

# Lumbar erector spinae plane block obtunding knee and ankle reflexes

### ABSTRACT

The erector spinae plane block (ESPB) has recently been described as an effective analgesic strategy for various surgeries at ventral and dorsal parts of body. The block has been utilized for postoperative pain relief in hip surgeries. Cadaveric and clinical studies performed at the lumbar level depict a dorsal spread and minimal ventral spread in the lumbar plexus. So far to our knowledge there is one case report which has described reduced quadriceps strength in a parturient after caesarean section. We report two patients who presented with absent knee reflexes (decreased quadriceps strength) and one patient with absent ankle reflex (foot drop) following continuous ESPB at the level of L3. The initial bolus was with 30 ml of 0.1% bupivacaine followed by a continuous infusion of 0.1% ropivacaine at 8ml/hour. The loss of knee reflexes in two patients and diminished reflexes in one patient suggested spread of local anaesthetic (LA) to the lumbosacral plexus. The LA infusion were stopped in all 3 patients. The average duration of motor block was 18 hours. These complications should be considered if early ambulation is mandatory for patients.

**Key words:** Ambulatory surgery; complications; erector spinae; regional anaesthesia

### Introduction

Postoperative analgesia is the primary concern after hip surgery. Early mobilization, improving nutrition and target organ functions enhances good outcome. The gold standard for postoperative analgesia in hip surgeries is lumbar epidural.<sup>[1]</sup> Apart from neuraxial techniques newer interfascial plane blocks are incorporated in the multimodal analgesia to deal with postoperative pain relief. Earlier quadratus lumborum blocks has been utilized for this purpose.<sup>[2]</sup> Recently ESPB at the lumbar level (L-ESPB) has been implemented for hip and proximal femur surgeries.<sup>[3,4]</sup> There is a single case report of quadriceps weakness post caesarean

section after bilateral ESPB at the level of T 11.<sup>[5]</sup> We present two patients who presented with unilateral absent of knee reflexes and one patient with a foot drop and absent ankle reflex after unilateral L-ESPB at the level of L3.


### Case Reports

Three patients with fracture femur were thoroughly evaluated for an elective hip surgery after admission in ward. All investigations were unremarkable. Standard monitoring was established for all patients (ECG, pulse oximeter, non – invasive blood pressure). All patients were administered spinal

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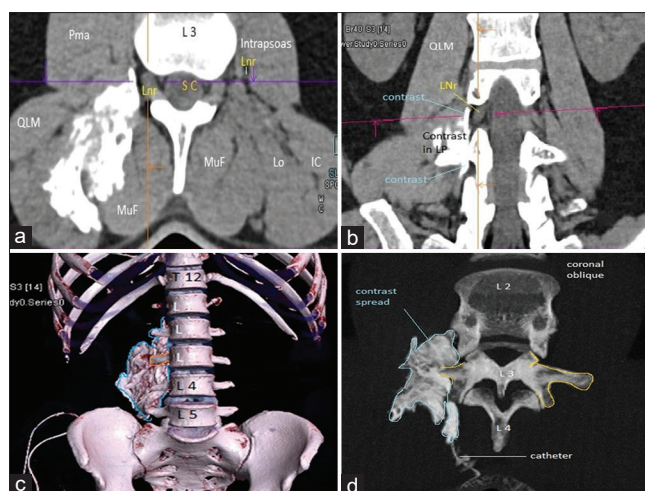
anaesthesia using a 27 G Whitacre spinal needle and 2.5 ml of 0.5% heavy bupivacaine. Unilateral ESPB was administered in 2 patients with left sided surgeries in right lateral position and one patient with right sided surgery in the left lateral position. A low frequency, curvilinear 8-3 MHz ultrasound system (Sonosite M-Turbo, Inc) was used to identify the L3 transverse process (TP) after scanning from the T12 in the sagittal plane. The probe was placed 3 cm from the L3 spinous process in the sagittal plane to visualise the transverse process of L3. An 18 G Tuohy needle (B-Braun, USA) was inserted out of plane, parallel to the sagittal plane, directly over the TP to deliver 30 ml 0.2% ropivacaine, 12.5 µg dexmedetomidine. Correct placement of needle tip was confirmed after injecting 3 ml of 0.9% saline in a plane between the erector spinae muscle and the transverse process. A continuous infusion of 0.1% ropivacaine was initiated at 8 ml/hour after placing a 19 G epidural catheter (Perifix®, B-Braun, USA) 5-6 cm in the erector spinae plane (ESP). All patients received 1 g paracetamol 8 hourly IV. Surgery went on uneventfully and patients were transferred to wards after monitoring for a few hours in the postoperative area.

