A Novel Way for Trainees to Estimate Epidural Depth in Morbidly Obese Parturients

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Introduction: Morbid obesity (MO) is associated with an increased epidural failure rate. In a previous study, we have shown ultrasound (US) can decrease the failed epidural placement rate in trainees and we also developed an equation (US-Epid-EQN) to calculate the distance from the skin to the epidural space in normal parturients. However, the use of US epidural placement in MO can be extremely difficult. In a study by Balki et al. on obese parturients (BMI at delivery was 30-79 kg/m²), they found the Pearson’s correlation coefficient was 0.85 between Ultrasound Depth (UD) and Needle Depth (ND). The purpose of this study is to determine if the US-Epid-EQN used in conjunction with US has a high correlation with actual epidural needle depth in MO parturients.

Methods: We included MO parturients (≥40 kg/m²) who requested labor epidural analgesia. First, the US-Epid-EQ was used to calculate the approximate distance from the skin to the epidural space, and then an experienced US trained anesthesiologist measured the distance in both the longitudinal and transverse views. All three US distances were made available to the trainee who inserted the epidural catheter under staff supervision. The actual epidural distance was recorded and the information was used to correlate the actual epidural distance to the US-Epid-EQ, the transverse US view and the longitudinal US view.

Results: 56 MO parturients were recruited. Mean maternal age was 28.6 ± 5.8 years, mean BMI was 43.5 ± 5.1 kg/m², mean gestation age was 38.6 ± 1.9 weeks, median gravidity was 1 (range 1-6), median parity was 0 (range 0-3), median cervical dilation at the time of epidural insertion was 3 cm (range 0-9), with a median VRS pain score of 7.5 (out of 10). There were no accidental dural punctures. Median epidural attempts were 2 (range 1-4) and no parturient required an additional intervertebral site for placement. Pearson’s correlations coefficients are provided in the Table.

Conclusion: US has been helpful for trainees to identify the midline and also determine the skin puncture site in MO parturients, in whom bony landmarks were not easily felt by deep palpation. It has shown promising Results with high success rate of epidural placement without any complication in MO parturients. With the use of the US-Epid-EQN, both the transverse and longitudinal view has a high clinical correlation with the actual epidural needle depth and can be used by trainees to assist in epidural catheter placement in MO parturients.