6-2012

The Use of Ultrasound to Measure the Depth of Thoracic Epidural Space

Issam Khayata  
University of Massachusetts Medical School

Gustavo Angaramo  
University of Massachusetts Medical School

Robert Lee  
University of Massachusetts Medical School

See next page for additional authors

Follow this and additional works at: http://escholarship.umassmed.edu/anesthesiology_pubs

Part of the Anesthesiology Commons

Repository Citation
Khayata, Issam; Angaramo, Gustavo; Lee, Robert; Negroiu, Costin Catalin; Zilber, Alexandr; and Amelin, Patricia M., "The Use of Ultrasound to Measure the Depth of Thoracic Epidural Space" (2012). Anesthesiology and Perioperative Medicine Publications. 121.  
http://escholarship.umassmed.edu/anesthesiology_pubs/121

This material is brought to you by eScholarship@UMMS. It has been accepted for inclusion in Anesthesiology and Perioperative Medicine Publications by an authorized administrator of eScholarship@UMMS. For more information, please contact Lisa.Palmer@umassmed.edu.
The Use of Ultrasound to Measure the Depth of Thoracic Epidural Space

Authors
Issam Khayata, Gustavo Angaramo, Robert Lee, Costin Catalin Negroiu, Alexandr Zilber, and Patricia M. Amelin

Comments

This poster is available at eScholarship@UMMS: http://escholarship.umassmed.edu/anesthesiology_pubs/121
The Use of Ultrasound to Measure the Depth of Thoracic Epidural Space
Issam Khayata, MD; Gustavo Angaramo, MD; Robert Lee, MD; Costin Negroiu, MD; Alexander Zilber, MD; Patty Amelin, NP
Department of Anesthesiology and Pain Management
University of Massachusetts Medical School, Worcester, MA

INTRODUCTION
The use of ultrasound to aid in regional blocks has increased in recent years as a result of improvement in ultrasound technology. There have been many studies to evaluate the use of ultrasound to measure the depth of the epidural space in the lumbar region1-9,10,11,12. Studies have shown a strong correlation between the depth of the lumbar epidural space measured by ultrasound and the distance of the needle from the skin after establishing the loss of resistance in the epidural space3,6,7. This study looked at the epidural space in the thoracic space to evaluate the possibility to visualize the thoracic spine anatomy and the possibility to measure the depth of the epidural space and it’s correlation with the actual depth by the loss of resistance technique. This study was also designed to assess the ability of the ultrasound to define the best needle insertion point and limit the number of needle skin puncture attempts.

METHODS
After approval of the IRB at the UMass Medical School and written consent was obtained, 29 patients were enrolled in the study. Exclusion criteria included pregnancy, prisoners, and patients with an absolute contra-indication to thoracic epidural. Ultrasound scan technique: We used a curvilinear 2-5 MHz probe. Both longitudinal para-medial and transverse scan were done before the placement of the epidural catheter. The transducer was stabilized at the the best image of intra-laminar space and a mark was placed at the midpoints of the transducer. The puncture point was determined by the intersection of those two lines. The depth of the epidural space was measured using the built-in calipers. The ultrasound depth of thoracic epidural was defined as the number of attempts were defined as the number of skin puncture points by a single provider or the number of providers attempting in the same insertion point. The use of ultrasound was able to identify the depth of the thoracic epidural space in 24/29 cases (83 %) of the cases. The catheter was considered at least partially functioning in 26/29 patients (20 functioning, 6 partially functioning (89.65 %)).

RESULTS
Mean ultrasound distance (UD) values were 4.22cm ± 0.82 and actual distance (AD) values were 5.59 cm ± 1.29 with Pearson’s correlation coefficient between AD and ultrasound longitudinal (USL) and ultrasound short axis (USS) values were 0.637 and 0.566 respectively. The mean number of attempts was 1.96 ± 1. The number of attempts were defined as the number of skin puncture points by a single provider or the number of providers attempting in the same insertion point. The ultrasound imaging can be used to measure the depth of the thoracic epidural space with good correlation.

CONCLUSION
Ultrasound scanning can be used to measure the depth of the thoracic epidural space with good correlation.

REFERENCES

<table>
<thead>
<tr>
<th>Spearmann’s rho</th>
<th>LOR</th>
<th>Age</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>US long depth correlation coefficient</td>
<td>.726</td>
<td>.015</td>
<td>.197</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>26</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>USD correlation</td>
<td>1.00</td>
<td>.079</td>
<td>.428</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>28</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>US short correlation</td>
<td>-1.00</td>
<td>.79</td>
<td>.428</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>28</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Age correlation</td>
<td>.079</td>
<td>1.00</td>
<td>-.313</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>28</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Height correlation</td>
<td>.428</td>
<td>-1.31</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>28</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>Weight correlation</td>
<td>.683</td>
<td>-1.000</td>
<td>.393</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>28</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>BMI correlation</td>
<td>.543</td>
<td>-.007</td>
<td>-.190</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>28</td>
<td>29</td>
<td>29</td>
</tr>
</tbody>
</table>