Introduction

• Ultrasound guidance for neuraxial blocks is gaining in popularity.
• Lack of clinician expertise and availability of equipment has limited widespread adoption.
• 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 (ND) (at loss of resistance during epidural insertion), and to traditional ultrasound (TU) measurements.

Methods

• Prospective, IRB-approved study of women requesting labor epidural analgesia
• 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) (Figure 2)
• The proceduralist, blinded to measured ultrasound depths, used the HU-identified insertion point (without palpation) for the epidural placement attempt.
• Bland Altman analysis was used to compare the epidural depths measured by HU, TU and Touhy needle.
• Number of Touhy needle passes, re-directs, the interspaces attempted were recorded.

Results

• Data analyzed from 47 women; age 32.3 ± 5.6 yrs, BMI 28.8 ± 4.7; 32% had BMI ≥ 30 kg/m².
• Mean difference between HU and ND was -0.61 cm; 95%CI -1.75 to 0.52 (Figure 1a)
• Mean difference between HU and TU depth was -0.29 cm; 95%CI -1.08 to 0.50 (Figure 1b)
• First attempt successful epidural placement in 87% of patients
• 78% required no re-directs
• HU accurately identified L3/4 interspace in 94% of patients.

Discussion

• HU accurately predicted Touhy needle depth to epidural space and provided similar accuracy comparable to TU.
• 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
• Future investigation is needed to examine its utility in an obese population.

![Figure 2: Accuro Handheld ultrasound on left and GE Logiq S8 on Right](image-url)

<table>
<thead>
<tr>
<th>Level of Training</th>
<th>Number of Blocks Placed for Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA1</td>
<td>2</td>
</tr>
<tr>
<td>CA2</td>
<td>8</td>
</tr>
<tr>
<td>CA3</td>
<td>23</td>
</tr>
<tr>
<td>Fellow</td>
<td>10</td>
</tr>
<tr>
<td>Attending</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 1: # of blocks placed for study by different training levels

1) Shaikh F. BMJ 2013;346:f172