Introduction

Paravertebral nerve blocks (PVNBs) are becoming a routine part of perioperative pain management for pediatric patients. PVNBs may be used in situations where epidurals are contraindicated. We describe combined ultrasound- and fluoroscopically-guided placement of bilateral PVNB catheters in a medically challenging patient undergoing tracheopy by sternotomy and bilateral thoracotomies.

Figure 1. Sonoanatomy of the paravertebral space (target injection indicated by red “X”)

Case Presentation

The patient is a 14-year-old female with a PMH notable for perinatal hypoxic encephalopathy, secondary dystonic and choreoathetoid cerebral palsy (managed with an implanted deep brain stimulator), pectus excavatum and severe scoliosis. A posterior spinal fusion led to respiratory arrest due to tracheal compression for which she returned to the OR urgently for placement of a high-thoracic Nuss bar. Her surgical history contraindicated epidural placement for postoperative analgesia. Again, shortly following extubation, she developed respiratory failure likely due to inadequate pain control (despite receiving diazepam, acetaminophen, ketorolac and opiates, as well as dexmedetomidine and ketamine infusions) that complicated a suboptimal tracheopy.

The patient was re-intubated and scheduled for re-do tracheopy. To facilitate extubation at the end of the case, we opted to place bilateral PVNB catheters preoperatively using ultrasound and fluoroscopic guidance in the prone position. A transverse in-plane ultrasound approach was attempted, but imaging was limited due to shadowing from her instrumentation (Figure 1). Using a catheter-over-the-needle system, we accessed what appeared to be the right paravertebral space. Initial injection of saline was reassuring with downward displacement of the pleura and the catheter was deployed. Unfortunately, fluoroscopy revealed only intercostal contrast spread. As we used a catheter-over-the-needle system, we were able to remove the catheter, reinsert the needle and reposition it more medially. Repeat fluoroscopy confirmed paravertebral spread (Figure 2). Her left side was then similarly blocked. While she was not extubated postoperatively secondary to unforeseen surgical concerns, she required only minimal IV sedation and analgesia in the ICU and when asked if she was in pain, she was able to shake her head, “No.”

Discussion

This case explores the use of multiple imaging modalities to facilitate placement of an anatomically challenging PVNB for postoperative pain management. Adequate non-sedating pain control is imperative for pediatric patients with a tenuous respiratory status to prevent respiratory failure. The use of PVNBs may be an invaluable technique in these cases. The adoption of USG PVNB has increased the potential for these blocks to be placed where safety and technical difficulty were once significant concerns.

Figure 2. Fluoroscopic image showing contrast spread in the paravertebral space (red arrow)

Conclusion

Perioperative pain management in children can be difficult, resulting in undertreated pain and potential complications. Paravertebral nerve blocks (PVNB) can provide excellent analgesia for extensive surgeries when epidural analgesia is contraindicated. The use of imaging techniques, including USG and fluoroscopy, may help to facilitate placement of these blocks in patients with challenging anatomy.

REFERENCES

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