Case Report

Successful postoperative analgesia with ilio-inguinal nerve block following sclerotherapy for a labial venous malformation

S. Kim,¹ S. Josephs² and B. C. H Tsui³

1 Pediatric Fellow, 3 Professor, Department of Anesthesiology, Perioperative, and Pain Medicine, 2 Clinical Professor, Department of Interventional Radiology and Diagnostic Radiology, Lucile Packard Children's Hospital at Stanford, Stanford, California, USA

Summary

Though ilio-inguinal nerve block has been commonly utilised in male urologic surgery, a single injection ilio-inguinal nerve block alone has not previously been reported for analgesia of the vulva. In this report, we describe the case of a 14-year-old girl undergoing sclerotherapy of a venous malformation affecting the labia majora and minora. After induction of anaesthesia, we performed an ultrasound-guided ilio-inguinal nerve block using a total volume of 15 ml of ropivacaine 0.2% with 1 $\mu\text{g}\cdot\text{ml}^{-1}$ dexmedetomidine which provided effective postoperative analgesia. Though the patient received intravenous analgesia intra-operatively and had an inpatient bed reserved in anticipation of severe postoperative pain, she required no further analgesia and was discharged home following 2 hours in the postoperative anaesthesia care unit. With the additional use of dexmedetomidine resulting in prolonged efficacy of the block, the patient reported effective postoperative relief for approximately 30 hours, solely using ibuprofen for pain relief. This case reminds clinicians that the ilio-inguinal nerve block may provide benefit not only for male urologic surgery but also for procedures involving the external female genitalia, with extended analgesia with the use of dexmedetomidine.

Correspondence to: B. C. H. Tsui

Email: bantsui@stanford.edu

Accepted: 25 July 2020

Keywords: ilio-inguinal anatomy; paediatrics; postoperative regional analgesia

Twitter: @BanTsui

Introduction

Providing regional analgesia for labial pain can be challenging given anatomical variation and contributions from the ilio-inguinal, iliohypogastric and genitofemoral nerves [1, 2]. The ilio-inguinal nerve block has been commonly utilised in inguinal hernia repair and male urologic surgery and is considered a safe alternative to the caudal block [3, 4]. Using the traditional landmark technique the success rate is 70–80% [4]. With ultrasound guidance, ilio-inguinal nerve blocks require significantly smaller volumes of local anaesthetic and fewer additional postoperative analgesics, reflecting a more accurate deposition of local anaesthetic proximal to the nerve [4]. However, its benefit is infrequently described for analgesia involving the vulva. In this report, we present the case of a patient who underwent sclerotherapy for venous malformation-associated labial pain who had effective postoperative analgesia following an ilio-inguinal nerve block.

Report

A 14-year-old girl weighing 52 kg with venous malformations involving her left pelvis and lower limb with associated pain was admitted for sclerotherapy of the left labia majora and minora. She was otherwise healthy and had previous anaesthetic history.

The interventional radiologist had requested regional analgesia for postoperative pain relief and had an inpatient bed reserved due to the possibility of difficult postoperative pain control. Pre-operatively the patient indicated a visual analogue scale pain score of 9/10, primarily in the region of her left labia. However, the entire left lower extremity was reported as painful but with lower intensity. After review of the imaging with the radiologist, we planned to undertake a regional anaesthetic technique with a needle insertion point distant from the venous malformations, with motor nerve sparing in order to enable early discharge if possible. The patient was therefore offered an ilio-inguinal block. The risks and benefits of the block were discussed, including the possibility of incomplete coverage and block failure.

