

Erector Spinae Plane Block in a Patient with Ischemic Heart Disease for Percutaneous Nephrolithotomy: A Case Report

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ABSTRACT

Erector spinae plane block is an interfascial plane block that is a novel analgesic technique which is easy to administer. It provides extensive multidermatomal sensory block. It is a simple and safe procedure and is a promise of the future. It has been used to multiple surgeries of the thoracic and abdominal regions like thoracotomy, mastectomy, fibroadenoma, percutaneous nephrolithotomy and so on. Here, we describe the case of a 40-year old male patient with ischemic heart disease, posted for percutaneous nephrolithotomy under general anesthesia, supplemented with ultrasound guided erector spinae plane block, with intermittent boluses. The catheter was used for post-operative pain relief for upto 48 hours and later removed. Intraoperative hemodynamics were optimal and post-operative need for multimodal analgesics had reduced.

Introduction

Percutaneous nephrolithotomy (PCNL) is the most common surgery for large renal calculi. To alleviate the pain associated with this surgical procedure, analgesic modalities like thoracic epidural, intravenous and intrathecal opioids, non-steroidal anti-inflammatory drugs and regional blocks have been in the play. Regional blocks include, paravertebral block, intercostal nerve block and the erector spinae plane block (ESPB). The erector spinae plane block is proven to be an effective analgesic modality in various thoracic and abdominal surgeries [1]. We report the case of a middle-aged man with known cardiac disease, who was taken up for PCNL, under erector spinae plane block while giving intermittent boluses.

Case Report

A 40-year-old gentleman, diagnosed with right renal calculi was posted for right PCNL. He was a known case of ischemic heart disease (IHD) with hypertension,

diagnosed at 30 years. He has been on tab ecosprin 75mg and tab. amlodipine 5mg for hypertension since 10 years. His ECG was suggestive of left ventricular hypertrophy and T wave inversion in Leads V1 to V3. Two dimensional echocardiography was suggestive of apicoseptal and apicolateral hypokinesia with grade I diastolic dysfunction, left ventricular ejection fraction of 50% and normal pulmonary artery pressures. All routine lab investigations were within normal limits. On the day of surgery, after confirming the fasting status and taking informed consent, the patient was shifted to the operation theatre and all ASA standard monitors were attached.

We decided to proceed with general anesthesia, supplemented with ESPB to maintain intraoperative hemodynamic goals and provide postoperative pain relief. Pre-oxygenation with 100% O₂ was given for 3 minutes. Following this the patient was premedicated with a cocktail of inj glycopyrrolate 4mcg/kg IV, inj midazolam 0.03mg/kg and inj ondansetron 0.1mg/kg. Fentanyl 2mcg/kg was the opioid of choice. Preservative free 2% lignocaine, 1mg/kg was given 90secs prior to intubation to attenuate the possible pressor response. Patient was induced with inj etomidate 0.3mg/kg IV and inj vecuronium 0.08mg/kg IV was the muscle relaxant used. He was intubated with size 8.5 endotracheal tube

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and the tube placement was confirmed with ETCO₂ and 5-point auscultation. He was maintained on 50% oxygen: nitrous oxide and inhalational agent sevoflurane with intermittent positive pressure ventilation. After this, the patient was given left lateral position for erector spinae block. Under all aseptic precautions, after painting and draping, with the curvilinear probe of ultrasonography machine kept in a cephalocaudal direction, the transverse process of T8 vertebra and erector spinae plane were identified in the midline (figure 1). Using the in-plane approach, an 18G touhys needle was inserted and the space was confirmed by hydro-dissection with 2ml normal saline after negative aspiration (Figure 2). The space was found at 3cms and the catheter was fixed at 8 cm to skin. Inj bupivacaine 0.125% 20cc with inj dexamethasone 4mg was given through the catheter after negative aspiration. Hemodynamics were stable throughout the intraoperative period and the patient did not require any analgesia or further opioid doses. He was reversed and extubated once he fulfilled the criteria for extubation.

In the post-operative period, pain was assessed using the visual analogue scale (VAS), 2 hourly until 6 hours and every 6 hours until 48 hours. Our patient was pain-free for a total period of 19 hours with hemodynamic stability. Patient demanded analgesia the following morning (VAS 4). Rescue analgesia was given through ESP catheter with inj lignoadrenaline 1% 10ml and inj bupivacaine 0.125% 10ml, after negative aspiration. This analgesic effect lasted for 6-8 hours and the same dose was repeated for upto 48hours, on demand. The catheter was removed after 48hours. Patient was absolutely pain free and comfortable in the post-operative period.

