

Continuous caudal epidural analgesia in a patient with an implanted intrathecal baclofen pump

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Introduction: The use of epidural analgesia in patients with implanted intrathecal delivery devices is somewhat controversial. Major concerns include the risk of damaging the intrathecal catheter, the risk of infection, and the potential for interaction between the epidurally-administered and the intrathecally-delivered medication. In children with cerebral palsy, intrathecal administration of baclofen permits significantly higher CSF concentrations of the drug than with oral administration, allowing for greater reduction in spastic tone and lower incidence of side effects (1). Epidural analgesia is an attractive option for postoperative analgesia in these patients, who frequently have co-existing medical issues making the use of intravenous opioids for pain less desirable (2). In addition, cognitive impairment, visual or hearing loss, and communication or behavioural disturbances can make pain measurement difficult. This report describes the successful use of continuous caudal epidural analgesia in a patient with an implanted intrathecal baclofen pump.

Case report: An 8 year-old, 29kg male patient presented to this institution for multi-level pelvic and femoral osteotomies, tenotomies, soft tissue releases, and Botox injections for a paralytic subluxation of the right hip. His past medical history was significant for premature birth at 24 weeks gestation, severe developmental delay, cortical blindness, and spastic quadriplegia with choreoathetosis. After a period of enteral baclofen therapy, an intrathecal baclofen pump was implanted when the patient was 7 years of age. The tip of the catheter was at the T4-5 level. The patient was non-verbal and wheelchair-bound. He had a history of dysphagia, mild gastroesophageal reflux and had no intake *per os*.

Epidural analgesia was considered to be desirable for this patient by both the anesthesia and surgical teams, due to the complexity of the procedure, the patient's co-existing medical conditions, and the potential difficulty in postoperative pain assessment. Upon examination of the patient the surgical scar from the intrathecal pump placement was at the level of L2-4. Because of reluctance to attempt epidural placement near the site of the existing intrathecal catheter it was decided to proceed with a continuous caudal technique. Programming of the intrathecal pump was not changed in the perioperative period.

After induction of general anesthesia and endotracheal intubation, the patient was positioned in the left lateral decubitus position. The lumbosacral area was prepared with chlorhexidine and draped in a sterile fashion. The skin overlying the sacral hiatus was pierced with an 18g needle and an 18g Jelco cathlon was introduced into the caudal space by loss of resistance. Styletted epidural catheters are not available in our institution, therefore, a 20g Braun epidural catheter was threaded through the cathlon to a predetermined distance of 12cm. Aspiration of the catheter was negative for CSF and blood, and a 3mL test dose of Bupivacaine 0.25% and epinephrine 5mcg/mL did not result in tachycardia or ECG changes. An epidurogram was performed with Omnipaque 180, 0.5mL, revealing distribution of the contrast agent in the epidural space at the level of L3-4 (Figure 1). The catheter was fixed with Mastisol, steri-strips, and a clear dressing, and a plastic barrier drape was placed to isolate the catheter insertion site from the buttock area.

An initial bolus dose of 7mL of Bupivacaine 0.25% and epinephrine 5mcg/mL was given, followed by an infusion of Bupivacaine 0.125% with epinephrine 2.5mcg/mL and Fentanyl 2.5mcg/mL at a variable rate of 7 to 9 mL/hr. Surgical time was approximately 6 hours. Upon completion of the procedure the patient was placed in a spica cast. The patient was transferred to the recovery room and extubated shortly after arrival. He continued on an epidural infusion of Bupivacaine 0.07% with Fentanyl 2.5mcg/mL at 7mL/hr and appeared comfortable.

The Fentanyl was removed from the epidural solution on postoperative day 1 because the patient appeared comfortable but was noted to hypoventilate at 6 breaths per minute although able to maintain an SpO₂ of 98% in room air. Thereafter the respiratory rate was noted to increase to 12 breaths per minute. The patient continued to appear comfortable, with no apparent nausea, vomiting, sedation, motor block, muscle spasms, or local or systemic signs of infection. He was able to tolerate physical manipulation and mobilization, and able to tolerate gavage feeds. On postoperative day 4 the patient was converted to analgesia given by his gastrostomy tube and the epidural catheter was removed. There were no signs of local infection noted at the catheter site. The remainder of his course was unremarkable and he was discharged home on postoperative day 8.

Discussion: Patients with cerebral palsy and spasticity significant enough to eventually require intrathecal Baclofen are also more likely to present for extensive orthopedic surgery. They also frequently have multiple comorbidities, particularly respiratory and gastrointestinal, and communication difficulties can make pain assessment challenging. Large doses of opioids or the need for benzodiazepines to control muscle spasm may cause significant side effects, including respiratory depression, nausea, vomiting, and increased risk of aspiration in patients with dysphagia and gastroesophageal reflux. Such patients could benefit greatly from regional anesthesia. However, damage to an intrathecal catheter or infection involving the apparatus could be catastrophic. This combination of factors creates a dilemma in how best to manage perioperative pain in this population.

There are no case reports in the literature describing the use of caudal epidural analgesia for patients with an implanted intrathecal Baclofen pump. The use of thoracolumbar epidural analgesia in a somewhat older patient in similar circumstances but less impaired has been recently reported (3). The epidural catheter was inserted above the previous surgical scar and two vertebral interspaces above the known site of catheter entry into the intrathecal space. Lumbar epidural analgesia for labor has also been described in a patient with an intrathecal pump for administration of Morphine to treat intractable epigastric pain secondary to hereditary pancreatitis (4). The epidural catheter was placed below the level of the previous surgical scar, but no comment was made on whether the entry site of the catheter into the intrathecal space had been verified from pre-pregnancy radiographs. The technique was successful, albeit difficult, as a midline approach failed, and the first paramedian approach resulted in a dural puncture. The only other epidural techniques reported in patients with intrathecal catheters include three case reports of epidural blood patches performed to treat postdural puncture headaches in patients at time intervals up to 5 weeks after placement of the intrathecal catheter (5,6,7). Two approaches were lumbar, both performed one interspace below the level of the intrathecal catheter. One was performed with the aid of fluoroscopy. The third report used a caudal approach.

The advantages of caudal versus direct thoracolumbar epidural catheter placement include technical simplicity, placement of the insertion site remote from the intrathecal catheter insertion site, and likely lower risk of accidental dural puncture with possible effects on the intrathecal or epidurally-administered drug. Disadvantages include the feasibility of threading a caudal catheter cephalad to the desired level in patients of increasing age, and greater potential for contamination of the caudal catheter insertion site due to its proximity to the buttock area.

This case report described the successful placement of a mid-lumbar epidural catheter by the caudal route in a 29kg, 8 year-old patient, providing excellent quality of analgesia with few side effects. There was no clinically apparent effect of the intrathecal infusion on the epidural local anesthetic dose or volume requirements or vice-versa. However, prudence is warranted with epidural narcotics and as in this case, local anesthetic-only solutions may be sufficient. With strict aseptic technique, efforts to isolate the caudal catheter from contamination and close postoperative follow-up, infectious complications seem avoidable.

In conclusion, it appears that continuous caudal epidural analgesia can be successfully and safely performed in patients with an indwelling intrathecal catheter and subcutaneous pump. Preoperative radiographs should be reviewed to confirm the vertebral level of the intrathecal catheter prior to attempts at epidural catheter placement. The caudal route to epidural placement may offer advantages in simplicity of technique and less potential risk of complications during catheter placement, provided all measures are taken to minimize the risk of contamination of the catheter. Whether the technique can succeed in patients older than presented here remains to be evaluated.

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