

## Use of erector spinae plane block in open abdominal surgery and cancer pain

The erector spinae plane (ESP) block is a new regional anaesthetic technique described by Forero *et al.*<sup>[1]</sup> Currently, the mechanism of analgesia is LA diffusion through the connective tissues to the transverse processes near the costotransverse foramina, near the dorsal and ventral rami of the thoracic spinal nerves.<sup>[1,2]</sup>

To date, there are only 14 published case reports of this technique.<sup>[1-14]</sup> ESP block was used as both single shot and continuous catheter in acute pain for laparoscopic thoracoabdominal surgery, fracture ribs and for neuropathic pain. We report two cases of successful ESP block using a continuous catheter technique for post-operative pain relief after open cholecystectomy and single-shot technique in cancer-related chronic pain at low thoracic level.

### Case 1

An 81-year-old male, admitted to the ICU with a diagnosis of cholecystitis and systemic sepsis requiring noradrenaline 13 mcg/min for haemodynamic support. His medical co-morbidities were: hypertension, ischaemic heart disease, hypercholesterolemia, type-2 diabetes mellitus, chronic obstructive airway disease, Parkinson's disease and acute renal failure. In view of sepsis and coagulopathy with an INR of 1.9 ESP block was considered appropriate. An informed consent was obtained for this to assist with post-operative analgesia.

An emergency laparoscopic cholecystectomy was planned. Due to sepsis and respiratory deterioration surgeons considered open procedure. Surgery was uneventful; the blood pressure (BP) was maintained on noradrenaline infusion at the same preoperative dose. Due to poor gas exchange and requirement of high inotropic support, he was considered for delayed extubation in the ICU. To improve post-operative respiratory function and allow active participation in physiotherapy and rehabilitation we considered ESP block continuous catheter infusion. After completion of surgery,

in the right lateral position, an ESP block was performed under ultrasound guidance at the level of the T7 transverse process. A 15-6 MHz Linear ultrasound probe (SonoSite X-Porte, SonoSite Inc. Bothell, Washington, United States) was placed in a longitudinal orientation 3 cm from the midline and the 2 muscles of the posterior thoracic wall, trapezius and erector spinae were identified. An 18 G, Touhy needle was inserted in a caudad-to-cephalad direction until the tip touched the transverse process and lay in the interfascial plane deep to the erector spinae muscle. Saline was used to confirm the space and to open the fascial plane [Figure 1]. A total of 0.75% ropivacaine 10 ml (Naropin, AstraZeneca Pty Ltd NSW, Australia) was injected followed by epidural catheter insertion. In the ICU, catheter infusion of ropivacaine 0.2% 4–6 ml/h was administered via infusion syringe driver Terumo TE 311 (Tokyo, Japan). After extubation the patient did not require any opioid analgesia and ESP infusion was continued for 5 days. The Acute Pain Service (APS) staff independently assessed the pain scores and performed catheter care. During his ICU stay, his pain scores were 1/10–2/10 and he was able to participate in deep breathing and coughing. The infusion was discontinued on the 5<sup>th</sup> post-operative day.

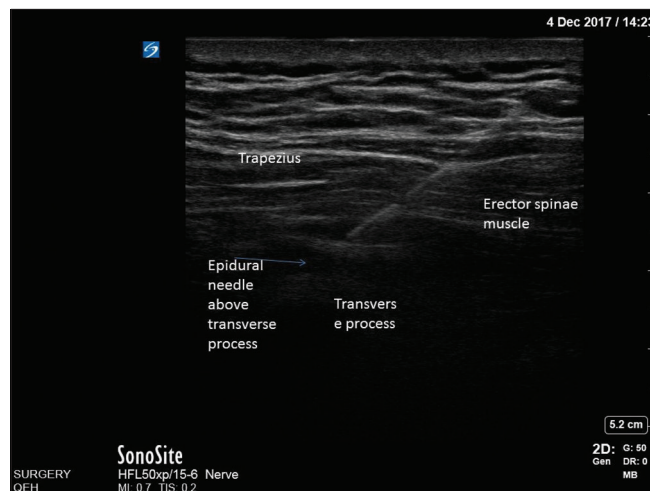
## Case 2

A 61-year-old male patient presents with Stage-4 metastatic lung adenocarcinoma causing posterior chest wall pain with both nociceptive and neuropathic descriptors. He was referred by the palliative care team for consideration of appropriate regional block. At the time of referral, pain management was requiring gradually escalating doses of MS-Contin (sustained release oral morphine), sublingual fentanyl 200–400 mcg (abstral) and local radiotherapy. Over the last 3 months prior to presentation, the patient noted low left posterior thoracic wall pain, with MRI showing pleural and rib deposits at the T11 rib in the posterior scapular line, with tumour tissue at, but not extending into, the T11/T12 neural foramen. He described localised intermittent severe, stabbing pain with movement and coughing (incident pain). He also has a less localised continuous aching, numbness, burning and itching extending up under the left scapula. In addition to that, he would experience breakthrough pain with no obvious triggers.

