1326932 - ULTRASOUND GUIDED CAUDAL-THORACIC EPIDURAL CATHETERS IN INFANTS

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Introduction: Access to the thoracic epidural space via the caudal route in neonates and infants avoids potential injury associated with direct needle insertion at a site where depth from skin to dura can be less than 1 cm.¹ When performed without catheter visualization, depth of insertion may be determined by landmark-based techniques, but exact catheter positioning remains uncertain. Ultrasound is a relatively new method of verifying catheter-tip location.² We describe our experience with caudal-inserted thoracic epidurals (CTE) positioned under ultrasound guidance (USG).

Methods: Research ethics board approval was obtained for interrogation of our Acute Pain Service database to identify patients who received a CTE from 2006 (when USG regional anesthesia was introduced in our facility) to 2011. Patient charts were reviewed to identify demographic data, catheter positioning techniques and clinical course related to epidural analgesia.

Results: 242 CTE were performed in the 6-year period. 45 were under USG. Median patient age and weight for USG CTE was 6 weeks and 4.3 kg, respectively. On average, catheters were inserted to the T8-9 interspace, with depth of catheter placement from the caudal insertion site ranging from 13 to 16 cm. In addition to USG, incidental perioperative fluoroscopic X-ray (XR) occurred in 8 patients. In the absence of injectable contrast, catheters were visible in 4 of these patients. Appropriate depth of catheter placement on XR correlated with measured depth by landmark based technique in all patients. In 3 patients reviewed on XR, catheters placed with USG without prior measurement of depth by landmark resulted in higher catheter tip placement by a median of 2 interspaces from the desired position. Catheters remained in situ for a median of 2 days (range 0 - 4). 9 catheters (20%) were discontinued for inadequate analgesia. 7 (16%) were removed prematurely due to catheter soiling.

Discussion: Blind positioning of CTE may result in a 32% rate of inadequate catheter position.³ While the gold standard for catheter tip verification is XR, it is cumbersome, exposes patients and staff to ionizing radiation and may require injection of contrast into the epidural space. Ultrasound can guide needle placement in the caudal space and catheter advancement to a cephalad site. It is non-invasive, non-irradiating, easily taught, does not require avoidance of neuromuscular relaxation, and allows real-time visualization of fluid injection into the epidural space. Our 80% rate of successful analgesia with USG CTE is comparable to the 84.9% reported in CTE placed using nerve stimulation.⁴ However many catheters were abandoned for reasons unrelated to analgesia. This technique is limited by reduced visualization of spinal anatomy with increasing patient age, weight and bone ossification. In our experience, it is most effective in patients under 6 months of age. Landmark-based determination of depth of catheter insertion was more accurate than USG when confirmed on XR. However blind insertion alone cannot confirm catheter advancement in the correct direction, therefore landmark techniques should be used in addition to USG to determine depth of catheter placement.

References: 1. Anesthesiology 1988; 69(2): 265-269
            4. Anesthesiology 2004; 100: 683–9