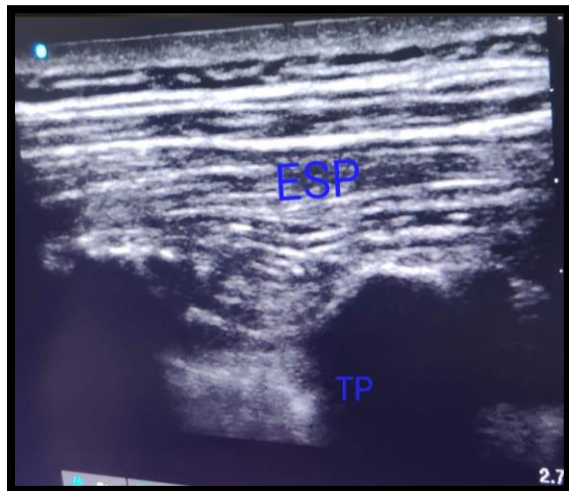


Figure 1- Anatomy of erector spinae plane block (TP- Transverse process of T8 vertebra)

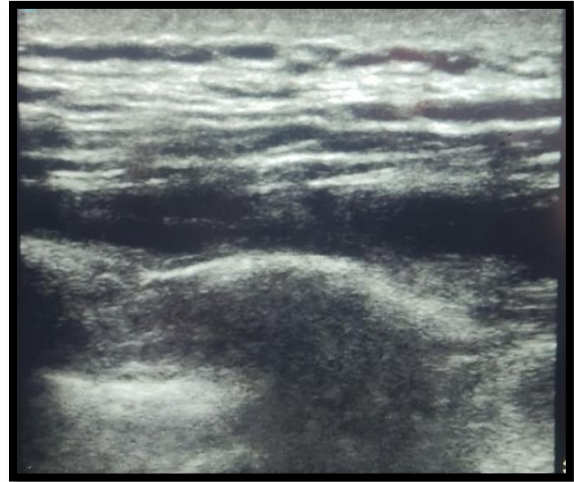


Figure 2- Hydrodissection after catheter placement in ESPB

Discussion

Percutaneous nephrolithotomy is a common surgery for the removal of renal stones. Adequate pain relief is of utmost importance, particularly in patients with cardiac compromise, so as to prevent pain induced tachycardia. Therefore, multimodal analgesia is often practiced by us anesthesiologists. However, we should aim at reducing the requirement of multiple analgesic doses, both opioids and NSAIDs, promote early ambulation and hence shorten the duration of stay in the hospital [2]. Adequate pre-operative optimization in patients with ischemic heart disease should be done owing to the possibility of perioperative myocardial ischemia due to oxygen demand-supply imbalance.

Erector spinae plane block can be used as a one-shot pain relief technique or as a continuous catheter technique. It is a relatively newer modality, which was approved in 2016 for acute and chronic pain management [1] and its role in pain management after PCNL has also been studied [3-4].

Visceral pain following PCNL originates from the kidneys and ureters and somatic pain from the incision site. The visceral pain is transmitted through T10-L2. Cutaneous innervation of the incision site is by T18-T12, since the tract from PCNL is usually in the 10th-11th intercostal space or in the subcostal area [5].

This technique blocks the dorsal and ventral rami of the thoracic and abdominal spinal nerves and hence a multi-dermatomal sensory block of the anterior, posterior, lateral thoracic and abdominal wall is achieved [1]. It can provide wide sensory blockade from T2-L4 to L1-L2 [1,6]. Since this is a fascial plane block, it is suggested that a total volume of 20-30ml of local anaesthetic (inj bupivacaine 0.125%) be given, to block 3-4 segments caudally and cranially from the site of injection [7].

In addition to providing adequate analgesia, the procedural simplicity and safety of administration are also highlights of this technique.

Multiple trials are still ongoing to study the full-fledged use of ESPB and whether it causes statistically significant reduction in opioid dosage, pain scores and duration of hospital stay [8].

Conclusion

With the advent of ultrasonography, regional anesthesia has gained momentum. The utilization of nerve blocks for adequate anesthesia and analgesia, especially in patients with cardiovascular compromise ensures stable hemodynamics in the perioperative period. ESPB may be tried as an effective alternative to multimodal analgesic techniques.

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