Does This Look Normal To You? The Importance of Recognizing Ultrasonographic Neonatal Spine Variation for Caudal Epidural Placement: A Case Report

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Introduction

Ultrasound-guided regional interventions have revolutionized the practice of pediatric anesthesiology and pain medicine. These modalities have increased confidence in utilizing interventions to treat pain in this vulnerable population. This innovation makes for challenges unique to neonates. With advanced imaging, issues are encountered in recognizing anatomic features which are specific to normal development and growth. In this case report, a caudal epidural injection under real-time ultrasonography revealed unusual images of a prominent filum terminale enhanced by a lack of bone shadowing due to immature non-ossified vertebrae below the caudal epidural space. This is a normal finding seen in neonates with incomplete bone calcification. These results raised questions as to whether non-experienced ultrasound practitioners are prepared to interpret such findings. This case report underscores the importance of being prepared to encounter normal anatomic variants in neonates which may lead practitioners to abandon an otherwise beneficial procedure.

Methods

A 2.7 kg male former 26 week infant (corrected gestational age 41 weeks) was scheduled for an inguinal herniorrhaphy. The patient's medical history was significant for birth weight of 850g with APGAR scores of 5/7 followed by respiratory complications requiring prolonged mechanical ventilation. Given his hospital course and medical history, the intraoperative anesthetic plan was for a caudal epidural catheter infusion of 3% chlorprocaine with IV dexmedetomidine infusion. The caudal catheter was to be placed under real-time ultrasonography using a BK3500 machine (BK Medical, Peabody MA USA). Upon scanning the sacrum and coccyx, no cutaneous markers of dysraphism were encountered including hair tuft, or skin dimpling. Unconventional ultrasound findings (Fig 1) was encountered most noticeably in the transverse plane which was recognized by the pediatric regional team as a prominent filum terminale, a normal variant. The caudal epidural catheter was placed uneventfully and the case proceeded successfully; the patient was discharged home shortly thereafter.

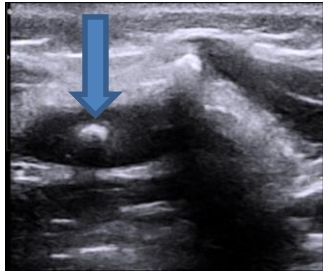

Figure 1. Ultrasound image depicting prominent filum terminale (Arrow) encountered during caudal epidural catheter placement.

Discussion

Neonates and premature patients benefit from general anesthesia-sparing techniques. With current practices trending towards the use of ultrasonography for regional procedures in this population, it is essential for interventionists to be aware of anatomic and physiologic variations that are unique to neonates. In order to improve safety and success of neuraxial techniques, pediatric anesthesiologists are more frequently utilizing point of care procedural ultrasonography in the operating room. For this reason, it behooves practitioners to familiarize themselves with these essential variations so as not to mistakenly diagnose an incidental pathologic finding and unnecessarily withhold treatment

Conclusion

It is essential for pediatric anesthesiologists and pediatric regional specialists to familiarize themselves with variants in neonatal spinal ultrasonography for pain procedures to ensure the safety and efficacy of the intended procedure.

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References

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