

CASE REPORT

Preoperative L1 and L2 paravertebral block is an effective postoperative analgesia for hip arthroscopy in a multimodal analgesic regimen

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SUMMARY

We describe the case of a 30-year-old woman with chronic hip pain secondary to avascular necrosis. She received preoperative L1–L2 paravertebral block for postoperative pain control after arthroscopic hip surgery. Preoperative paravertebral block at the level of L1–L2 provided an effective postoperative analgesia for hip arthroscopy when used in a multimodal approach.

BACKGROUND

Hip arthroscopy is a relatively new technique available to orthopaedic surgery to evaluate and treat intra-articular pathology of the hip.¹ Regional anaesthesia techniques have become more attractive to patients and surgeons for orthopaedic procedures of the hip.^{2–4} It is noteworthy that more than 40% of patients undergoing ambulatory orthopaedic surgeries experience moderate to severe pain postoperatively.⁵ Effective postoperative pain control, reduced risk of perioperative complications such as deep venous thrombosis, decreased opioid-related side effects, earlier physical therapy and rehabilitation are some of known advantages of regional anaesthesia techniques in the orthopaedic patient population.^{6–7} Moreover, there is an increasing trend to perform arthroscopic hip procedures in the outpatient setting so patients are able to be discharged the same day and start rehabilitation early in the postoperative period.⁴ Failure to provide adequate analgesia will impede this purpose and may result in longer hospital stay, increased opioid consumption and opioid-related side effects (nausea, vomiting, ileus, urinary retention, sedation), and obviously low-patient satisfaction.^{3–6}

Incisional infiltration, periarticular infiltration, lumbar plexus block (LPB) with or without sciatic nerve block and neuraxial analgesia have been reported to be effective modalities for postoperative pain control in patients undergoing hip arthroplasty.⁸ However, each of these analgesic modalities have significant shortcomings, as they may provide inadequate pain control (local infiltration of skin and joint), muscle weakness (neuraxial, lumbar plexus block and sciatic nerve block) that is undesirable especially in the ambulatory setting.

Lee *et al*⁹ described combined L1 and L2 paravertebral block (PVB) as an effective postoperative analgesic technique for hip arthroscopy. We present our experience with this technique in a 30-year-old woman undergoing hip arthroscopy for avascular necrosis and labral tear.

CASE PRESENTATION

An otherwise healthy 30-year-old woman (weight 75 kg, height 170 cm, body mass index 26, American Society of Anesthesiologists physical status 1) was diagnosed with avascular necrosis of the hip that resulted in chronic hip pain. Her pain management included tramadol 100 mg as needed up to 200 mg daily. She underwent hip arthroscopy, removal of osteonecrotic loose fragments and repair of the labrum at our outpatient surgery centre.

In the preoperative holding area the patient was placed in the sitting position with maximal back flexion. Nasal oxygen and routine monitors were applied. Intravenous midazolam 2 mg and fentanyl 100 µg were given for procedural sedation. Two-dimensional ultrasound imaging was used to identify first and second lumbar levels as well as transverse processes depth. Insertion points were marked 2.5 cm lateral to the superior aspect of corresponding spinous processes. A skin wheal was made using lidocaine 1% at each level and then a 22-gauge, 8 cm Tuohy needle (Perifix Epidural Needle) was advanced until it made contact with the transverse process. The needle was withdrawn slightly and walked off caudally to an additional depth of 1 cm. Five milliliters of 0.5% ropivacaine was injected slowly after negative aspiration was confirmed at each level. The patient tolerated the procedure well and was taken to the operating room where she received intravenous propofol for induction of anaesthesia and a laryngeal mask airway (LMA Unique size 4) was placed. Anaesthesia was maintained with sevoflurane and she received 1000 mg intravenous acetaminophen, 50 mg intramuscular meperidine and 4 mg intravenous ondansetron to prevent postoperative nausea/vomiting. At the end of surgery 20 mL bupivacaine 0.25% with epinephrine was injected into the hip joint. Ninetyminutes after arrival to the postanesthesia care unit the patient reported only mild pain (2/10 on a visual analogue scale) and did not require treatment for breakthrough pain or nausea. She also did not require narcotic pain medication for 24 h following surgery and was able to proceed with her physical therapy.

DISCUSSION

Hip arthroscopy is gaining popularity in treatment of intra-articular pathology (femoroacetabular impingement, intra-articular loose bodies and labral tear) since it is diagnostic, therapeutic and minimally invasive.¹ It is preferred to do these procedures

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in an outpatient setting so postoperative pain control is very important aspect of anaesthetic management as patients generally experience severe pain.^{2–5} Different regional anaesthesia techniques (epidural, spinal or peripheral nerve blocks) have been proposed to provide either surgical anaesthesia or postoperative analgesia with varying degrees of success.^{3–4, 8}

The sensory innervation of the hip is very complex and characteristics of the sensory nerves are not clearly understood. The obturator nerve was believed to be the major sensory supply to the hip but its blockade is successful for pain relief in only some cases. Birnbaum *et al*¹⁰ performed a comprehensive anatomical study on hip innervation and concluded that obturator, femoral, sciatic, superior gluteal nerves and the nerve to quadratus femoris muscle all contribute to sensory innervation of the hip joint.

LPB has been described as a successful technique in controlling pain after hip surgeries in at least two different studies.^{11–12} However, LPB can be associated with rare but serious complications (epidural or spinal spread resulting in profound hypotension, retroperitoneal haematoma and kidney puncture.).¹¹ Therefore, it is imperative to look for safer techniques with equal or better safety profile which can be conducted faster and provide adequate pain relief.

PVB has been used for postoperative pain control following breast surgery with an excellent safety profile.¹³ However, its efficacy in hip arthroscopy has not been well studied.

To our knowledge, there are only two cases describing successful postoperative pain control after hip arthroscopy reported by Lee *et al*.⁹ The rationale for a PVB at the level of L1 and L2 arises from the fact that most of the surgical intervention is in the anterior aspect of the hip and analgesia in these dermatomes can cover pain in arthroscopic portal sites overlying the anterolateral upper thigh.^{9–10} Moreover, blocking the L2 and partially L3 (because of caudad spread of the local anaesthetic) can provide analgesia to the femoral and obturator nerves distribution as well. Of note, quadriceps motor blockade will be less with PVB compared with LPB and this is in favour of early discharge, and probably early ambulation and rehabilitation.

Competing interests None.

Patient consent Obtained.

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Learning points

- ▶ Preoperative paravertebral block should be considered as an effective analgesia for hip arthroscopy but this technique needs to be investigated in randomised controlled studies.
- ▶ Ultrasonography is very helpful in finding anatomical landmarks for this technique.
- ▶ A multimodal pain control approach is more effective analgesia.

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