

Top 5 Journal Club Articles

42th Annual Pediatrics in the Red Rocks Conference

Article 1:

Rhinovirus in Febrile Infants and Risk of Bacterial Infection

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BACKGROUND: Febrile infants with viral respiratory infections have a reduced risk of bacterial infection compared with virus-negative infants. The risk of concomitant bacterial infection in febrile infants positive for human rhinovirus (HRV) by polymerase chain reaction (PCR) is unknown.

METHODS: Infants 1–90 days old managed using the care process model for well-appearing febrile infants and with respiratory viral testing by PCR (RVPCR) in the emergency department or inpatient setting of 22 hospitals in the Intermountain Healthcare system from 2007–2016 were identified. Relative risk (RR) of bacterial infection was calculated for infants with HRV, non-HRV viruses, or no virus detected.

RESULTS: Of 10 964 febrile infants identified, 4037 (37%) had RVPCR. Of these, 2212 (55%) were positive for a respiratory virus; 1392 (35%) for HRV alone. Bacterial infection was identified in 9.5%. Febrile infants with HRV detected were more likely to have bacterial infection than those with non-HRV viruses (7.8% vs 3.7%; $P < .001$; RR 2.12 [95% CI 1.43–3.15]). Risk of urinary tract infection was not significantly different for HRV-positive infants at any age, nor was risk of invasive bacterial infection (IBI; bacteremia and/or meningitis) meaningfully different for infants 1–28 day olds. Infants 29–90 days old with HRV had a decreased likelihood of IBI (RR 0.52 [95% CI 0.34–0.80]).

CONCLUSIONS: HRV is common in febrile infants. Detection did not alter risk of concomitant urinary tract infection at any age or risk of IBI in infants 1–28 days old. HRV detection may be relevant in considering risk of IBI for infants 29–90 days of age.

Article 2:

Negative Chest Radiography and Risk of Pneumonia

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BACKGROUND AND OBJECTIVES: The ability of the chest radiograph (CXR) to exclude the diagnosis of

pneumonia in children is unclear. We sought to determine the negative predictive value of CXR in children with suspected pneumonia.

METHODS: Children 3 months to 18 years of age undergoing CXRs for suspected pneumonia in a tertiary-care pediatric emergency department (ED) were prospectively enrolled. Children currently receiving antibiotics and those with underlying chronic medical conditions were excluded. The primary outcome was defined as a physician-ascribed diagnosis of pneumonia independent of radiographic findings. CXR results were classified as positive, equivocal, or negative according to radiologist interpretation. Children with negative CXRs and without a clinical diagnosis of pneumonia were managed for 2 weeks after the ED

visit. Children subsequently diagnosed with pneumonia during the follow-up period were considered to have had false-negative CXRs at the ED visit.

RESULTS: There were 683 children enrolled during the 2-year study period, with a median age of 3.1 years (interquartile range 1.4–5.9 years). There were 457 children (72.8%) with negative CXRs; 44 of these children (8.9%) were clinically diagnosed with pneumonia, and 42 (9.3%) were given antibiotics for other bacterial syndromes. Of the 411 children with negative CXRs who were managed without antibiotics, 5 were subsequently diagnosed with pneumonia within 2 weeks (negative predictive value of CXR 98.8%; 95% confidence interval 97.0%–99.6%).

CONCLUSIONS: A negative CXR excludes pneumonia in the majority of children. Children with negative CXRs and low clinical suspicion for pneumonia can be safely observed without antibiotic therapy.

Article 3:

Shortened IV Antibiotic Course for Uncomplicated, Late-Onset Group B Streptococcal Bacteremia

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BACKGROUND: Guidelines recommend a prolonged course (10 days) of intravenous (IV) antibiotic therapy for infants with uncomplicated, late-onset group B *Streptococcus* (GBS) bacteremia. Our objective was to determine the frequency with which shorter IV antibiotic courses are used and to compare rates of GBS disease recurrence between prolonged and shortened IV antibiotic courses.

METHODS: We performed a multicenter retrospective cohort study of infants aged 7 days to 4 months who were admitted to children's hospitals in the Pediatric Health Information System database from 2000 to 2015 with GBS bacteremia. The exposure was shortened IV antibiotic therapy, defined as discharge from the index GBS visit after a length of stay of ≤ 8 days without a peripherally inserted central catheter charge. The primary outcome was readmission for GBS bacteremia, meningitis, or osteomyelitis in the first year of life. Outcomes were analyzed by using propensity-adjusted, inverse probability-weighted regression models.

RESULTS: Of 775 infants who were diagnosed with uncomplicated, late-onset GBS bacteremia, 612 (79%) received a prolonged IV course of antibiotic therapy, and 163 (21%) received a shortened course. Rates of treatment with shortened IV courses varied by hospital (range: 0%–67%; SD: 20%). Three patients (1.8%) in the shortened IV duration group experienced GBS recurrence, compared with 14 patients (2.3%) in the prolonged IV duration group (adjusted absolute risk difference: -0.2% ; 95% confidence interval: -3.0% to 2.5%).

CONCLUSIONS: Shortened IV antibiotic courses are prescribed among infants with uncomplicated, late-onset GBS bacteremia, with low rates of disease recurrence and treatment failure.

Article 4:

Antibiotic Treatment of Nonsevere Pneumonia With Fast Breathing—Is the Pendulum Swinging?

Amanda J. Driscoll, PhD, MHS; Karen L. Kotloff, MD

Article 5:

Association of Diagnostic Criteria With Urinary Tract Infection Prevalence in Bronchiolitis A Systematic Review and Meta-analysis

Corrie E. McDaniel, DO; Shawn Ralston, MD; Brian Lucas, MD; Alan R. Schroeder, MD

IMPORTANCE :Concomitant urinary tract infection (UTI) is a frequent concern in febrile infants with bronchiolitis, with a prior meta-analysis suggesting a prevalence of 3.3%. However, the definition of UTI in these studies has generally not incorporated urinalysis (UA) results.

OBJECTIVE: To conduct a systematic review and meta-analysis examining the prevalence of UTI in infants with bronchiolitis when positive UA results are incorporated into the UTI definition.

DATA SOURCES: Medline (1946-2017) and Ovid EMBASE (1976-2017) through August 2017 and bibliographies of retrieved articles.

STUDY SELECTION: Studies reporting UTI prevalence in bronchiolitis.

DATA EXTRACTION: Data were extracted in accordance with meta-analysis of observational studies in epidemiology guidelines via independent abstraction by multiple investigators. Random-effects models generated a weighted pooled event rate with corresponding 95%confidence intervals.

MAIN OUTCOMES AND MEASURES: Prevalence of UTI.

RESULTS: We screened 477 unique articles by abstract, with full-text review of 30 studies. Eighteen bronchiolitis studies reported a UTI prevalence and 7 of these reported UA data for inclusion in the meta-analysis. The overall reported prevalence of UTI in bronchiolitis from these 18 studies was 3.1% (95%CI, 1.8%-4.6%). With the addition of positive UA results (defined as the presence of pyuria or nitrites) as a diagnostic criterion, the prevalence of UTI as reported in the 7 studies in bronchiolitis was 0.8%(95%CI, 0.3%-1.4%). Sensitivity analyses yielded similar results, including for infants younger than 90 days. Heterogeneous definitions of UTI and UA criteria introduced uncertainty into prevalence estimates.

CONCLUSIONS AND RELEVANCE: When a positive UA result is added as a diagnostic criterion, the estimated prevalence of concomitant UTI is less than recommended testing thresholds for bronchiolitis.