Evidence-Based Neonatal Medicine (Session II): Finding the Evidence in Medical Literature

Presented by:
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UCI Science Library
04/30/2014
Learning Objectives:

- Introduce the neonatologists to the concept of Evidence-Based Practice (EBP) and to demonstrate simple methods to find and use the best evidence to answer their clinical questions.
- Become competent self-directed, lifelong learners with skills to effectively and efficiently keep up to date.
- Develop EBP skills to solve problems encountered in daily practice.
- Learn to identify problems/questions encountered in practice and seek solutions by rapidly answering clinical questions with best evidence.
- Take the skill you learn today and apply it to your medical education, clinical research and practice.
Session II: Agenda

- Understand the basics of EBM and the essential elements of the EBM approach.
  - Recognizing and formulating clinical questions;
  - Finding and accessing information (refining questions and searching the most suitable resource);
  - Interpreting information (appropriately evaluating information in a quick, reliable format); and
  - Applying information.

- Formulating focus clinical questions from a case scenario
  - Search the TRIP database for the evidence
    - (EBM summaries, PubMed, Systematic reviews, guidelines)
**A Case Scenario**

**Pt:** A 24 hr old male infant with bradycardia and oxygen desaturation.

**Hx:** The pregnancy was uncomplicated until 32 weeks’ gestation when his mother presented in preterm labor. He was born by vaginal delivery 2 days later. He did not need resuscitation and had Apgar scores of 6 at 1 min and 8 at 5 mins. His birth weight was 1600g. He was admitted to the NICU with cardiorespiratory monitoring.

**PE:** His temperature, heart rate, and breathing rate were normal and he had no signs of respiratory distress while breathing room air. Formula feeds were given every 2 hours via an orogastric tube.
A Case Scenario (Cont’d)

CC: The first episode of apnea occurred at 12 hrs of age, detected by the cardiorespiratory monitor and confirmed by nursing observation. The apnea was associated with cyanosis and bradycardia to a rate of 80/min, which were quickly reversed by cutaneous stimulation. Three more episodes have occurred over the next 12 hrs.

Between events, he has looked and behaved normally for a preterm infant. But ...
Your Questions About this Patient

- Before taking care of this patient, what are your questions and concerns?
- Where would you search to find answers for your questions?

Asking Focused Questions -- PICO

- The questions need to be both directly relevant to the patient’s problems and phrased in ways that direct your search to relevant and precise answers.
## Type of Clinical Question leads to Type of Study Design

<table>
<thead>
<tr>
<th>Question Type</th>
<th>Study Design likely to lead least biased answer</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy of a diagnostic test</td>
<td>Independent, blind comparison to a gold standard</td>
<td>Usually cross-sectional or cohort design</td>
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<tr>
<td>Therapy / Intervention</td>
<td>Randomized, blinded clinical trial</td>
<td>Systematic review of RCTs is ideal if of good quality</td>
</tr>
<tr>
<td>Harm / Etiology</td>
<td>RCT, concurrent cohort study, case-control study</td>
<td>Design will be determined by nature of exposure and frequency of outcome</td>
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<tr>
<td>Prognosis</td>
<td>Cohort study</td>
<td>May be prospective or historical</td>
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Levels of Evidence

Ref:
How would you conduct a PubMed search for a clinical question on diagnosis?

1. (Diagnosis/Narrow[filter]) AND ((preterm infant OR prematurity OR premature infant) AND apnea AND (monitor OR monitoring))
   Filters: English; Newborn: birth-1 month

OR

2. ((preterm infant OR prematurity OR premature infant) AND apnea AND (monitor OR monitoring) AND (sensitivity and specificity))
   Filters: English; Newborn: birth-1 month
How Do You Apply PICO?

- How should one monitor apnea in newborn infants?
- How should one treat the condition?
- Why this particular infant is having apnea?
- What is the likely outcome for this patient?
**Structuring Well-Built Clinical Questions**

**PICO**

<table>
<thead>
<tr>
<th>Patient or Problem</th>
<th>Intervention (a cause, prognostic factor, treatment, etc.)</th>
<th>Comparison Intervention (if necessary)</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tips or Building</td>
<td>Starting with your patient, ask &quot;How would I describe a group of patients similar to mine?&quot; Balance precision with brevity.</td>
<td>Ask &quot;Which main intervention am I considering?&quot; Be specific.</td>
<td>Ask &quot;What is the main alternative to compare with the intervention?&quot; Again, be specific.</td>
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<tr>
<td>Example</td>
<td><em>In preterm infants with recurrent apnea</em> does <em>treatment with caffeine</em> compared with <em>placebo</em></td>
<td><em>reduce apnea and the long-term effects on neurodevelopment and growth</em></td>
<td></td>
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Framing an Answerable PICO in Diagnosis

**How should one monitor apnea in newborn infants?**

*In newborn infants, how does continuously recorded electronic monitoring compare with nursing vital sign monitoring in the detection of apnea and bradycardia*

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<td><strong>Patient / Problem</strong></td>
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<td><strong>Intervention</strong></td>
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<tr>
<td><strong>Comparison</strong></td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
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Framing an Answerable PICO in Therapy

How should one treat apnea in preterm infants?

