
<td>56,187</td>
<td>3*</td>
<td>0.05 (0-0.1)</td>
</tr>
</tbody>
</table>

* None had maternal risk factors or were symptomatic on their birth hospital admission

#2: Neonatal Sepsis Calculator

**Pros**
- More targeted
- Provides background risk with readily available variables
- Now includes clinical exam
- Decrease Blood Cx, abx use, and maternal-infant separation.
- Conservative risk thresholds (upper limits CI)
- Does not depend on OB diagnosis of chorio vs. "fever in labor"

**Cons**
- Requires technology and could interrupt workflow
- Questions arise with "equivocal" exam and softer exam findings
- Need to look at risk prediction and tolerance of risk
- Rare serious events may not be detected
- Extrapolating data from integrated health system
- Variability depending on “incidence” chosen
Common Management Techniques

1) CDC/AAP guidelines and Lab Testing
2) Neonatal Sepsis Risk Calculator
3) **Monitoring Based on Clinical Exam**
4) Other

#3: Monitoring Based on Clinical Exam

- All infants are potentially at risk for EOS, regardless of risk factors
- Development of symptoms determines management
- Most common symptoms: respiratory distress, tachypnea, poor perfusion
- Severe disease most often presents in first 6 hours of life
- 90% of symptomatic infants will present in first 24 hours
- Clinical exam biggest driver of neonatal sepsis calculator
#3: Clinical Monitoring Outcomes

- Recent approaches relying on clinical exam to identify EOS
- Infants symptomatic in most cases of EOS
- NNT in symptomatic infants: <50 infants for every one true infection

<table>
<thead>
<tr>
<th>Source</th>
<th>Era</th>
<th>Gestation, wk</th>
<th>Births, n</th>
<th>Symptomatic infants</th>
<th>Well-appearing infants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ottolini 2003</td>
<td>1996-1999</td>
<td>≧35</td>
<td>19,320</td>
<td>300</td>
<td>19,020</td>
</tr>
<tr>
<td>Cantoni 2013</td>
<td>2005-2006</td>
<td>≧35</td>
<td>7611</td>
<td>44</td>
<td>7567</td>
</tr>
<tr>
<td>Fidel-Rimon 2012</td>
<td>2005-2008</td>
<td>All</td>
<td>22,215</td>
<td>434</td>
<td>1661</td>
</tr>
<tr>
<td>Hashavya 2011</td>
<td>2005-2009</td>
<td>All</td>
<td>53,788</td>
<td>N.S.</td>
<td>N.S.</td>
</tr>
<tr>
<td>Berardi 2014</td>
<td>2009-2011</td>
<td>≧35</td>
<td>19,504</td>
<td>80</td>
<td>N.S.</td>
</tr>
</tbody>
</table>


#3: Clinical Monitoring Outcomes

- In those who remain well-appearing, extremely low risk of infection
- Only 1 case of culture positive sepsis
  - Preterm infant, chorioamnionitis

Clinical Exam now major driver of EOS risk in Sepsis Calculator

- Well-appearing: ↓ 59%
- Equivocal: ↑ 5 fold
- Clinical Illness: ↑ >20 fold

NO treatment recommendation given until clinical exam considered

#3: Monitoring Based on Clinical Exam (Back to the Calculator)

Clinical Exam now major driver of EOS risk in Sepsis Calculator

- Well-appearing: ↓ 59%
- Equivocal: ↑ 5 fold
- Clinical Illness: ↑ >20 fold

NO treatment recommendation given until clinical exam considered

#3: Monitoring Based on Clinical Exam

- Largest prospective implementation of calculator to date: 56,261 infants
- In infants who were initially well-appearing at birth → 6 cases of culture-positive EOS
  - 5 of 6 (83%) had a LOW calculator score at birth < 0.5 per 1000
  - EOS was identified in these ‘low risk’ infants because of a change in their clinical presentation
#3: Monitoring Based on Clinical Exam

**Pros:**
- Flexible; Allows for some provider variation/judgement
- Forces you to look at the baby
- Real-time decisions
- Reduces unnecessary antibiotics and lab testing
- Decreases maternal-infant separation
- No technology/calculations required
- Emphasizes that all babies are at risk regardless of risk factors

**Cons:**
- Too subjective; Too much provider discretion and variability in care
- No objective numbers to rely on
- Requires personnel for exams
- Requires you to “trust” those doing the exam
- Feasibility of doing multiple serial exams; May require increased staffing and resources ($)
- Does not account for overall risk based on maternal risk factors

Common Management Techniques

1) CDC/AAP guidelines and Lab Testing
2) Neonatal Sepsis Risk Calculator
3) Monitoring Based on Clinical Exam
4) Other
SMALL GROUPS #1

SMALL GROUPS #1 DISCUSSION

• What management styles do you choose?
• What did you like and dislike about different approaches?
Part 2

Institutional Change

Polling Instructions

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answer(s).
• Select Finish to submit your answer(s).
Poll #3

In the last 5 years, have you or your institution changed your management of well-appearing infants at risk for early onset sepsis?

