Abstract #:T-18

Accuracy of a Handheld Ultrasound Device and a Traditional Ultrasound for Neuraxial Depth and Landmark Assessment in Cohort Receiving Labor Epidurals

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Introduction: Ultrasound guidance for neuraxial blocks is gaining in popularity, however lack of clinician expertise and availability of equipment has limited widespread adoption.(1) We investigated a novel handheld ultrasound (HU) device with pattern recognition software that recognizes lumbar spine bony landmarks and calculates depth to epidural space. We compared the accuracy of HU measurements to Touhy needle depth (at loss of resistance during epidural insertion), and to traditional ultrasound (TU) measurements.

Methods: A prospective, IRB-approved study of women requesting labor epidural analgesia. The L2/3, L3/4, L4/5 interspaces and respective depths to epidural space were identified, marked and measured using HU (Accuro, Rivanna Medical) and TU (GE Logiq S8). The epiduralist, blinded to measured ultrasound depths, used the HU-identified L3/4 interspace insertion point without palpation for the first epidural placement attempt. We used Bland Altman analysis to compare the epidural depths measured by HU, TU and Touhy needle. We also recorded the number of Touhy needle passes, re-directs, the interspaces attempted.

Results: We analyzed data from 47 women; age 32.3 ± 5.6 yrs, BMI 28.8 ± 4.7; 32% had BMI ≥ 30 kg/m2. The mean difference between HU and Touhy needle depth was -0.61 cm; 95%CI -1.75 to 0.52 (Figure 1a). The mean difference between HU and TU depth was -0.29 cm; 95%CI -1.08 to 0.50 (Figure 1b). Using the HU-identified insertion point resulted in successful epidural placement at first attempt in 87% of patients, 78% of these required no re-directs, and the HU accurately identified L3/4 interspace in 94% of patients.

Conclusion: The HU accurately predicted Touhy needle depth to epidural space and provided similar accuracy comparable to TU. The HU-identified epidural insertion was associated with high first pass success and minimal needle redirections. This handheld ultrasound device appears to be a useful to guide epidural insertion in our non-obese laboring population, and future investigation is needed to examine its utility in an obese population.

Reference:

1.   Shaikh F. BMJ 2013;346:f172

Figure 1: Bland Altman plots. Figure 1a shows the differences between measurements for the handheld ultrasound (HU) and the clinical depth represented by the Touhy needle. Figure 1b shows the differences between measurements for HU and traditional ultrasound (TU). On both figures the x-axis represents the mean difference and the y-axis represents the difference between these measured depths.