

What is the risk of serious bacterial illness in infants with RSV?

Levine et al. Risk of serious bacterial infection in young febrile infants with respiratory syncytial virus infections. Pediatrics 2004; 113:1728-1734.

Take Home Message: Febrile infants < 60 days of age with RSV are significantly less likely to have a serious bacterial infection than febrile infants without RSV; however, the rate of urinary tract infections is still substantial.

Highlights: Prior trials to determine if febrile infants with recognizable viral infections are at decreased risk of serious bacterial infection (SBI) compared to febrile infants without viral infections had been mostly retrospective and had not included many young infants. In this multicenter trial published in 2004, Levine et al. assessed prospectively the risk of SBIs in young febrile infants ≤ 60 days who tested positive for RSV compared with those who tested negative for RSV. They found that febrile infants with RSV were significantly less likely to have SBIs than those without RSV; however, the overall rate of SBI in infants with RSV remained appreciable, mostly due to UTIs. In the youngest infants <28 days, RSV did not alter the risk of SBI. This study provides some evidence that a more selective approach to screening febrile infants >28 days with clinical bronchiolitis or RSV positivity may be warranted.

The Nitty-Gritty:

Design:

- o Multicenter, prospective, cross-sectional study

- o N= 1248

- § RSV positive group (n=269)

- § RSV negative group (n=979)

- o Setting: 8 US university hospital emergency rooms

- o Enrollment: October through March 1998-2001

- o Outcome: risk of SBIs in RSV-positive infants as compared to RSV-negative infants

Population:

- o **Inclusion Criteria:** infants ≤ 60 days with a rectal temperature $\geq 38^{\circ}\text{C}$

- o **Exclusion Criteria:** Received antibiotics within 48 hours of ED presentation

- o **Baseline Characteristics** – comparisons are RSV positive vs. RSV negative, otherwise are from the RSV positive group without significant differences between groups

- § Age: 36.4 ± 14.2 days

- § Male: 51%

- § URI symptoms: 91% vs. 52% (absolute difference 29%, 95%CI 24.7%-33.9%)

- § Tmax, °C: 38.5 ± 0.46 vs. 38.7 ± 0.52 (absolute difference -0.12, 95% CI -0.19 to -0.06)

§ WBC x 1000/mm³: 12.3±4.2

§ Absolute Neutrophil Count x 1000/mm³: 4.7±3.1

§ Absolute Band Count x 1000/mm³: 0.78 ±1.2 vs. 1.1±1.2 (absolute difference -0.32, 95% CI -0.45 to -0.1)

§ UA Positive: 10.2% vs. 18.1% (absolute difference -7.9%, 95% CI -12.6% to -3.2%)

§ Bronchiolitis: 37.6% vs. 6.6% (absolute difference 31%, 95% CI 24.8%-37.2%)

· **Study Design:** Each enrolled infant had a nasopharyngeal aspirate for rapid RSV antigen detection via enzyme immunoassay or indirect fluorescent antibody sent. Infants had urine, blood, and cerebrospinal fluid analyzed as well. Stool cultures and chest radiographs were performed at the discretion of the examining physician.

· **Outcomes:**

o **Primary outcome: rate of SBIs in RSV-positive infants as compared to RSV-negative infants**

§ Overall rate of SBI in study population: 11.4%

§ 7% of RSV-positive infants with SBI vs. 12.5% of RSV-negative infants with SBI
- RR: 0.6, 95% CI: 0.3-0.9

- o **Subanalyses:**

- § **Rates of specific individual bacterial infections**

- **UTIs:**

- o Overall rate of UTI in entire study population: 9.1%
- o 5.4% of RSV-positive infants with UTI vs. 10.1% of RSV-negative infants – RR 0.5 (0.3-0.9)

- **Bacteremia:**

- o Overall rate of bacteremia in entire study population: 2.0%
- o 1.1% of RSV-positive infants with bacteremia vs. 2.3% of RSV-negative infants – RR 0.5 (0.1-1.6)

- **Meningitis:**

- o Overall rate of meningitis in entire study population: 0.7%
- o 0 RSV-positive infants with meningitis vs. 0.9% of RSV-negative infants with meningitis, RR 0

- § **Rates of SBI by age category**

- Infants ≤ 28 days of age:

- o 10.1% of RSV-positive infants ≤ 28 days of age had SBIs (6.1% with UTIs, 3.7% with bacteremia) vs. 14.2% of RSV-negative infants ≤ 28 days of age (RR:0.71; 95% CI: 0.35-1.5)

- Infants 29-60 days of age:

- o 5.5% of RSV-positive infants 29-60 days of age had SBIs (all were UTIs, no bacteremia or meningitis) vs. 11.7% of RSV-negative infants 29-60 days of age (RR: 0.47; 95% CI: 0.24-0.91)

§ Rates of SBI in patients with and without clinical bronchiolitis regardless of RSV status

- 7.1% rate of SBI in infants with clinical bronchiolitis vs. 12.5% in infants without bronchiolitis ($p=.07$)

- rate of UTIs in infants with clinical bronchiolitis: 6.5%