CLINICAL GUIDELINES ID TAG	
Title:	***Erector Spinae Plane Block Guideline***
Author:	***Dr Peter Merjavy***
Speciality / Division:	***Anaesthetics / ATICS***
Directorate:	***Acute***
Date Uploaded:	21st March 2019
Review Date	***20th March 2022***
Clinical Guideline ID	CG0603

Introduction

Ultrasound guided erector spinae (ESP) block was described for the first time by Forero as an analgesic technique to treat thoracic neuropathic pain. ESP blocks offer good postoperative analgesia for rib fractures or thoracic/breast surgery. One recent RCT found bilateral ESP block to be as effective as thoracic epidural analgesia after cardiac surgery. Some authors suggested that the ESP block has analgesic effects not only on somatic, but also on visceral pain. Local anaesthetic (LA) probably spreads towards the paravertebral space affecting the *ventral rami* and *rami communicantes* that include sympathetic nerve fibres. Bilateral ESP blocks at lower levels have been found as effective as thoracic epidural analgesia for major abdominal surgery. Multiple other case reports used T7 as an optimal point of injection for various (mostly laparoscopic) abdominal procedures. 20 mls of fluid injected in to the erector spinae plane of cadavers at T7 was found to spread from C7/T2 to L2/3 according to one cadaveric study. ESP blocks can be performed at T4-5 level for breast and thoracic surgeries and T7-8 levels for abdominal surgeries.

Indications

T2 level

- Chronic shoulder pain syndrome
- Cervicogenic headache

T4/5 level

- Rib fractures
- Open thoracotomy / VATS lobectomy
- Cardiac surgery

- Breast surgery with axillary clearance
- Chronic post-herpetic neuralgia
- Chronic post-thoracotomy pain
- Metastatic cancer of the rib
- Rescue technique after Thoracic epidural analgesia failure

T7/8 level

- Nephrectomy
- Laparoscopic
    - Hernia repair
    - Cholecystectomy
    - Colorectal surgery
- Laparotomy
    - Liver resection
    - Open cholecystectomy
- Chronic post-herpetic neuralgia
- Acute pancreatitis
- Hysterectomy

Contraindications

- Patients refusal
- Allergy to local anaesthetics
- Infection at site of injection
- Uncontrolled coagulopathy (INR >3)
- Difficult anatomy – scoliosis, previous spine surgery (relative, operator dependent)

ESP block - technique

Positioning

- The ESP block can be performed in patients awake, sedated or asleep.
- The patient can be sitting or positioned semi prone, lateral decubitus or prone.

Equipment

- Ultrasound guidance is necessary to visualise sono-anatomical landmarks.
- High frequency linear ultrasound probe is placed longitudinally approximately 5-6 cm from midline to identify ribs and pleura. Probe is then moved towards midline to identify costo-transverse junction and more medially to identify transverse processes. This is usually 2.5-3 cm from midline in thoracic region.
- 100mm echogenic regional anaesthesia needle (Pajunk or BBraun) should be used for single shot blocks.

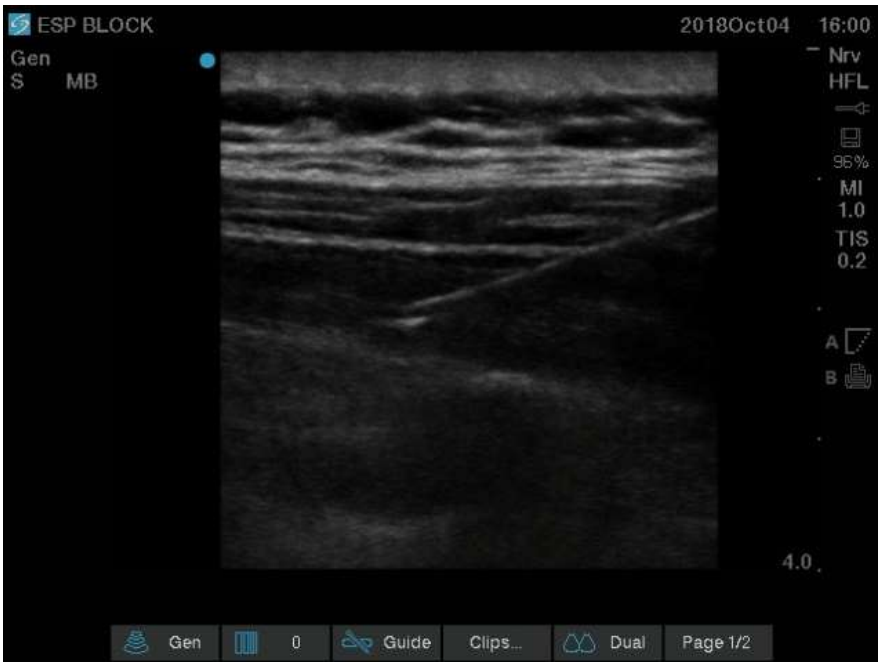
- Standard epidural kit (16G Tuohy needle and 18G epidural catheter – Smiths Medical) or Rectus Sheath kit (for bilateral catheters) can be used for continuous techniques.

