Postdural Puncture Meningitis

AUTHORS: CD Glover.  S Shetty. S Bidani

AFFILIATION: Texas Childrens Hospital Houston Tx

Introduction:

Caudal catheters are commonly used for postoperative analgesia because their efficacy, ease of placement, and their lack of associated complications. Deep infections of which meningitis is included have an incidence of 0-0.7% (1). We present a case of meningitis following removal of a caudal catheter placed in a child.

Case Presentation:

A 3 y/o 7 kg male with Cornelia De Lange Syndrome and failure to thrive presented for fundoplication and gastrostomy tube placement. Past medical history was significant for GERD and aspiration pneumonia treated with ranitidine. Physical exam revealed a thin, small for age child (<5% for weight) with global developmental delay. No focal neurologic deficits were noted and the child was ambulatory.

Inhalation induction with cricoid pressure facilitated placement of an IV and 4.0 ETT. After sterile prep and drape using betadine, an 18G Jelco™ was introduced through the sacral hiatus to facilitate catheter placement in this child. Clear CSF was noted upon removal of the needle. Depth of insertion was less than 5 cm.

The 18G catheter was removed and replaced at the same location with no CSF reported. A non-styletted catheter was then placed and threaded to 21 cm at the skin. No CSF or blood was aspirated via either catheter. Test dose was negative and the patient was loaded with 5 cc of 0.25% bupivacaine. The patient remained hemodynamically stable with surgical manipulation. Epidural infusion consisted of bupivicaine 0.125% and fentanyl 2mcg/cc at 1.5cc/hr. Extubation was routine.

On POD#1, the pain service was called to the bedside for complaints of pain. Examination revealed leakage of clear fluid around the catheter. The dressing was secured, and a bolus dose of local anesthetic resulted in good overall pain control. The catheter was removed on POD #2 and the patient was placed on oral acetominophen with hydrocodone. On POD #4, clear discharge was noted by the parents at the insertion site. Evaluation of the site noted no erythema or induration. A sterile Tegaderm™ dressing was reapplied. Overnight, the patient became febrile and workup revealed a WBC count of 36K. A lumbar tap isolated Enterococcus faecalis. The Infectious Disease Service was consulted, and the patient was started on antibiotics tailored to the organism. Workup also revealed a previously undiagnosed tethered cord via myelography. Antibiotic therapy was completed and the parents reported no change in overall function. The patient subsequently returned three months later for release of his tethered cord.

Discussion:

Central nervous system infections following neuraxial analgesia are uncommon. Risk factors cited in the literature include: diabetes mellitus, chronic renal failure, immune suppression, chronic alcohol abuse, and anorexia (8). The mechanisms by which infections occur include poor aseptic
technique and contaminated infusate. Single use chlorhexidine or povidone should be used, since multiple use vials harbor growth of bacteria (1). Bacterial colonization is another factor (4). Colonization of caudal catheters by Gram positive and Gram negative bacteria are reported at an incidence of 25% and 16% respectively (4). However, serious bacterial infections did not occur in this patient population when catheters were left in place for less than three days (4).

It seems multiple factors contributed to the development of meningitis in this patient. It must be noted that dural puncture occurred at a shallow depth (less than 5 cm). This along with catheter placement may have allowed a tract for the infection. The shallow depth in retrospect should have clued us to the possibility of aberrant anatomy.

Clear discharge was noted at the catheter insertion site, but lack of other exam findings made follow-up routine. No subjective concerns were ever voiced by the parents or child. Multiple inspections of the site failed to reveal any erythema or induration. In fact, fever was our first and only indicator that something was amiss.

Although some might recommend tunneling catheters to decrease the incidence of colonization, we do not believe that our case experience justifies that approach. Strafford reported no serious bacterial infections in a pediatric cohort of more than 1600 patients. The catheters were left in place for a mean of 2.4 days (with a range of 2 to 9) (2). Our preliminary data suggest this is the first instance of meningitis in 10 years at our institution. However, the incidence of caudal catheter contamination is higher than that of lumbar epidurals secondary to fecal contamination (6,7).

We believe that the best methods to avoid serious infections following neuraxial procedures are already in place. Good aseptic technique with mask and sterile gloves is a must. Sterile gowns is another consideration. If entry into the caudal space results in a wet tap, anatomic abnormalities should be considered and an alternative analgesic plan should probably be considered. Placement of the epidural catheter closer to the surgical site would be an option if epidural analgesia is strongly preferred or indicated.

We feel very strongly that a complete evaluation of the patient’s overall condition as well as an examination of the epidural site should be performed every day by those managing neuraxial analgesia in the pediatric patient. Our care protocols and vigilance helped us recognize and treat the meningitis with expedience and contributed to our patient’s positive outcome.

References

5. Baer ET. Post-Dural puncture bacterial meningitis. Anesthesiology 2006;105:381-393