Following premedication with oral midazolam 2 mg, standard Association of Anaesthetists monitoring was applied before induction in the interventional radiology suite. General anaesthesia was induced with propofol 150 mg and fentanyl 50 µg i.v. A supraglottic airway was inserted and anaesthesia was maintained using a propofol infusion and sevoflurane 1% in oxygen. After induction of anaesthesia, a SonoSite X-Porte ultrasound (SonoSite, Bothell, USA) with a 13–6 MHz linear probe was used to guide an ilio-inguinal/iliohypogastric nerve block. The site and ultrasound probe were prepared using aseptic technique, the ultrasound transducer was placed in a transverse orientation between the anterior superior iliac spine and the umbilicus to identify the ilio-inguinal and iliohypogastric nerves. An insulated 22-gauge 50-mm nerve block needle (Pajunk, Geisingen, Germany) was inserted in an in-plane orientation. Fifteen millilitres of ropivacaine 0.2% with 1 µg.ml⁻¹ of preservative-free dexmedetomidine was injected between the transversus abdominus and internal oblique muscles, medial to the ilio-inguinal nerve (Fig. 1). The distribution of the local anaesthetic was viewed in real-time under ultrasound guidance. The radiologist then utilised direct and intermittent fluoroscopic guidance to perform direct puncture of the venous malformation involving the left labia majora and minora; a total of 12 ml of foam mixture, comprising 3ml of sodium tetradecyl sulphate 3% and 9 ml embolisation agent (sodium tetradecyl sulfate 3%) mixed with 9 ml air in a 1:4 ratio was used. Intra-operatively, a total of 50 µg of fentanyl, 0.3 mg of hydromorphone, 26mg of ketorolac and 780 mg of acetaminophen were given i.v. for anticipated postoperative pain.

The patient was discharged home after 2 hours in the postoperative anaesthesia care unit. She reported no pain and did not receive additional analgesic medications for approximately 30 hours. The visual analogue pain scores were 1–2/10 on postoperative day 1 without any medication and 3/10 on postoperative day 2 with ibuprofen. Follow-up on postoperative day 8 revealed that she had no labial pain. However, she continued to have chronic lower extremity pain.

Discussion

As far as we are aware, this is the first case demonstrating an opioid-sparing acute pain technique following sclerotherapy for labial pain that can be accomplished by a single injection of local anaesthetic with adjuvant.

Classical anatomy suggests that the ilio-inguinal nerve provides only anterior superficial sensory innervation of the labia. Therefore, an ilio-inguinal nerve block may not provide the complete analgesic coverage that a neuraxial technique or supplemental blockade of branches from the genitofemoral nerve and pudendal nerve would provide. In this case, a neuraxial technique was excluded because the interventional radiologist preferred this patient to go home with a motor sparing block. Based on magnetic resonance imaging, a pudendal nerve block was also excluded due to the severity and extent of her venous

Figure 1 Sonograph of ilio-inguinal nerve block using an in-plane technique. At the level of anterior superior iliac spine (ASIS), needle is inserted from lateral to medial with local anaesthetic deposited medial to the ilio-inguinal nerve (IN) and between the transversus abdominus muscle (TAM) and internal oblique muscle (IOM) resulting in hydrodissection of the transversus abdominus plane.

malformations in the region of injection. Thus, an ultrasound-guided ilio-inguinal nerve block was deemed to provide the greatest safety profile given the accessibility and distal location to the surgical site [4].

Caudal epidural blocks are one of the most widely used regional techniques for peri-operative analgesia in a variety of paediatric surgical procedures. With neuraxial techniques, side-effects such as prolonged motor blockade and urinary retention could delay discharge in outpatient procedures. Peripheral nerve blocks and truncal blocks are safe alternatives that can provide effective analgesia with fewer side-effects [4]. Transversus abdominal plan, rectus sheath and ilio-inguinal/iliohypogastric nerve blocks are commonly performed for abdominal and urological procedures. The use of ultrasound can improve the quality and consistency of these techniques and provide effective analgesia when neuraxial techniques are contra-indicated.

Sclerotherapy for vascular malformations requires at the very least deep sedation in the paediatric setting as increased pain and swelling related to the procedure are commonplace [5]. Among vascular malformations, venous malformations are the most common form with an incidence of 1–5 in 10,000 [6]. Abnormal endothelial cell development causes dilated venous networks that may affect any part of the body including the head and neck (40%), limbs (40%) and trunk (20%) [6]. Venous malformations present at birth grow with the child and can cause a spectrum of clinical presentations later in life ranging from varicose veins to extensive disfiguring lesions. Symptoms may include chronic pain and significant swelling. The low-flow state of venous malformations can induce thrombus formation. This inflammatory response results in further swelling and mass effect on surrounding structure.