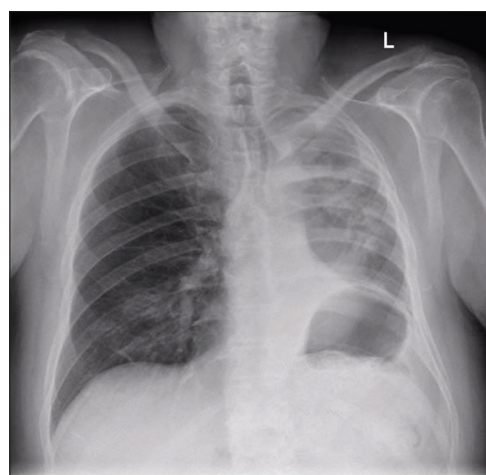
Post-radiotherapy his CT/chest X-ray showed pleural apical thickening, reflecting progressive radiation fibrosis, superimposed infection/inflammation and recurrent malignancy [Chest X-ray Figure 2].

He was reviewed at the Pain Management Unit and the decision was to trial proximal T11 intercostal nerve block (ICNB) lateral to the paravertebral space. The block was undertaken

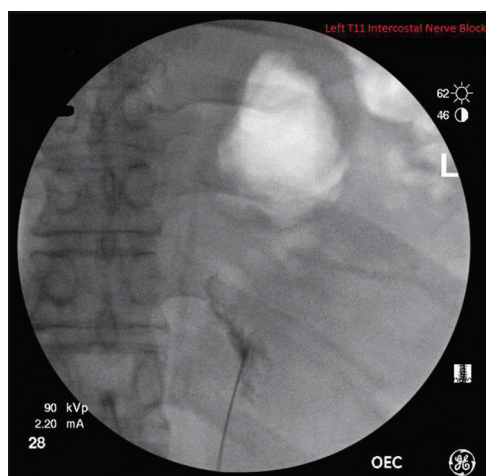
under ultrasound and X-ray guidance using 22 G spinal needle and 8 ml of naropin 1% and betamethasone 11.4 mg were injected [Figures 3 and 4]. Patient had reduced pin



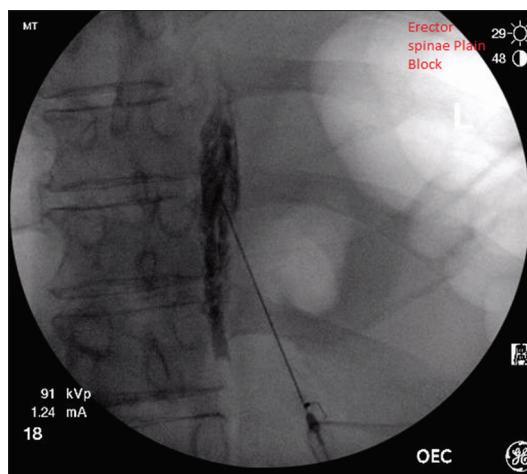
**Figure 1:** Showing the ultrasound-guided erector spinae plane block at T7 level



**Figure 2:** Chest X-ray showing pleural thickening



**Figure 3:** Intercostal nerve block showing limited contrast both proximally and distally

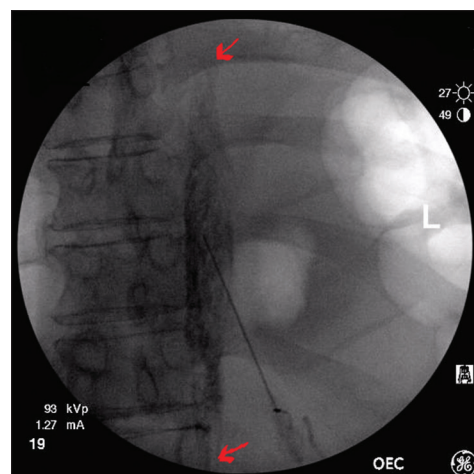


**Figure 4:** Left erector spinae plane block contrast study

prick sensation confined to the T11 dermatome immediately after the block. This enabled him to cough without any pain. His posterior chest wall pain scores reduced from 10/10 to 3/10 but he continued to experience significant breakthrough pains requiring abstral.

After 2 weeks patient started to re-experience severe pain, and was referred for consideration of a neurolytic block. Further options such as repeat intercostal nerve block, neurolytic block, intercostal nerve radiofrequency and intrathecal analgesia were discussed with the patient, nevertheless each of them had its shortcomings. During previous ICNB, contrast spread was noted to be limited both proximally and distally. This was thought to be due to post-radiotherapy fibrosis, and tumour deposits at the neural foramen and in the rib and the pleura. For these reasons, ESP block was an intriguing option to consider. A single-shot technique was considered initially with the expectation of considering a tunnelled ESP catheter (utilising self-administered naropin 0.2%, 20 ml TDS) should a repeat procedure be required.

