

## Meningitis – Always a Relevant Topic!

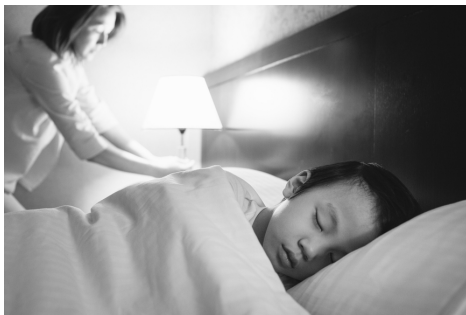
April 27, 2017

Dr. Rianna Leazer and colleagues report on a multi-center study that examined the epidemiology and time to detection of positive cerebrospinal fluid (CSF) culture for infants with bacterial meningitis.

Dr. Lydia Furman, MD, Assistant Editor, Pediatrics

**Content License:** FreeView

**Article type:** [Pediatrics Blog](#)



In a recently released issue of *Pediatrics* ([10.1542/peds.2016-3268](#)), Dr. Rianna Leazer and colleagues report on a multi-center study that examined the epidemiology and time to detection of positive cerebrospinal fluid (CSF) culture for infants with bacterial meningitis. I find that I am always drawn to studies on the topic of bacterial meningitis, perhaps because so much of my time both as a trainee and as an attending has been spent worrying about missing that one infant or child who presents with subtle signs

and symptoms, yet has evolving bacterial meningitis and must be treated urgently. The authors examined CSF cultures from infants <90 days old over a 13 year period (2000-2013) from 4 hospital systems, and report on 410 positive CSF cultures of which just 53 (12.9%) were true pathogens. The population inclusion and exclusion criteria, and study definitions (true pathogen, contaminant, etc.) are clear and well explained.

Several results shed light on interesting dilemmas that confront us during work rounds. Just 51% of infants with true positive CSF cultures, and hence bacterial meningitis as best as could be determined, had a positive blood culture with the same organism. The meaningful clinical implication is that one cannot assume that infants with negative blood cultures don't have bacterial meningitis. Thus the infant who is or was ill and did not have a lumbar puncture (either attempted or successfully completed) must be evaluated clinically and managed with this information in mind. Performing lumbar punctures (LPs) on small ill babies has never been easy, and trainees of yore may have had an advantage in that meningitis was much more prevalent, and many more LPs were needed and done prior to the advent of Haemophilus influenzae type B and Pneumococcal vaccination. Although some information on LP competence among trainees is discouraging with respect to success rates,<sup>1,2</sup> the use of simulation shows great promise, with significant increases in both self-perceived confidence and success rate for trainees.<sup>3</sup> Hopefully if more LPs are needed as a result of data shared in studies like this one, future trainees will be better prepared to perform them thanks to such simulation efforts. It is important that lack of LP experience does not become a deterrent to an expeditious diagnosis especially in the setting of a negative blood culture that does not eliminate bacterial meningitis as a possibility.

The other result I found very interesting and relevant for work rounds management planning was the difference in mean time to positivity between CSF cultures that were true pathogens and those judged to be contaminants. Fortunately, true pathogens appear to “pop positive” significantly earlier than contaminants. While there is no magic cut off, a CSF culture that became positive >36 hours from being drawn had a 22.2 times greater odds of being a contaminant ( $p<0.001$ ) than a true pathogen. This information has clinical importance for timing of discharge and cessation of antibiotic treatment. Certainly the data provided in this study cannot and should not be regarded as a hard and fast rule (16.2% of contaminants became positive at <36 hours) but it is reassuring information.

I have just scratched the surface of this excellent article, and have not even covered other topics of great interest to the clinician, including the unique predictors of a true positive CSF culture, and the organisms that were most frequently found as causes of bacterial meningitis in this sample. I hope you enjoy this article as much as I have and take home your own practical “nuggets” of information for work rounds.

#### References

1. Kessler D, Pusic M, Chang TP, Fein DM, Grossman D, Mehta R, et al. Impact of Just-in-Time and Just-in-Place Simulation on Intern Success With Infant Lumbar Puncture. *Pediatrics*. 2015;135:e1237-46. doi: 10.1542/peds.2014-1911.
2. Auerbach MA, White ML, Bhargava S, Zaveri P, Seelbach EB, Burns RA, et al. Are Graduating Pediatric Residents Prepared to Perform Infant Lumbar Punctures?: A Multi-Institutional Descriptive Study. *Pediatr Emerg Care*. 2016 Oct 6. [Epub ahead of print]
3. Augustine EM, Kahana M. Effect of procedure simulation workshops on resident procedural confidence and competence. *J Grad Med Educ*. 2012;4:479-85. doi: 10.4300/JGME-D-12-00019.1.

- [Tigecycline Therapy in an Infant for Ventriculoperitoneal Shunt Meningitis](#)
- [Facebook](#)
- [Instagram](#)

Copyright © 2017 American Academy of Pediatrics