*In preterm infants with recurrent apnea, does treatment with caffeine compared with placebo reduce apnea and the long-term effects on neurodevelopment and growth?*

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<tr>
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<tr>
<td><strong>Patient / Problem</strong></td>
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<td><strong>Comparison</strong></td>
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<tr>
<td><strong>Outcome</strong></td>
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</table>
How would you conduct a PubMed search for a clinical question on Therapy?

(Therapy/narrow[filter]) AND (preterm infant OR prematurity OR premature infant) AND apnea AND Caffeine Filters: English; Newborn: birth-1 month
Framing an Answerable PICO in Etiology / Causation

Why this particular infant is having apnea?

In newborn infants, what are the risk factors for recurrent apnea/bradycardia?

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<tbody>
<tr>
<td><strong>Patient / Problem</strong></td>
</tr>
<tr>
<td>Newborn infants</td>
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<tr>
<td><strong>Intervention</strong></td>
</tr>
<tr>
<td>Recurrent apnea / bradycardia</td>
</tr>
<tr>
<td><strong>Comparison</strong></td>
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<tr>
<td></td>
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<tr>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>Increase likelihood of death</td>
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</table>
How would you conduct a PubMed search for a clinical question on Etiology?

(Etiology/narrow[filter]) AND (preterm infant OR prematurity OR premature infant) AND (apnea OR bradycardia) AND (risk OR risk factor) AND (mortality OR death) Filters: English; Newborn: birth-1 month
Framing an Answerable PICO in Prognosis

What is the likely outcome for this patient?

*Are Preterm infants with recurrent apnea at increased risk of sudden infant death syndrome (SIDS)?*

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<td><strong>Outcome</strong></td>
</tr>
</tbody>
</table>
(Prognosis/narrow[filter]) AND (preterm infant OR prematurity OR premature infant) AND (apnea OR bradycardia) AND (mortality OR death OR sudden infant death OR SID OR impact* OR risk factor*) Filters: English; Newborn: birth-1 month
The Trip Database

- A clinical search engine designed to quickly and easily find and use high-quality research evidence to support their practice and/or care.

- It allows clinicians to search across other content types including systematic reviews, guidelines, articles from peer-reviewed journals, patient information leaflets and medical images, videos, educational courses, and news.

- Trip is updated using a number of methods. The content from PubMed is typically added every two weeks while content added manually (mostly our secondary evidence) is added once per month (typically around the middle of the month).

- It is freely available at www.tripdatabase.com
Apnea of Prematurity Search in TRIP
3. Systematic review: In preterm infants with recurrent apnoea, methylxanthine reduces the number of episodes and the use of mechanical ventilation in the short term; caffeine is also associated with improved longer term outcomes.

Evidence-Based Medicine (Requires free registration) 2011

4. Caffeine for apnoea of prematurity: all products to be named and prescribed as caffeine citrate.

MHRA Drug Safety Update 2013

5. Does caffeine treatment for apnoea of prematurity improve neurodevelopmental outcome in later life?

BestBETS 2010

6. Progestogens for Prevention of Preterm Birth

AHRQ - Comparative Effectiveness Review 2012
1. Survival without disability to age 5 years after neonatal caffeine therapy for apnea of prematurity. 
JAMA 2012

2. CO(2) inhalation as a treatment for apnea of prematurity: a randomized double-blind controlled trial 
Evidence Updates 2012

3. Randomised crossover trial of four nasal respiratory support systems for apnoea of prematurity in very low birthweight infants 
Evidence Updates 2009

4. A Randomized Controlled Trial of Theophylline Versus CO(2) Inhalation for Treating Apnea of Prematurity 
Evidence Updates 2008

5. Randomized Trial of Prongs or Mask for Nasal Continuous Positive Airway Pressure in Preterm Infants
When deciding whether to incorporate a new treatment into practice

Several Clinical Questions Must Be Addressed:

1. What is the baseline risk for the condition for which a treatment is needed?
2. Is the effect of treatment real treatment real and not due to chance?
3. What is the direction and size of the treatment effect?
4. Is the treatment associated with adverse effects, and how frequently do they occur?
5. What are the economic and psychosocial consequence of treatment?
6. Do the proposed benefits outweigh the risks and costs?
7. Is the treatment applicable to my practice?
Assignment for the Next EBM Session

1. Conduct a search from the clinical question you submitted.
2. Write up the PICO (determine your search terms and the Boolean operators)
3. Conduct the search in the Trip database.
5. Copy and paste the best available evidence (reference) you find from your search results.
6. Read and evaluate the evidence (the study) you find. Complete the CAT worksheet.
7. When we meet next week, share your search experience and result you find in the study.
Evidence Based Medicine Worksheets

All EBM worksheets are available at the Dartmouth Biomedical Libraries at:

Worksheets for:

- Asking the Clinical Question and Example
- Appraising the Evidence (Critical Appraisal Worksheets): Therapy, Practice Guideline, Diagnostic Test Study, Prognosis Study, Harm/Etiology, and Qualitative Study.
- Applying the Evidence to the Patient:
- Putting it all together - Creating and Using CATs:
- CAT (Critically Appraised Topic)
Questions and Comments??

Feel free to contact your medical librarians anytime!

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Thank you!!