Pediatric Anesthesia and Critical Care Journal 2014; 2(1):40-43
doi:10.14587/paccj.2014.10

PACCJ

Providing effective perioperative analgesia with a unilateral Transversus Abdominis Plane (TAP) block in a patient with suspected opioid allergies

A. Joselyn[1], J. K. Goeller[1], T. Bhalla[1], G. Cambier[1], C. McKee[1], D. P. Martin[1], L. Governale[3], J. D. Tobias[1,2]

[1]Department of Anesthesiology & Pain Medicine, Nationwide Children's Hospital and the Ohio State University, Columbus, Ohio, USA

[2]Departments of Anesthesiology, The Ohio State University, Columbus, Ohio, USA

[3]Department of Neurosurgery, Nationwide Children's Hospital, Ohio, USA

Corresponding author: [1]T. Bhalla, Department of Anesthesiology & Pain Medicine, Nationwide Children's Hospital and the Ohio State University, Columbus, Ohio. Email: Tarun.Bhalla@Nationwidechildrens.org

Key points

TAP block may provide more effective analgesia, prolong the time to the first request for opioids and lower visual analog scores (VAS) in comparison to local infiltration by the surgeon. This is more significant for patients who have absolute/relative contraindications for perioperative opioid use.

Abstract

Regional analgesia is an excellent alternative for patients who may have contraindications to intravenous narcotics for perioperative analgesia. The transversus (TAP) block is a peripheral nerve block which can provide sustained abdominal wall analgesia for lower and middle abdominal surgery and offers an alternative to parenteral opioids in these situations. We report a patient with spastic quadriplegia who presented for a baclofen pump revision surgery and had a history of suspected intravenous narcotic allergies. A TAP block was used to provide postoperative analgesia. Its application in such clinical scenarios is discussed.

Keywords: nerve block; narcotics; anesthesia, regional.

Introduction

Regional analgesic techniques have gained an increased role in the management of postoperative pain. It has been well documented that regional anesthesia reduces the need for postoperative opioid use, reduces opioid related adverse effects and, offers superior analgesia over opioid-based analgesic techniques.[1] Even though there is a greater abundance of literature describing peripheral neural blockade in adults, the use of regional anesthesia is increasing in pediatric institutions. This has been encouraged by the infrastructure of a 'block service' being established in many pediatric facilities.

Although the use of opioid analgesics is generally safe, adverse effects do occur thereby mandating the use of alternative analgesic techniques in specific clinical scenarios.[2] In the adult population, the TAP block provides effective postoperative analgesia for lower abdominal procedures such as bowel resection, retropubic prostatectomy, cesarean section, and total abdominal hysterectomy. [3-6] We present our experience with the use of a unilateral TAP blockade to provide perioperative analgesia following an anterior abdominal wall incision for replacement of a baclofen pump in a 23-year old patient with spastic quadriplegia and suspected opioid allergies.

Case report

Institutional Review Board approval is not required at Nationwide Children's Hospital for the presentation of single case reports. A 23 year-old, 47.6 kg patient presented for a baclofen pump revision with an abdominal incisional approach for continued treatment of his spastic quadriplegia. Despite the fact that the patient was 23-years-old, she had been a patient at our institution since her infancy. Given our institutional policy and the fact that our neurology and neurosurgical colleagues were still her primary physicians, she was still cared for at Nationwide Children's hospital. Additional past medical history was significant for developmental delay, seizures, scoliosis, and cerebral palsy. Of note, the patient's medical record listed allergies to intravenous morphine, fentanyl, and hydromorphone. All of which led to 'tremors,' general irritability and hemodynamic instability. The patient had historically undergone surgical procedures without the use of intravenous opioids. The patient presented from home with his family. His family was extremely concerned with his perioperative pain plan, as he had a history of uncontrollable postoperative pain during prior procedures at other facilities given issues with the use of intravenous opioids.

After confirmation of his fasting status, he was transported to the operating room and monitoring of his vital signs was established. An intravenous catheter was placed using nitrous oxide and oxygen. Anesthesia was induced with propofol and endotracheal intubation was performed. Anesthesia was maintained with sevoflurane (2-3%) in air and oxygen. Prior to the start of the surgical procedure, the left side of the abdomen was prepped with betadine. Using a linear, high frequency, ultrasound transducer, the patient was scanned from medial to the lateral aspect of the anterior abdominal wall. Given his significant myotonic state, scoliosis, and the prior incisions, the anatomy was somewhat distorted. However, with the aid of ultrasonography, the appropriate layers were visualized just lateral to the prior incision and medial to the triangle of Petit. With the ultrasound probe placed in a transverse plane in the region of the anterior axillary line, the potential space between the transversus abdominis muscle and the internal oblique muscle was confirmed with hydro-dissection using a 21 gauge needle. Correct needle tip position was confirmed by observing the internal oblique and the transversus abdominis muscles separating from each other with the formation of a black, lens shaped collection of fluid. A total of ten milliliters of 0.5% ropivacaine was injected with incremental aspiration and injection. Weight-based intravenous acetaminophen and ketorolac were also administered intraoperative during the procedure. The surgery proceeded without complications which included a repeat left-sided anterior abdominal wall incision approximating six inches. There was no response to the initial surgical incisions and the patient's hemodynamic status was stable throughout. Additional analgesic agents were not administered. At the completion of the surgical procedure, the patient's trachea was extubated and he was transported to the post anesthesia care unit. No additional pain medications were administered during his stay in the post anesthesia care unit and the pain scores were all less than 3. The family was very satisfied with the patient's pain relief from the regional technique and stated that they will request a similar technique for any further baclofen pump revisions.