(A) YES
(B) NO
Poll #4

Are you interested in changing your management of well-appearing infants at risk for early onset sepsis?

(A) YES
(B) NO
Experiences Changing Management

1) Community Perspective
   • Suzanne Mendez, MD, FAAP
   • St Charles Medical Center
   • Bend, Oregon

2) Academic Perspective
   • Arun Gupta, MD, FAAP
   • Lucile Packard Children’s Hospital Stanford
   • Palo Alto, California

A Community Experience with Change

• Hospital: St. Charles Medical Center in Bend
• Location: 4-hospital health care system in Central Oregon
• Nursery Levels: Family-birthing centers and Level III NICU (Bend)
• Deliveries per Year: 1600 in Bend; 600 in other 2 centers
• Bend Hospital Coverage:
  • Family-birthing center (FBC): Pediatric hospitalists
  • NICU and delivery coverage: 24/7 NNP or Neonatologist in-house
A Community Experience with Change

• Prior Management:
  Wide variation in practice for infants at risk or born to mothers with chorio:
  • Over 20 different providers
  • Most common approach: Send CBC and BCx, then make decision on antibiotics
  • Others: Clinical exam then if concerns, send CBC and BCx
  • Infants room-in with mothers even with PIV
  • Large reliance on CBC at predicting neonatal sepsis

A Community Experience with Change

• Prompt for Change:
  • Pediatric Hospitalist program formed over several years by community pediatric practices and St. Charles
  • June 2015:
    • First 2 Pediatric hospitalists started
    • Both physicians from outside the system and one also a neonatologist
    • Wide variation in practice noted; confusion/frustration in nursing staff and at handoffs
A Community Experience with Change

• **Process:**
  • Peds hospitalist/Neo drafted an Early-onset Neonatal sepsis Guideline proposal
  • Guideline presented to Peds hospitalist director, NICU director, and long-term community pediatrician/Neonatologist; edits made

• **Buy-in:**
  • Peds ID long-term community physician and NICU director in support of new guideline
  • Education sessions provided to community pediatricians and OB's by NICU director/Peds hospitalists.
  • Allowed use of CBC after 4-6 hours of life, if desired

A Community Experience with Change

• **New Guideline (as of February 2016)**
  • Based on use of the Neonatal Sepsis Calculator
  • Infants at risk remain in FBC (delivered in same room) unless clinically ill
  • Infants on IV antibiotics remain in mother's room unless clinically ill
  • FBC staff able to do enhanced vitals in mother's room (maintains BFH status)

• **Outcomes**
  • In process of tracking blood cultures, CBC, and use of Guideline
  • 23% decrease on antibiotic utilization in FBC and NICU
  • Less provider variation; less confusion among nursing staff and more consistent care between handoffs
A Community Experience with Change

**Opportunities:**
- Pediatric hospitalist group with smaller group of physicians rounding in Newborn nursery
- Able to standardize care based on available evidence
- Less variation in care = less confusion with nursing providers and more consistency with handing off to next physician
- Decrease unnecessary lab tests and antibiotics

<table>
<thead>
<tr>
<th>Barriers/Challenges</th>
<th>Lessons Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliance on CBC as decision point</td>
<td></td>
</tr>
<tr>
<td>Habit of drawing a CBC along with BCx</td>
<td></td>
</tr>
<tr>
<td>Consistency with multiple providers</td>
<td></td>
</tr>
<tr>
<td>Defining &quot;equivocal&quot; exam and avoiding variation</td>
<td></td>
</tr>
<tr>
<td>Tracking use of Guideline</td>
<td></td>
</tr>
<tr>
<td>Opportunity is provided when other changes occur</td>
<td></td>
</tr>
<tr>
<td>Physicians more open to change when education is provided</td>
<td></td>
</tr>
<tr>
<td>Educate/involve OBs and nursing staff in nursery and NICU</td>
<td></td>
</tr>
<tr>
<td>Guideline needs to be readily accessible to all providers (RNs and MDs)</td>
<td></td>
</tr>
</tbody>
</table>
An Academic Hospital Experience with Change

