

Invasive Bacterial Infections in Afebrile Infants With Otitis Media: Worry Less but Still Worry

Joseph Ravera, MD,^a M.W. Stevens, MD, MSCE^b

In this issue of *Pediatrics*, McLaren et al¹ evaluated the risk of invasive bacterial infections (IBIs) among infants aged <90 days who have been diagnosed with acute otitis media (AOM). The identification of IBIs in febrile infants has been an area of extensive study in pediatrics for the better part of 50 years, with many risk stratification systems that rely on combinations of clinical and laboratory features.²⁻⁴ Similarly, the diagnosis of AOM has been an area of active research, with multiple care guidelines.^{5,6} The commonly used AOM guidelines do not include recommendations for children aged <6 months, and there is a dearth of data on which to base care recommendations for young infants with a clinical diagnosis of AOM without accompanying fever.⁷⁻¹¹

Most children diagnosed with AOM are treated as outpatients, and serious complications are uncommon.¹² However, neonates and young infants are at increased risk of developing disseminated infection. The best care practices for AOM in this age group are unclear. In their study, McLaren et al¹ help to fill this gap.

The authors conducted an international multicenter retrospective chart review of 1637 afebrile infants aged ≤90 days with an emergency department (ED) diagnosis of AOM seen in 29 pediatric EDs. Overall, a reassuring extremely low rate of

IBIs was identified. However, although the authors present a robust data set, several qualifications are needed if one attempts to translate the findings into clinical practice. The first qualification is inherent to the retrospective study design: the inability to verify the diagnosis of AOM. The authors acknowledge and address this by adding the chart review of physical examination findings to support the study findings, but they unfortunately include an examination description of erythema alone as confirmatory of the diagnosis. Red ear notoriously lacks specificity because erythema can result from a viral infection or crying. Also, there is tremendous interobserver variation.^{13,14} Furthermore, a proportion of patients might be noted as having erythema to support the clinician's bias toward finding AOM. Overdiagnosis can overestimate the positive outcomes found in this age group. Including specifics on how many times erythema only on physical examination was used to confirm the diagnosis of AOM could help indicate the potential extent of this bias. In the data set presented, it appears that erythema only may have occurred in up to 35% of the sample (assuming 30% with otorrhea and 35% with bulging tympanic membranes were exclusive groups), which could be a significant limitation of this study.

^aSection of Pediatric Emergency Medicine, Division of Emergency Medicine, Department of Surgery and
^bDepartment of Pediatrics, Robert Larner, MD, College of Medicine, The University of Vermont, Burlington, Vermont

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Address correspondence to Joseph Ravera, MD, Department of Surgery, Robert Larner, MD, College of Medicine, The University of Vermont, 111 Colchester Ave, Burlington, VT 05405. E-mail: joseph.ravera@uvmhealth.org

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This report will not resolve the significant challenge faced by clinicians in treating infants aged <28 days who have the highest risk of occult bacteremia and systemic spread of a focal bacterial infection. In studies of febrile infants, researchers have established this age group to be at the highest risk for systemic bacterial involvement and the most difficult to risk stratify on the basis of physical examination findings and initial laboratory results.¹⁵ In fact, the subjects aged <28 days in this study had nearly a 50% admission rate, underscoring the clinical uncertainty faced by pediatric emergency medicine providers. In addition, the study included relatively few subjects aged ≤28 days (6% of the sample; 100 of 1637), and the authors acknowledge insufficient data to generalize the overall findings to the youngest infants. Management of infants in this age group after finding a focal bacterial infection continues, for now, to be part of the art of clinical care.

Despite a paucity of young infants and limitations inherent to the design, this study does contribute to the literature with a robust retrospective data set of afebrile infants between 1 and 3 months of age with an ED diagnosis of AOM, with the findings of low rates of laboratory findings or identified outcomes consistent with IBI. It certainly provides a base of support for carefully designed prospective studies in which researchers aim to determine the best care for AOM in children aged <6 months.

ABBREVIATIONS

AOM: acute otitis media
ED: emergency department
IBI: invasive bacterial infection

REFERENCES

1. McLaren SH, Cruz AT, Yen K, et al. Invasive bacterial infections in afebrile infants diagnosed with acute otitis media. *Pediatrics*. 2020;147(1):e20201571
2. Aronson PL, Wang ME, Shapiro ED, et al.; Febrile Young Infant Research Collaborative. Risk stratification of febrile infants ≤60 days old without routine lumbar puncture. *Pediatrics*. 2018;142(6):e20181879
3. Kuppermann N, Dayan PS, Levine DA, et al.; Febrile Infant Working Group of the Pediatric Emergency Care Applied Research Network. A clinical prediction rule to identify febrile infants 60 days and younger at low risk for serious bacterial infections. *JAMA Pediatr*. 2019; 173(4):342–351
4. Gomez B, Mintegi S, Bressan S, Da Dalt L, Gervais A, Lacroix L; European Group for Validation of the Step-by-Step Approach. Validation of the “step-by-step” approach in the management of young febrile infants. *Pediatrics*. 2016; 138(2):e20154381
5. American Academy of Pediatrics Subcommittee on Management of Acute Otitis Media. Diagnosis and management of acute otitis media. *Pediatrics*. 2004;113(5):1451–1465
6. Lieberthal AS, Carroll AE, Chonmaitree T, et al. The diagnosis and management of acute otitis media [published correction appears in *Pediatrics*. 2014; 133(2):346]. *Pediatrics*. 2013;131(3). Available at: www.pediatrics.org/cgi/content/full/131/3/e964
7. Burton DM, Seid AB, Kearns DB, Pransky SM. Neonatal otitis media. An update. *Arch Otolaryngol Head Neck Surg*. 1993; 119(6):672–675
8. Nozicka CA, Hanly JG, Beste DJ, Conley SF, Hennes HM. Otitis media in infants aged 0-8 weeks: frequency of associated serious bacterial disease. *Pediatr Emerg Care*. 1999;15(4):252–254
9. Turner D, Leibovitz E, Aran A, et al. Acute otitis media in infants younger than two months of age: microbiology, clinical presentation and therapeutic approach. *Pediatr Infect Dis J*. 2002; 21(7):669–674
10. Sakran W, Makary H, Colodner R, et al. Acute otitis media in infants less than three months of age: clinical presentation, etiology and concomitant diseases. *Int J Pediatr Otorhinolaryngol*. 2006;70(4):613–617
11. Sommerfleck P, González Macchi ME, Pellegrini S, et al. Acute otitis media in infants younger than three months not vaccinated against *Streptococcus pneumoniae*. *Int J Pediatr Otorhinolaryngol*. 2013;77(6):976–980
12. Mattos JL, Colman KL, Casselbrant ML, Chi DH. Intratemporal and intracranial complications of acute otitis media in a pediatric population. *Int J Pediatr Otorhinolaryngol*. 2014;78(12): 2161–2164
13. Isaacson G. Acute otitis media and the crying child. *Pediatr Infect Dis J*. 2016; 35(12):e399–e400
14. Shaikh N, Hoberman A, Kaleida PH, et al. Otoloscopic signs of otitis media. *Pediatr Infect Dis J*. 2011;30(10):822–826
15. Biondi EA, Lee B, Ralston SL, et al. Prevalence of bacteremia and bacterial meningitis in febrile neonates and infants in the second month of life: a systematic review and meta-analysis. *JAMA Netw Open*. 2019;2(3):e190874

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