After obtaining an informed consent, ESP block was performed at the level of T11 transverse process under US and X-ray guidance. A 22 G spinal needle was used, and 20 ml of naropin 1% plus 11.4 mg of betamethasone were injected. Contrast (Ultravist 240) injection confirmed excellent cephalad and caudad spread with no intravascular uptake, and local anesthetic spread was also noted under real-time ultrasonography and fluoroscopy [Figures 4 and 5]. Patient reported prompt complete relief of his posterior chest wall as well as incidental pain. His numerical pain scores dropped dramatically from 10/10 to 0/10. Interestingly, examination revealed reduced pin prick sensation from T6 to L1 dermatomes.



**Figure 5:** Left erector spinae plane block after local anesthetic injection

Previous reports were successful in performing blocks at higher than T8 level, we were successful in performing the block at the T11 level. This allows us to perform block at the required segmental level rather than performing at the higher thoracic level resulting in blocking unrequired dermatomes.

ESP block with catheter technique may be used for prolonged post-operative analgesia with minimal opioid use. It may also be used in cancer pain and when neuraxial block is contraindicated. Comparative randomised studies will be needed to confirm the effectiveness of continuous ESP block.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

**Vasanth Rao Kadam, Medhat Wahba<sup>1,2</sup>**

Department of Anaesthesia, The Queen Elizabeth Hospital, The University of Adelaide, <sup>1</sup>Department of Anaesthesia, <sup>2</sup>Flinders Medical Centre, SA, Australia

Address for correspondence: Dr. Vasanth Rao Kadam, Department of Anaesthesia, The Queen Elizabeth Hospital, The University of Adelaide 28 Woodville Road, Woodville, SA 5011, Australia.

E-mail: vasanth.rao@health.sa.gov.au

## References

- Forero M, Adhikary SD, Lopez H, Tsui C, Chin KJ. The erector spinae plane block: A novel analgesic technique in thoracic neuropathic pain. *Reg Anesth Pain Med* 2016;41:621-7.
- Chin KJ, Adhikary S, Sarwani N, Forero M. The analgesic efficacy of pre-operative bilateral erector spinae plane (ESP) blocks in patients having ventral hernia repair. *Anaesthesia* 2017;72:452-60.
- Hamilton DL, Manickam B. Erector spinae plane block for pain relief in rib fractures. *Br J Anaesth* 2017;118:474-5.
- Scimia P, Basso Ricci E, Droghetti A, Fusco P. The ultrasound-guided continuous erector spinae plane block for postoperative analgesia in video-assisted thoracoscopic lobectomy. *Reg Anesth Pain Med* 2017;42:537.
- Forero M, Rajarathinam M, Adhikary S, Chin KJ. Continuous erector spinae plane block for rescue analgesia in thoracotomy after epidural failure: A case report. *A A Case Rep* 2017;8:254-6.
- Chin KJ, Malhas L, Perlas A. The erector spinae plane block provides visceral abdominal analgesia in bariatric surgery: A report of 3 cases. *Reg Anesth Pain Med* 2017;42:372-6.
- Ueshima H, Otake H. Erector spinae plane block provides effective pain management during pneumothorax surgery. *J Clin Anesth* 2017;40:74.
- Ueshima H, Otake H. Clinical experiences of ultrasound-guided erector spinae plane block for thoracic vertebra surgery. *J Clin Anesth* 2017;38:137.
- Restrepo-Garces CE, Chin KJ, Suarez P, Diaz A. Bilateral continuous erector spinae plane block contributes to effective postoperative analgesia after major open abdominal surgery: A case report. *A A Case Rep* 2017;9:319-21.
- Kumar A, Hulsey A, Martinez-Wilson H, Kim J, Gadsden J. The use of liposomal bupivacaine in erector spinae plane block to minimize opioid consumption for breast surgery: A case report. *A A Pract* 2018;10:239-41.
- Muñoz F, Cubillos J, Bonilla AJ, Chin KJ. Erector spinae plane block for postoperative analgesia in pediatric oncological thoracic surgery. *Can J Anaesth* 2017;64:880-2.
- Ohgoshi Y, Ikeda T, Kurahashi K. Continuous erector spinae plane block provides effective perioperative analgesia for breast reconstruction using tissue expanders: A report of two cases. *J Clin Anesth* 2018;44:1-2.
- 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* 2018;44:68.
- Veiga M, Costa D, Brazão I. Erector spinae plane block for radical mastectomy: A new indication? *Rev Esp Anesthesiol Reanim* 2018;65:112-5.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

Access this article online	
<b>Quick Response Code:</b>	<b>Website:</b> www.joacp.org
	<b>DOI:</b> 10.4103/joacp.JOACP_366_17

**How to cite this article:** Kadam VR, Wahba M. Use of erector spinae plane block in open abdominal surgery and cancer pain. *J Anaesthesiol Clin Pharmacol* 2018;34:564-7.  
© 2019 Journal of Anaesthesiology Clinical Pharmacology | Published by Wolters Kluwer - Medknow