

INTRODUCTION

The use of regional anesthesia in pediatric patients has increased in the past decades, especially concerning indwelling epidural catheters. They not only offer adequate pain control, but they provide a path to decreasing administration of opioid analgesics, averting opioid-induced adverse effects, and enhancing multimodal pain control. As this usage increases, heightened familiarity and vigilance is required of providers, not only during placement, but throughout the course of the patient's hospitalization. We present a unique postoperative complication regarding an indwelling caudal epidural catheter, and its multidisciplinary management.

CASE PRESENTATION

Our patient is a 9-month-old male with no other past medical history who presented with right-sided hydronephrosis due to ureteropelvic junction obstruction. He was admitted and scheduled for pyeloplasty with stent placement under general anesthesia. For intra/postoperative pain control, a caudal catheter was placed in the epidural space under landmark approach, and threaded to approximately T10 level, with the catheter secured at 20cm at the skin. This was placed easily with a negative test dose, and bolus doses of 0.25% bupivacaine with 1:200,000 epinephrine were given intermittently throughout the operation. At the time of skin closure, an epidural infusion of 0.1% ropivacaine at 3mL/hour was begun. He tolerated the procedure well, was extubated without issue, and eventually transferred to the hospital floor after recovery in the PACU. He was seen by the Acute Pediatric Pain Management service (APPMS) postoperatively, who deemed his pain well controlled.

During the first postoperative night, the edge of the catheter occlusive dressing was noted to be soiled during diaper change. The nurse had cut the soiled bit of dressing away, and new dressing had been applied. This dressing change was unwitnessed by the APPMS. In the morning of postoperative day #1, the APPMs, per urologic protocol, stopped the epidural infusion to ensure adequate pain control with oral medication before epidural removal and patient discharge. Three hours later, satisfactory pain control without epidural analgesia confirmed, the APPMS returned to bedside to remove the catheter. Examination revealed the dressing was once again soiled and separated from the skin, and fecal material was noted beneath the dressing. While removing the remaining dressing, it was discovered that the catheter had been cut approximately four centimeters from the caudal insertion site, presumably during the initial dressing change by the nurse earlier that day. Approximately ten centimeters of catheter remained in the patient. The catheter was immediately removed, with a clean catheter tip noted.

DISCUSSION

Neuraxial catheter complications are not a new entity, and are a great source of morbidity and mortality. This case highlights not only the importance of vigilance in sterility, but also the management of potential complications associated with neuraxial anesthesia. Management of a disconnected neuraxial catheter has been discussed frequently in the literature. The American Society of Anesthesiologists practice advisory states that "the Task Force believes that, in order to avoid infectious complications, an unwitnessed accidentally disconnected catheter should be removed."¹ Also, it has been shown that with short, witnessed disconnection times with limited intra-catheter fluid movement, re-sterilization is possible.² However, the novel portion of this case concerns gross contamination coupled with unwitnessed and prolonged disconnection.

Caudal catheters have been shown to be used more in patients younger than three years of age. This preference is likely due to mechanical factors of epidural space depth, risk of dural puncture, and available catheter kits. They are also more likely to have dressing compromise compared with lumbar epidural catheters as they are less likely to be toilet-trained.³ These factors contributed to this situation: caudal catheter, placed out of standard of practice and expertise, in a patient most at risk of soiling the entry site and dressing.

Removal is paramount and without question, as bacteria has been shown to advance far beyond point of contamination.² Should further neurological monitoring or antibiotic prophylaxis be afforded this patient?



Figure 1. Tunneled caudal epidural catheter.⁴

OUTCOME

For concerns of fecal contamination of the catheter and potential progression of fecal bacteria to the epidural space, Infectious Disease was consulted. Other institutions' acute pain services were queried. A literature review was conducted for guidelines and practice standards regarding this situation. No definitive guidelines were found to aid in management of a contaminated catheter. On the recommendation of the Infectious Disease service, our patient remained inpatient three extra days for neurologic and infectious monitoring, and was given three doses of intravenous ceftriaxone 25mg/kg every 24 hours. He was then discharged home in stable condition, without neurologic changes or documented fevers. Four weeks later, the patient returned for stent removal, and was found to have had no signs or symptoms of infection or weakness.

LESSONS LEARNED

Several strategies have been proposed to decrease the incidence of dressing soiling with caudal catheters. Tunneling of catheters away from the insertion site has been suggested to decrease infection risk and increase longevity of the catheter (Figure 1). Avoidance of the caudal site in preference for lumbar does not eliminate the soiling risk, and also increases placement difficulty. Antimicrobial dressings and hyperabsorbent diapers have also been suggested, with nil to conflicting evidence, as well as increased cost.³ Fortunately, continuous neuraxial anesthesia has been shown to have a relatively low risk of complications, and the majority of those that do occur have no long-term sequelae. However, as in this case, they can increase care costs and length of stays.

Our approach to this novel situation was to utilize a multidisciplinary team, highlighted by Infectious Disease and outside institution consultation, to manage this patient's care. The lack of literature and standardization of a contaminated catheter, use of antibiotics, and maneuvers to decrease risk emphasizes the importance of further study and discussion in order to ensure safe utilization of neuraxial modalities, minimize complications, and ultimately create standardized guidelines for acute pain services.

REFERENCES

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