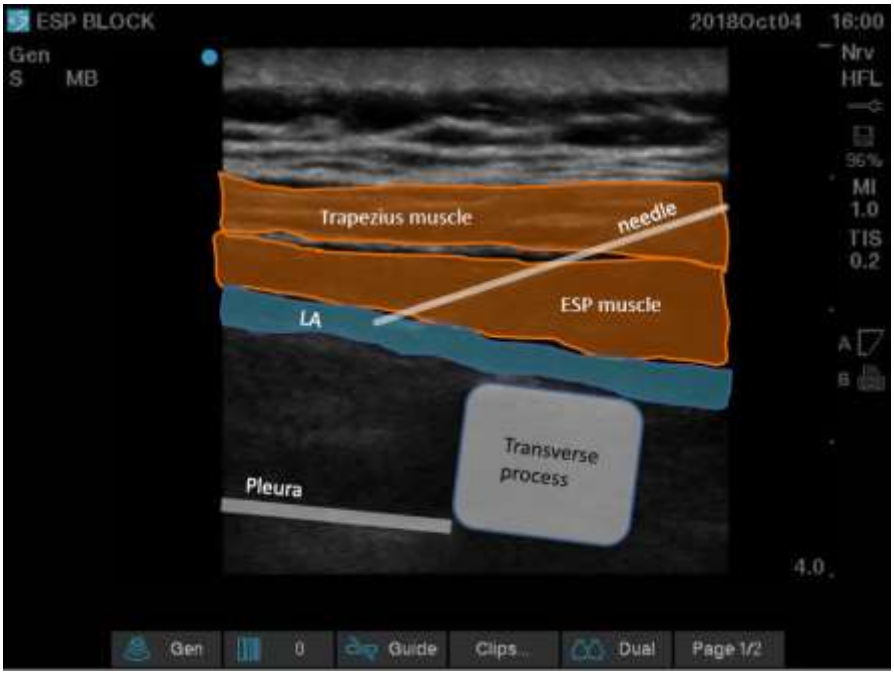
Single shot technique

- After asepsis of patient skin with chlorhexidine or betadine and sterile probe cover, needle is inserted in plane from cranial to caudal (mostly for abdominal indications) or caudal to cranial (for thoracic indications) passing through paravertebral muscles until bone contact with appropriate transverse process.
- Real time visualisation in ultrasound is of paramount importance. Injection of LA results in separating paravertebral muscles (erector spinae muscle) from transverse processes and spread of LA in cranio-caudal direction.
- For single shot injection the LA choice is 0.25 – 0.375% Levobupivacaine 20-30ml (15ml for small patients). Always check levobupivacaine maximum recommended dose for your patient (2.5 mg/kg with and without adrenaline). Expected duration of action after single shot injection is 10-12 hours

Catheter technique

- For the catheter technique it is possible to open the space using 5mls of normal saline and insert the catheter 3-4 cm into space.
- Correct position of the catheter is then confirmed by injection of LA through catheter and visualisation of appropriate spread on ultrasound.
- The catheter should be secured to the skin using tissue glue (Dermabond) and a transparent dressing (Tegaderm). A bacterial filter should be flushed with LA and attached.
- As for other continuous techniques full asepsis (gown, hat, mask, gloves + full ultrasound sleeve & drape) is required.
- It is recommended to give an initial bolus of 15-20 ml of 0.25 – 0.375% Levobupivacaine.
- As the ESP block is a field block, the volume of LA is important to deliver successful analgesia. The **Intermittent programmable boluses** programme is therefore selected in the regional anaesthesia variable infusion pump – (RA-VIP).
- 0.125% Levobupivacaine or 0.2% Ropivacaine (200 ml bag) can be used for intermittent boluses via pump. The first bolus will be delayed for 4 hours after pressing the start button. Intermittent boluses should be selected in volumes of 10-20 mls for unilateral catheters or 30-40mls in the case of bilateral catheters. The pump will deliver a bolus of LA every 4 hours.
- The catheter should be removed after 96 hours (4 days) unless it is still necessary. Individual assessment by an anaesthetist or the Acute Pain Team, including an inspection of the catheter insertion site for any signs of infection should be undertaken daily.

