COMMENTARY

The Illusion of Consensus: Febrile Neonates and Lumbar Puncture

Corrie McDaniel, DO

In the current issue of *Hospital Pediatrics*, Aronson et al[1] conducted a qualitative analysis of factors influencing decision-making on lumbar punctures (LPs) in febrile infants ≤8 weeks of age. In this study, they interviewed 15 physicians and 8 nurses, identifying 5 main factors that influence the decision about whether to perform an LP: age, physician experience, use of research findings, physician values, and the role of the primary care provider. The authors also explored the role of shared decision-making, identifying both facilitators and barriers to incorporating a family into the decision on whether to perform an LP.

Within their study sample, Aronson et al[1] report physicians stated that they uniformly perform LPs for all infants ≤4 weeks of age, identifying consensus as the driving and primary factor influencing the decision for performing the procedure. Consensus, defined as a general agreement of the majority opinion on a given topic,[2] within medicine has specific implications. Medical consensus is often a public statement of agreement by a group of experts on a particular aspect of medical practice and is considered a summation of available evidence and experience.[3]

LP is an invasive procedure with its own set of benefits and harms, and the evidence surrounding the clinical management of febrile infants has evolved significantly over the last 30 years. Perceptions of consensus around febrile infant management advanced with the publication of the Rochester criteria,[4,5] the Philadelphia criteria,[6] and the Boston criteria[7] in the 1990s. Fast forward several decades and authors of recent publications attempt to identify low-risk febrile infants <30 days of age who may not need LPs.[8–10] In Table 1, we describe criteria and statistical values for common scoring systems used to identify low-risk febrile infants. Beyond this, researchers in studies examining fever in neonates often adjust published scores to create local standards for low-risk infants, combining previous criteria with newer available tests (eg, procalcitonin or c-reactive protein), adding additional standards of critical values (eg, neutrophil count >10 000/mm^3) or broadening criteria to fit populations not described in the original publications.[11–13]

Yet despite perceptions of consensus, clinical practice variation in accepted standards of care within the febrile neonate population is well described, even in children <28 days old.[14–17] Pantell et al[15] reported that only 55% of febrile infants <31 days of life underwent an LP after being evaluated by their primary care physician. Greenhow et al[16] later described a similar finding in infants cared for in the emergency department, with almost 40% of febrile infants <28 days not undergoing an LP, which parallels the results found by Aronson et al[14].

So, although the indications to obtain an LP in neonates may feel like consensus within groups, regions, or specialties, true consensus within medicine is often a moving target. Individual physician experience, bias, and risk

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TABLE 1 A Sample of Published Criteria for Defining Low-Risk Febrile Infants

	Rochester	Philadelphia[a]	Boston[a]	Laboratory Score	Step-by-Step[b]
Age	≤60 d	29–56 d	28–89 d	7 d–36 mo	>21 d
Temperature, °C	≥38.0	≥38.2	≥38.0	≥38.0	≥38.0
History and physical examination	•Term •Otherwise healthy •Well-appearing •No skin, soft tissue, bone, joint, or ear infections	•Well-appearing •Unremarkable examination	•No immunizations within 48 h •No antibiotics within 48 h •Well-appearing •No focal infection	•Well-appearing •No focal infection	•Well-appearing •No focal infection
Laboratory values for low-risk criteria	•WBC count 5000–15 000/mm^3 •solute bands ≤1500/mm^3 •Urinalysis ≤10 WBC/HPF •Stool ≤5 WBC/HPF on smear	•WBC count ≤15 000/mm^3 •Urinalysis ≤10 WBC/HPF •CSF ≤8 WBC/mm^3 •CSF gram-stain negative •CXR negative •Stool ≤5 WBC/HPF on smear	•WBC count ≤20 000/mm^3 •Urinalysis ≤10 •WBC/HPF and negative result for LE •CSF ≤10 WBC/mm^3 •CSF gram-stain negative •CXR negative	•Procalcitonin (ng/mL): <0.5, 0 points ≥0.5, 2 points ≥2 4, points •CRP (mg/L): <40, 0 points 40–99, 2 points ≥100, 4 points •Urine dipstick: Negative, 0 points Positive LE or nitrite, 1 points	•Urinalysis without leukocyturia •Procalcitonin <0.5 ng/mL •CRP ≤20 mg/L •Absolute neutrophil count ≤10 000
Statistical values for low-risk infants, % (range)	Sensitivity: 92 (83–97) Specificity: 50 (47–53) PPV: 12 (10–16) NPV: 98.9 (97–100)	Sensitivity: 98 (92–100) Specificity: 42 (38–46) PPV: 14 (11–17) NPV: 99.7 (98–100)	Sensitivity: N/A Specificity: 94.6 PPV: N/A NPV: N/A	For high risk (≥3 pts): Sensitivity: 94 (74–99) Specificity: 78 (64–87) PPV: 61 (42–76) NPV: 97 (87–100)	Sensitivity: 92 (84–96) Specificity: 47 (45–49) PPV: 6.7 (5.4–8.3) NPV: 99.3 (98.5–99.7)
Cases of meningitis in low-risk population	0 in 437 patients	0 in 287 patients	0 in 476 patients	0 in 202 patients	0 in 586 patients

CRP, c-reactive protein; CSF, cerebral spinal fluid; CXR, chest radiograph; HPF, high-power field; LE, leukocyte esterase; N/A, not available; NPV, negative predictive value; PPV, positive predictive value; WBC, white blood cell.

[a] Requires CSF to determine low-risk infants.

[b] Explicitly recommends LP for all infants <21 d.

tolerance always filter our interpretation of the available evidence,[15,18] and perhaps more powerfully, the role of group normative behavior influences our acceptance of certain practice patterns as consensus. So whereas for 1 group, consensus may represent obtaining LPs on all children <30 days, for others, consensus may dictate LPs on all febrile infants <28, <56, or <60 days, or some may conclude that the literature does not currently converge on consensus as to which infants require LPs at all. Because the care for febrile infants spans many domains, from outpatient primary care to the emergency department to inpatient settings, the perception of consensus around LP in infants will likely vary as a result of both care domain as well as geographic location.

Ultimately, a perception of consensus influences the role of shared decision-making with families, as described by Aronson et al[14]. Providers were less likely to engage families in a discussion regarding obtaining an LP in infants <4 weeks of age because they perceived there was not a decision to be made. If providing high-value care to our patients is finding the balance between available evidence, assessment of the patient in front of us, and a family's values and goals of care, then understanding consensus with its implications may provide an opportunity to empower shared decision-making rather than limit it.

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