Perioperative Analgesia for Forequarter Amputation in a Morbidly Obese Patient: Dual ESP Block Catheters Plus Interscalene Block

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Abstract

Erector spinae plane block (ESPB) is a novel fascial plane block that has been first described in 2016. ESPB has been considered as an alternative for brachial plexus blocks in shoulder and upper back surgeries as the erector spinae muscle extends to the cervical level. We present a case of a 34-year-old, 6-foot, 145 kg female patient with a BMI of 43.5, for which we successfully inserted dual-level ESPB catheters combined with single shot interscalene for an upper extremity forequarter amputation.

Keywords: Erector spinae plane block, Interscalene block, Morbidly obese, Forequarter amputation

Introduction

The erector spinae plane block (ESPB) has been described in the management of both thoracic and abdominal pain. There is growing literature suggesting the successful use of a high-thoracic ESPB for upper extremity analgesia [1], as the erector spinae muscle extends to the cervical spine. Moreover, there is a reduced risk of direct spinal cord injury, epidural hematoma, and central infection compared to neuraxial techniques [2]. Additionally, high-thoracic ESPB can be a phrenic nerve-sparing alternative to continuous interscalene brachial plexus blockade [3]. We present a case of successful dual-level ESPB catheters combined with single shot interscalene block in a morbidly obese patient presenting for an upper extremity forequarter amputation.

Material And Methods

Patient informed consent was obtained for case report submission. IRB approval exempt as per Cleveland Clinic guidelines.

Case Report

We present a case of a 34-year-old, 6-foot, 145 kg female patient with a BMI of 43.5 with an enlarging and painful left axilla mass complicated by fungating wound on the posteromedial aspect of the upper arm thought to be due to a lympho-vascular malformation. Her relevant past medical history also included obstructive sleep apnea, asthma and lung nodules. The patient had multiple rounds of sclerotherapy for the presumed lympho-vascular malformation prior to confirmation of diagnosis and developed chronic severe shoulder pain requiring extensive multimodal analgesia including IV ketamine infusions, acetaminophen, oxycodone, ketorolac, gabapentin, hydromorphone, amitriptyline, and tapentadol. A diagnosis of malignant angiomatoid fibrous histiocytoma was eventually confirmed by biopsy; however, this was complicated by axillary hematoma with continued bleeding from the biopsy site requiring several blood transfusions. She also had finger paresthesia and weakness due to invasion of the brachial plexus in the axilla. Her case was discussed at tumor board and she was recommended to undergo a forequarter amputation since her mass was considered intermediate risk of metastatic spread and thus malignant behavior, as well as that the tumor was surrounding the subclavian and axillary artery. The patient underwent interventional angiogram and embolization of the brachial arterial branches feeding the tumor before surgery.

Acute pain management was consulted for peripheral nerve block placement preoperatively. We checked the patient’s coagulation profile and labs prior to the block as the ESP is a deep block. Her labs were in the normal range including INR, PTT, and platelets levels. After an appropriate time-out, the patient was placed in a sitting position and her back prepped with chlorhexidine. Using a low-frequency, curvilinear ultrasound transducer in a longitudinal orientation, the left T5 spinous process was identified with the transverse process. After negative aspiration, 15 mL of bupivacaine 0.25% was injected under ultrasound visualization opening the erector spinae fascial plane. A 17G Tuohy needle was inserted in-plane under ultrasound guidance in a caudad to cephalad direction until it touched the transverse process. After negative aspiration, 15 mL of bupivacaine 0.25% was injected under ultrasound visualization opening the erector spinae fascial plane. A 19G catheter was inserted and another 5mL bupivacaine was injected to confirm catheter position (Figure 1). We repeated catheter insertion at the level of T3 transverse process also using 20 mL of bupivacaine 0.25%. The two ESP catheters were tunneled subcutaneously to the right away from the surgical site (Figure 2) and we checked their level with the orthopedics team and they were fine with their site. The patient was moved to a semi-sitting position for the interscalene block.

We identified the brachial plexus between the anterior and middle
scalene muscles using a high-frequency linear ultrasound transducer. We were careful to identify that there was no mass located near the brachial plexus at this location or anywhere along the needle trajectory. Using a 20G, 10 cm, echogenic needle, we injected 20 mL of a mixture composed of 10 mL of bupivacaine 0.5% with 10 mL of liposomal bupivacaine 1.3% and visualized spread around the brachial plexus.

The patient then underwent left interthoracoscopic forequarter amputation under general anaesthesia. She received 200 mcg of fentanyl, 200 mg of ketamine and 2 mg of hydromorphone intraoperatively. The patient remained intubated in the ICU until postoperative day one and the ESP catheters were started with a programmed intermittent bolus infusion of ropivacaine 0.1% 12 mL bolus every 90 minutes with 5 mL basal rate. During the first two days postoperatively, the patient had aching left shoulder pain, tolerable at rest, and extremely painful with movement, but improved with ropivacaine bolus. We increased her bolus to 15 mL every 90 minutes with improvement in pain. She was satisfied with her pain control and the catheters were removed on postoperative day 6. The patient was discharged to an acute rehabilitation facility on postoperative day 11 with multimodal analgesic regimen that included acetaminophen, baclofen, gabapentin, and PO hydromorphone.

Discussion

The erector spinae plane block has been used increasingly in various pain conditions since it was introduced in 2016 [4]. The mechanism of action is still not fully understood. Theories include the direct spread of local anaesthesia to the adjacent paravertebral space or even to the epidural space; the direct spread of the anesthetic medications to the adjacent thoracic and cervical plexuses, or even immunomodulatory analgesic effect of the injected mixture in the erector spinae plane. But the most probable action of any significance is via blockade of neural targets [5]. In this case report, we placed ESP catheters in addition to a single shot interscalene block as a part of multimodal analgesic strategy. We used a two-level approach for ESP catheters due to difficulty visualizing the paravertebral space and possible difficulty with thoracic epidural placement, as well as less restrictions as with neuraxial catheters for postoperative prophylactic anticoagulation, which made the insertion of ESP catheters a better option. We performed a single shot interscalene block using liposomal bupivacaine in order to ensure brachial plexus blockade as well as prolong duration of action, as we were not able to place a catheter due to proximity to the surgical field. The higher pain scores at first were improved with the increase of the intermittent bolus volume. A higher volume was likely necessary to ensure better spread along the erector spinae plane. At our institution, we use Ropivacaine (0.4-0.6 mg/kg/hr) for infusions and we try to avoid using levels above that to avoid the risk of local anaesthesia toxicity.

Conclusion

ESP block is a promising technique that might provide an excellent alternative to many neuraxial and peripheral nerve blocks. It provides a safer profile in morbidly obese patients, patients on anticoagulation, and patients where the phrenic nerve should be spared. Identifying the exact mechanism of action and proper dosing will help expand the use of this block.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil    Source of support: None

References