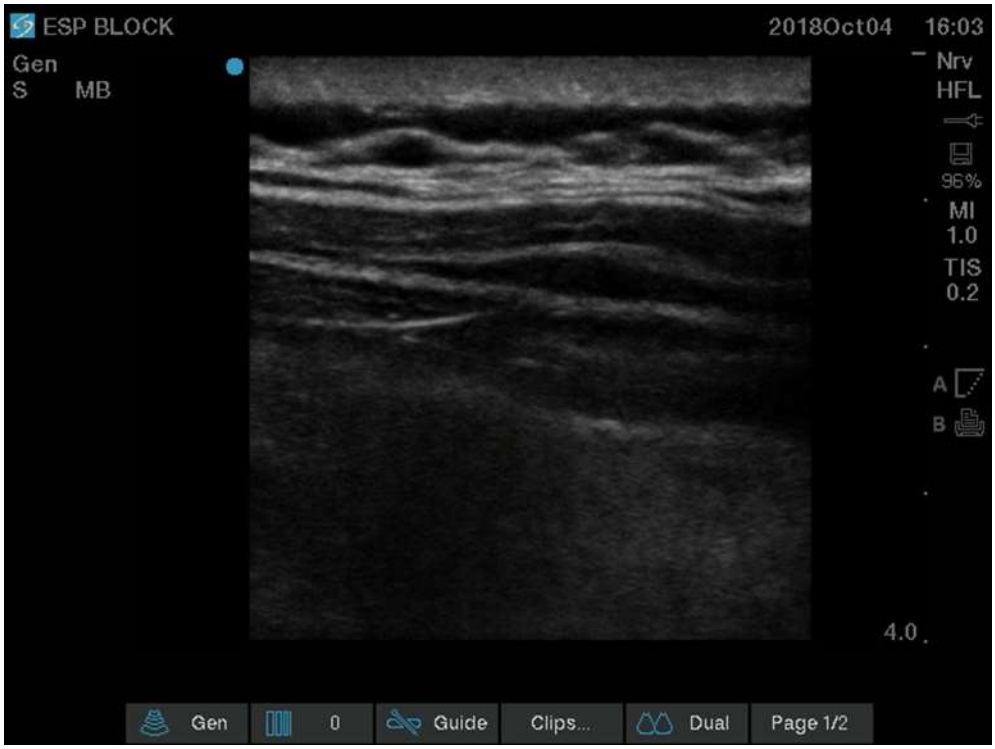




ESP Block and anticoagulation

ESP block has been successfully used in patients on anticoagulants when epidural or paravertebral techniques might not be feasible. There is a small risk of haematoma formation after injection, but due to the location of injection (between ES muscle and transverse processes) this does not represent any major harm to patients. Presence of LMWH, antiplatelet medications, NOAC/DOAC or warfarin is therefore not a contraindication to ESP block. Caution should be exercised when INR is above therapeutic range (>3) and correction of coagulation should be performed prior to block placement.

For information on how to set up the Regional Anaesthesia Pump for programmable boluses please refer to appropriate Standard Operating Procedure published by Acute Pain Team.



Multimodal Therapy

While ESP catheters may diminish acute pain, patients undergoing extensive surgery, particularly those who are opioid-tolerant, may require multimodal analgesia in addition to LA. The anaesthetist may consider and prescribe the following analgesics as appropriate*:*

- PARACETAMOL 1g IV/PO QID
- *Short –acting Opioids*: Most patients will be given short-acting oral opioids, most commonly OXYNORM (SHORTEC) 5-10mg 2-4 hourly PO.
- NSAIDS: After discussing with the surgeon, adding NSAID of your choice (eg IBUPROFEN 200 – 400mg PO TID / BD IV PARECOXIB 40mg) will diminish the opiate requirement. Avoid traditional NSAIDS in patients with a history of gastritis, renal dysfunction, and/or bleeding diathesis. PARECOXIB 40mg IV BD, a COX-2 inhibitor, offers some advantages including less risk of gastritis, no platelet inhibition, and reduced central sensitization.
- *Long-acting Opioids*: Challenging acute pain patients may require a short course of long-acting agents, such as modified release OXYCODONE 10-20 mg BD PO. Initiate therapy with the lowest possible dose with the intent to discontinue therapy after the ESP catheter is removed.
- MORPHINE SULPHATE PCA
- *Other*: Co-administration of anticonvulsants (e.g. GABAPENTIN 300-600 mg PO TID) can be effective in reducing opioid requirements, particularly in opioid-tolerant patients in the acute pain setting.