Discussion

Regional analgesia is an excellent alternative for patients who may have relative and/or absolute contraindications to intravenous opioids for perioperative analgesia. While caudal analgesia remains the most commonly employed regional technique in pediatric institutions for lower extremity and lower truncal procedures[7], there are specific circumstances that warrant the use of abdominal and truncal blockade. The transversus abdominis plane (TAP) block is a peripheral nerve block which can provide sustained abdominal wall analgesia for lower and middle abdominal surgery and offers an alternative to parenteral opioids in these situations. Although originally described in the adult literature, there are several

anecdotal reports of its successful application in the pediatric population.[8-10]

The intercostal, subcostal, and first lumbar nerves that contribute to the innervation of the anterior abdominal wall run in a neurovascular plane known as the transverses abdominis plane which is located between the internal oblique muscle and the transversus abdominis muscle. Blockade of these nerves can be achieved with a single injection of a local anesthetic solution administered in this plane.

Correct identification of the fascial plane can be facilitated by the use of ultrasound guidance.[11]

The TAP block has been used to provide analgesia to the anterior abdominal wall following several different abdominal surgical procedures including appendectomy, cholecystectomy, cesarean section, and most laparoscopic incisions. Unlike neuraxial techniques, the TAP block does not provide full surgical anesthesia for intra-abdominal manipulation. However, it will decrease both intraoperative and postoperative opioid requirements and in many cases, as noted in our patient, may provide analgesia that is effective enough to eliminate the need for opioids for superficial abdominal procedures. In a prospective randomized trial, TAP block with either ropivacaine (0.2 mL/kg of 0.75%) or placebo was administered to 50 adults following cesarean delivery.[6] The group receiving a TAP blockd with ropivacaine had decreased postoperative pain scores, a 70% reduction in postoperative morphine requirements, and a longer time to the first request for analgesia (220 vs. 90 minutes). De Oliveira et al performed a dose ranging study and found that TAP blocks with ropivacaine 0.25% and 0.5% reduced pain, decreased opioid consumption and provided earlier discharge readiness for outpatient laparoscopic gynecological surgeries.[12]

During prior surgical procedures, our patient had received local anesthetic infiltration by the surgeon. Preliminary data has shown that a TAP block may provide more effective analgesia, a longer time to rescue dose of intravenous opioids, and lower visual analog scores (VAS) during the postoperative period when compared to local infiltration of the surgical site.[13] The use of the unilateral TAP block along with adjuvant analgesics (acetaminophen and ketorolac) in the perioperative period resulted in our patient having a comfortable and pain free postoperative course with increased parental satisfaction. Our current report adds additional anecdotal experiences regarding the unique applications of the TAP block in the pediatric population.

References

1. Kettner SC, Willschke H, Marhofer P. Does regional anaesthesia really improve outcome. Br J Anaesth 2011;107:90-5.
2. Morton N. S, Errera A. APA national audit of pediatric opioid infusions. Pediatr Anesth 2010,20:119-25.
3. McDonnell JG, O'Donnell BD, Farrell T, et al. Transversus abdominis plane block: a cadaveric and radiological evaluation. Reg Anesth Pain Med 2007;32:399-404.
4. O'Donnell BD, McDonnell JG, McShane AJ. The Transversus Abdominis Plane (TAP) block in open retropubic prostatectomy. Regional Anesthesia and Pain Medicine. 2006;31:1.
5. Carney J, McDonnell JG, Ochana A, et al. The transversus abdominis plane block provides effective postoperative analgesia in patients undergoing total abdominal hysterectomy. Anesth Analg 2008;107:2056-60.
6. McDonnell JG, Curley G, Carney J, et al. The analgesic efficacy of transversus abdominis plane block after Cesarean delivery: a randomized controlled trial. Anesth Analg 2008;106:186-91.
7. Polaner DM, Taenzer AH, Walker BJ, Bosenberg A, Krane EJ, Suresh S, Wolf C, Martin LD. Pediatric Regional Anesthesia Network (PRAN): a multi-institutional study of the use and incidence of complications of pediatric regional anesthesia. Anesth Analg 2012;115:1353-64.

8. Frederickson M, Seal P, Houghton J. Early experience with the transverses abdominis plane block in children. Pediatr Anesth 2008;18:891-2.
9. Hardy CA. Transversus abdominis plane block in neonates: is it a good alternative to caudal anesthesia for postoperative analgesia following abdominal surgery? Pediatr Anesth 2008;19:56.
10. Tobias JD. Preliminary experience with transversus abdominis block in infants and children. Saudi J Anesth 2009;3:2-6.
11. Siddique M, Sajid M, Uncles D, Cheek L, Baig M. A meta-analysis on the clinical effectiveness of transversus abdominis plane block. J Clin Anesth 2011;23,7-14.
12. De Oliveira GS Jr, Fitzgerald PC, Marcus RJ, Ahmad S, McCarthy RJ. A dose-ranging study of the effect of transversus abdominis block on postoperative quality of recovery and analgesia after outpatient laparoscopy. Anesth Analg 2011;113:1218-25.
13. Sivapurapu V, Vasudevan A, Gupta S, Badhe AS. Comparison of analgesic efficacy of transversus abdominis plane block with direct infiltration of local anesthetic into surgical incision in lower abdominal gynecological surgeries. J Anaesthesiol Clin Pharmacol 2013;29:71-5.