• **Hospital**: Lucile Packard Children’s Hospital Stanford
• **Location**: Palo Alto, CA
• **Nursery levels**: Level I Well Baby Nursery (WBN), Level II Intermediate Care Nursery (ICN), Level III/IV NICU
• **Deliveries per year**: ~4500 Deliveries per year
• **Hospital coverage**:
  - Neonatologists, Neonatal Fellows (24/7), Neonatal Hospitalists (24/7), NNPs (24/7), Residents, General Pediatricians, Private Pediatricians

An Academic Hospital Experience with Change

Prior Management:
• All infants born to mothers with chorioamnionitis admitted to a ICN or NICU
  - At least 1 CBC, 2 CRPs, Blood culture
  - IV placement, IV medications (minimum 2 days of antibiotics)
  - Separated from mother for 2 days
• Infants with other risk factors (NOT chorioamnionitis) admitted to WBN
  - Labs (at least 1 CBC and 2 CRPs)
  - If labs abnormal → admitted to the ICN or NICU and started on antibiotics, even if asymptomatic
An Academic Hospital Experience with Change

Prompt For Change:
• Low overall incidence of sepsis
• Consequences to overtreatment of well appearing infants
• Limited utility and predictive value of lab tests
• Poor predictive performance of maternal risk factors alone
• Increasing data and literature on use of clinical exam to drive management decisions

An Academic Hospital Experience with Change

• Involved multi-disciplinary team
• Studied and reviewed data and literature
• Proposal for new care approach developed
• Implementation
  - Education to nursing staff and physicians
  - Support and buy-in for new approach
  - Ensure adequate nursing staffing and physician coverage
• Study outcomes
An Academic Hospital Experience with Change

New Approach (Phase 1):

- **Well appearing** chorio-exposed infants (>35 wks EGA) allowed to:
  - Do skin to skin care with mother for first 2 hours
  - Then admitted to Level II ICN – but only for clinical monitoring
  - No labs, No IV, No antibiotics
  - If remained asymptomatic after 24 hrs, transferred to WBN

- All other **well appearing** infants (regardless of sepsis risk factors):
  - Admit to WBN and room in with mother
  - Routine sepsis screening labs discouraged
  - **All infants** get q4hr checks for first 24 hrs, then q8hr

**Outcomes**

**Chorio-Exposed Infants**

**Well-Appearing at Birth (n=277)**

- Antibiotics: 100% → 11.6%
- Labs: 100% → 17.3%
- NO cases of culture positive sepsis
- NO bad outcomes

Stanford Children’s - Ampicillin in GA ≥ 34 weeks

60% reduction in antibiotic exposure across all inborn infants >34 wks
An Academic Hospital Experience with Change

Retrospective Comparison to Neonatal Sepsis Calculator

- If calculator risk cutoff >1.54 at birth used (no exam):
  Additional 82 well-appearing infants would have received abx

- If add in exam & raise cutoff >3:
  Only 8 additional well-appearing infants would have received abx

- High concordance between calculator with exam and clinical monitoring alone

An Academic Hospital Experience with Change

New Approach (Phase 2):

- All chorio-exposed infants initially assessed in Del Room
- If well appearing, remain on L&D for 2 hrs for skin to skin care (with Level 2 ICN nurse)
- Infants (>35 wks) that remain well appearing admitted directly to WBN and allowed to room in with mother
- No IV, No antibiotics, No labs
- All get q4hr checks for first 24 hrs, then q8hr (along with all other infants)
- Finding symptomatic babies is a CATCH, not a miss!
An Academic Hospital Experience with Change

Barriers to Change:
• Fear of Change
• “These babies are at risk/sick!”
• Missing that one case of sepsis
• Set in our ways (“We’ve always done it this way!”)
• Others/Colleagues
• Not enough support for change
• Not enough resources

Lessons Learned:
• Get support
• Multi-disciplinary approach
• Education!
  • Educate yourself
  • Review literature
  • Educate others
  • Nurses, Physicians
• Take Baby Steps
  • Phase changes in slowly
• Study outcomes
• Continue to assess

SMALL GROUPS #2
SMALL GROUPS #2 DISCUSSION

• Do you want to go back to your institution and implement any changes?
• What do you want to change? What one improvement can you try to focus on?
• What steps can you start taking when you get home to implement this change?

Summary

• Approaches to the management of chorio-exposed infants is evolving
• No one management technique is perfect
• Choosing a management technique will be dependent on each institution’s resources and risk contexts
• Change can be difficult: Identifying barriers and potential solutions early can help
• Utilize recent research to support your goals
References


References


