



## Ultrasound guidance for lumbar puncture

**Josh Torgovnick, MD:** I read the article by Soni et al.<sup>1</sup> line by line. Because of my association with a hospital at the epicenter of the AIDS epidemic, I have performed many thousands of lumbar punctures (LPs) for all of the usual reasons. Many patients were tapped repeatedly. I am right-handed and so the LP is performed with the patient in the left lateral decubitus position. This is essential to measure the opening pressure. I mark the back in the usual fashion using the line between the superior iliac crests to identify the L4-L5 interspace. I prefer the L2-L3 interspace for the procedure. Once identified, I begin the procedure. I use the same words with each patient and prep and drape the patient in the same fashion each time. I use local anesthesia. Once I again have the L2 spinous process identified, I keep my left thumb firmly pressed there for guidance and support and to distract the patient. The needle is advanced perpendicular to the skin and once it has passed the bone is at times angled cephalad. What I have described is a ritual. It is the ritual that makes the successful LP and this can be taught.

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**Nitin K. Sethi, MD:** I read with interest the article by Soni et al.<sup>1</sup> on the use of ultrasound guidance for LP. The authors advocate for routine use of ultrasound in all patients undergoing LP, although they highlight a recent randomized trial comparing routine use of ultrasound-guided vs landmark-based techniques that failed to demonstrate a benefit of using ultrasound localization for LP insertion.<sup>1,2</sup> Who uses a cannon to kill a fly? An excess of what is necessary or appropriate for a particular end is not standard of care. The use of ultrasound for LP is neither cost-effective nor logistically possible in low- and middle-income countries. Instead of wasting precious resources in future studies looking at the effect of ultrasound in clinical decision-making, emphasis should be on teaching LP clinical and procedural skills to residents in training. In the hands of an experienced operator, landmark-guided LP has a very high success rate. “See one, do one, teach one” is a long-established medical adage and it shall be our folly to forget it.

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**Authors Respond:** Nilam J. Soni, MD, MSc; David M. Tierney, MD; Daniel Schnobrich, MD; Gerard Salame, MD; Paul McHardy, MD: We appreciate the feedback on our article.<sup>1</sup> The recent randomized trial by Peterson et al.<sup>2</sup> did not find a difference between landmark-based vs ultrasound-guided LP, but some important limitations must be recognized. Most important, the operators were residents with “varying degrees of experience performing ultrasound examinations, from no documented experience to over 100 documented examinations.” Thus, the investigators did not control for a critically important variable: operator skill level. Second, convenience sampling likely introduced selection bias prior to randomization. Third, this study is likely underpowered based on a power calculation using the mean difference in insertion attempts (−0.44) reported in the meta-analysis of 14 randomized trials by Shaikh et al.<sup>3</sup> that

found ultrasound guidance reduced the number of needle insertions, needle redirections, and failed procedures.

No formal cost-effectiveness studies have been published, but we can speculate that a higher success rate of LP expedites patient care and reduce health care costs. Low- and middle-income countries are increasingly using point-of-care ultrasound because it is a relatively inexpensive, portable imaging modality that can be utilized by front-line clinicians, as summarized by Sippel et al.<sup>4</sup>

Ultrasound guidance for LP has shown the greatest benefit in patients with few palpable landmarks, most often due to obesity. Before attempting to use ultrasound in an obese patient, providers must have mastered the technique, and the only way to master a technique is to gain experience by practicing it routinely. We recommend that procedure educators continue to use ultrasound guidance to provide their trainees with the opportunity to learn a technique that requires practice to master. Rodriguez-Paz et al.<sup>5</sup> eloquently summarize how the training paradigm has shifted beyond “see one, do one, teach one” for patient safety.

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University of Texas Health Science Center, San Antonio; Abbott Northwestern Hospital; University of Minnesota, Minneapolis; University of Colorado/Denver Health Hospital; Sunnybrook Health Sciences Centre Toronto, Canada. **Disclosures:** N.J. Soni receives publishing royalties for *Point-of-Care Ultrasound*, 1st ed. (Elsevier-Saunders, 2014). D. Schnobrich, D.M. Tierney, G. Salame, and P. McHardy report no disclosures.

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