At 24 hours when limb physiotherapy was to be initiated, two patients complained of unilateral lower limbs weakness and one patient had unilateral weak foot movements. Hip flexion was objectively weak (power of 2/5) and weakness in knee extension (power of 3/5) in two patients. The femoral nerve related sensory loss could be delineated in all patients. The sensation of patient with foot drop was blunted on the lateral aspect of leg and dorsum of the foot. The L-ESP infusions were discontinued and motor power regained more than 24 hours later in all patients.

In 2 patients, after counselling and written consent, a CT contrast study injected through the ESP catheter was planned to understand the spread of LA causing foot drop and loss of knee reflexes on postoperative day 3. The catheters were removed after the CT contrast study. The axial and coronal demonstrated lumbar nerve root spread at L3, and 4 in case 1 with loss of knee reflexes [Figure 1a-d]. The coronal axial, oblique views also demonstrated spread to lumbar nerve root at L4 and L5 levels [Figures 2a and 2b] in patient with loss of ankle reflexes. All 3 patients had normal neurological functions as assessed by neurologist before discharge from the hospital (postoperative day 5).

## Discussion

Motor weakness are described with fascial plane blocks.<sup>[6]</sup> A weak hip flexion following quadratus lumborum block is reported. There is one case report mentioning a lower



**Figure 1:** (a) (Axial view) (b) (Coronal view) showing spread of contrast along Lnr. (Pma – Psoas major; Lnr – Lumbar nerve root; SC-Spinal cord; QLM-Quadratus Lumborum; MuF – Multifidus; Lo-Longissimus; IC-Iliocostalis) (c) CT-Volume rendering technique. Blue outline – Contrast spread behind transverse process (orange outline). (d) Axial Oblique view showing spread of contrast across L3-4 and close to L3 Lnr

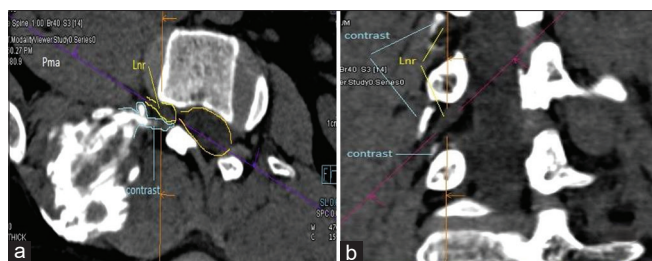
extremity motor blockade, after a T11 bilateral ESPB, possibly due to lumbar plexus infiltration.<sup>[7]</sup>

De Lara González *et al.* performed bilateral ESPB on fresh cadavers (total of 12 blocks) at L4 level and performed CT contrast study.<sup>[8]</sup> On analysis the authors concluded that L-ESPB at L4 always acts on the posterior branches of the spinal nerves and infrequently spreads to the paravertebral space to block the spinal nerve. In our 3 patients, CT contrast studies revealed spread to the ventral nerves L4-5 and with time might have travelled to sacral nerves with continuous infusion.

Thus, with a low ESPB block a neurological examination is mandatory before the patients are made to undergo physiotherapy and walk with support. Motor weakness may result in accidental falls with serious consequences.