Individualised treatment utilising a multidisciplinary approach is recommended given the variability of presentation, symptoms, location and extent of venous malformations. Treatment for complex cases focuses on symptom abatement rather than a curative approach. Extensive lesions may often require multiple types of therapy which may include a combination of medications, open surgery, sclerotherapy, cryoablation and laser treatments [6]. Treatment with sclerotherapy is associated with complications including skin blistering and necrosis, cutaneous fistula and pigmentation in up to 10% of cases, depending on the sclerosing agent used [7]. Other complications include nerve damage (4.8%), muscle fibrosis (1.5%), renal damage (3.9%), pulmonary embolism (0.25%) and cardiovascular collapse (0.08%) [7]. Given the potential for many of these complications to be painful, an effective peri-operative analgesia plan is required.

We present a patient who emerged from anaesthesia pain-free following ilio-inguinal nerve block. It is difficult to ascertain if the procedure, the nerve blockade, or the other analgesic medication provided the initial comfort. However, in the experience of the radiologist most patients undergoing this type of procedure experience severe pain postoperatively which is markedly different from the experience of our patient. One possible explanation for the adequate pain relief in our case is that the injected volume of local anaesthetic may have spread along the transversus abdominus plane and through the inguinal canal to provide blockade of the genital branch of the genitofemoral nerve. This assumes that the ilio-inguinal nerve and genital branch of the genitofemoral nerve travel in parallel with the round ligament into the inguinal canal. The ilio-inguinal nerve and its relationship to the genital branch of the genitofemoral nerve is known to have great variability and frequently exhibits overlapping sensory innervation to the upper portion of the inner thigh, mons pubis and labia [1, 2]

With the addition of the α -2 agonists dexmedetomidine (approximately $0.3 \mu\text{g.kg}^{-1}$), our patient was noted to experience prolonged postoperative relief for approximately 30 hours. Dexmedetomidine was selected based on its safety profile, and its known efficacy in prolonging analgesia for paediatric inguinal hernia repair using the same block technique [8, 9]. While this is only a single patient followed-up remotely, the duration of effective postoperative analgesia reported by the patient was significant.

This report illustrates that the ilio-inguinal nerve block may provide a simplified analgesia technique for procedures involving labial pain. Although the anatomy of the ilio-inguinal nerve is variable, we suggest this technique should be considered as a potential option for postoperative pain relief. Neuraxial analgesia would have been effective but would have been short-lived and complicated by undesirable motor blockade. Our patient and their parent were pleased with the pain control experienced as well as the ability to return home within hours following the procedure.

Acknowledgements

Published with the consent of the patient's parent. No external funding or competing interests declared.

References

1. Cesmebasi A, Yadav A, Gielecki J, Tubbs RS, Loukas M. Genitofemoral neuralgia: a review. *Clinical Anatomy* 2015; **28**: 128–35.

2. Rab M, Ebmer J, Dellon AL. Anatomic variability of the ilio-inguinal and genitofemoral nerve: implications for the treatment of groin pain. *Plastic and Reconstructive Surgery* 2001; **108**: 1618–23.
3. Willschke H, Marhofer P, Bösenberg A, et al. Ultrasonography for ilio-inguinal/iliohypogastric nerve blocks in children. *British Journal of Anaesthesia* 2005; **95**: 226–30.
4. Oliver J-A, Oliver L-A. Beyond the caudal: truncal blocks an alternative option for analgesia in pediatric surgical patients. *Current Opinion in Anesthesiology* 2013; **26**: 644–51.
5. Landrigan-Ossar M. Common procedures and strategies for anaesthesia in interventional radiology. *Current Opinion in Anesthesiology* 2015; **28**: 458–63.
6. Hage AN, Beecham Chick JF, Srinivasa RN, et al. Treatment of venous malformations: the data, where we are, and how it is done. *Techniques in Vascular and Interventional Radiology* 2018; **21**: 45–54.
7. Qiu Y, Chen H, Lin X, Hu X, Jin Y, Ma G. Outcomes and complications of sclerotherapy for venous malformations. *Vascular and Endovascular Surgery* 2013; **47**: 454–61.
8. Lundblad M, Trifa M, Kaabachi O, et al. Alpha-2 adrenoceptor agonists as adjuncts to peripheral nerve blocks in children: a meta-analysis. *Paediatric Anaesthesia* 2016; **26**: 232–8.
9. Lundblad M, Marhofer D, Eksborg S, Lönnqvist PA. Dexmedetomidine as adjunct to ilio-inguinal/iliohypogastric nerve blocks for pediatric inguinal hernia repair: an exploratory randomized controlled trial. *Paediatric Anaesthesia* 2015; **25**: 897–905.