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The Use of Ultrasound to Measure the Depth of Thoracic Epidural Space
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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 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 correlation analysis and general linear model. Difference by gender groups were evaluated using Student’s t-test.

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 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 (UD) was also measured in the transverse view. The epidural catheter was placed using the standard technique at the UMass Memorial Medical Center. Assessment of the catheter function was based on the technique, response to test dose and pain control on post operative day number one. Statistical analysis included the distributional characteristics of the measures, Pearson’s correlation analysis and general linear model. Difference by gender groups were evaluated using Student’s t-test.

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 0.82 and 0.56 respectively. The number of mean attempts were 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 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 %)).

CONCLUSION

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

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