Clair *et al.* described the reflexes which link the sensory receptors in the lower leg with the lower back muscles (ESM).<sup>[9]</sup> The results supported the hypothesis that the reflex pathways connect the muscle of the lower limb and the back muscles. The lower ESM provides stability of the lumbar spine and together with the transverses abdominis and internal oblique muscle corrects for change in the centre of gravity. Perhaps the ESPB might alter the reflexes in lower extremity by blocking the lower thoracolumbar outflow.

The lower motor weakness should be included as a possibility and informed in advance to the patient and relatives. Postoperatively, a neurological assessment of loss or attenuation of knee and ankle reflexes will ascertain



**Figure 2: (a) Axial Oblique view showing contrast spread across (blue outline) dorsal part of Lnr (yellow) emerging from spinal cord (orange). Rest of contrast occupies ESM. (b) Coronal Oblique showing contrast spread shown in blue across Lnr (yellow line) on its outer side at L4 and L5 and on inner side at L5 level**

the strength of the muscle groups of lower limbs. In three of our patients with an ESPB administered at level of L3, neurological examination revealed weakness of quadriceps femoris muscles in 2 patients and tibialis anterior in 1 patient in the postoperative period. This confirms a spread from L3 to the lumbosacral elements. There is no optimal dose of LA defined for an ESPB at various levels. However, volumes from 3.4 ml to 4.6 ml have been suggested.<sup>[10]</sup> ESPB is a large volume block with a chance of LA spread to the lumbar plexus. As of now, we are not sure whether a further decrease in concentration and infusion rate will balance between pain relief and lower limb muscle strength. We caution against the use of continuous ESPB as an ambulatory block without lower limb neurological examination.

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#### Conflicts of interest

There are no conflicts of interest.

#### References

1. Foss NB, Kristensen MT, Palm H, Kehlet H. Postoperative pain after hip fracture is procedure specific. *Br J Anaesth* 2009;102:111-6.
2. La Colla L, Ben-David B, Merman R. Quadratus lumborum block as an alternative to lumbar plexus block for hip surgery: A report of 2 cases. *Case Rep* 2017;8:4-6.
3. Tulgar S, Senturk O. Ultrasound guided erector spinae plane block at L-4 transverse process level provides effective postoperative analgesia for total hip arthroplasty. *J Clin Anesth* 2017;44:68.
4. Tulgar S, Selvi O, Senturk O, Ermis MN, Cubuk R, Ozer Z. Clinical experiences of ultrasound-guided lumbar erector spinae plane block for hip joint and proximal femur surgeries. *J Clin Anesth* 2018;47:5-6.
5. Selvi O, Tulgar S. Ultrasound guided erector spinae plane block as a cause of unintended motor block. *Rev Esp Anestesiol Reanim* 2018;65:589-92.
6. Mellerta LT, Cheunga ME, Gemma RA. Femoral nerve palsy following landmark based ilioinguinal-iliohypogastric nerve block: Case report and safety review. *J Med Cases* 2017;8:155-8.
7. Wikner M. Unexpected motor weakness following quadratus lumborum block for gynaecological laparoscopy. *Anaesthesia* 2017;72:230-2.
8. De Lara González SJ, Pomés J, Prats-Galino A, Gracia J, Martínez-Camacho A, Sala-Blanch X. Anatomical description of anaesthetic spread after deep erector spinae block at L-4. *Rev Esp Anestesiol Reanim* 2019;66:409-16.
9. Clair JM, Okuma Y, Misiaszek JE, Collins DF. Reflex pathways connect receptors in the human lower leg to the erector spinae muscles of the lower back. *Exp Brain Res* 2009;196:217-27.
10. De Cassai A, Tonetti T. Local anesthetic spread during erector spinae plane block. *J Clin Anesth* 2018;48:60-1.