Care of the injection/insertion site.

- Observe site for redness, excessive bruising, swelling and infection (i.e. pain, warmth, discharge).

- Check dressing over insertion site 4 hourly and with each top-up injection.
- Do not routinely replace the primary dressing.
- Observe for a wet dressing indicating leakage of blood or medication. If dressing saturated, reinforce tape around dressing or replace dressing using aseptic technique. If concerned, notify Acute Pain Team or anaesthetist.
- Ensure catheter is always securely taped.
- Be cautious when moving or turning the patient so the catheter is not dislodged.
- Check catheter tubing and pump connection for disconnection or kinking.
- If the catheter becomes disconnected, call the Acute Pain Team/anaesthetist immediately.
- Patient should not bathe or shower while catheter in situ.

Removing ESP Catheters.

Supplies:

- Clean gloves
- 2 x 2 gauze
- Sterile semi-permeable dressing (e.g. 4-sided Elastoplast, Opsite … etc).
- If tip / site is to be cultured: Dressing tray, sterile scissors, sterile specimen container, microbiology swab, requisition and labels

Procedure:

- Perform hand hygiene.
- Position the patient so that catheter sites are easily accessible.
- Turn off the infusion pump.
- Place sterile field to receive catheter if tip culture is required.
- Use sterile gloves.
- Remove dressing and tape (if any). *(Note: Catheter may come out with dressing)*
- Gently withdraw catheter steadily and place on sterile field if tip is to be sent for C&S

Note: If unable to remove the catheter or there is any resistance upon removing catheter, stop and notify anaesthetist immediately.

- Assess the catheter site for unusual bleeding, bruising, swelling, or redness.

Note: If evidence of infection, obtain swab for C & S from the site and notify surgical team.

- After catheter removal clean site with appropriate antiseptic solution (eg. Chlorhexidine 2%, Betadine …) and apply an occlusive dressing.

Note: Check catheter tip to ensure it is intact. If not intact notify the anaesthetist immediately.

If the ESP catheter is suspected as a source of infection:

- Use sterile scissors to remove 5 cm from the distal end of catheter and place in sterile container and label specimen container at bedside.
- Recheck site one hour following catheter removal for any persistent fluid leakage, localized bleeding, expansion of bruising or hematoma. If present notify the anaesthetist immediately.
- Remove sterile semi-permeable dressing (e.g. 4-sided Elastoplast) in 24 hours.

Document:

- Date and time of removal
- Condition of insertion site

- Condition of catheter tip
- If any bleeding, fluid drainage, hematoma at catheter site present
- Whether tip / site was cultured
- Patient response to procedure
- Complications and intervention

Report to the anaesthetist if there is:

Persistent fluid leak, localized bleeding or expansion of bruising or hematoma is noted.

References:

1. M. Forero, S. D. Adhikary, H. Lopez, C. Tsui, and K. J. Chin, "The erector spinae plane block a novel analgesic technique in thoracic neuropathic pain," Regional Anesthesia and Pain Medicine, vol. 41, no. 5, pp. 621–627, 2016.
2. K. J. Chin, L. Malhas, and A. Perlas, "The erector spinae plane block provides visceral abdominal analgesia in bariatric surgery a report of 3 cases," Regional Anesthesia and Pain Medicine, vol. 42, no. 3, pp. 372–376, 2017.
3. D. Bonvicini, L. Tagliapietra, A. Giacomazzi, and E. Pizzirani, "Bilateral ultrasound-guided erector spinae plane blocks in breast cancer and reconstruction surgery," Journal of Clinical *Anaesthesia*, vol. 44, pp. 3-4, 2018.
4. C. E. Restrepo-Garces, K. J. Chin, P. Suarez, and A. Diaz: Bilateral Continuous Erector Spinae Plane Block Contributes to Effective Postoperative Analgesia After Major Open Abdominal Surgery *A & A Case Reports*, vol. 9, no. 11, pp. 319–321, 2017.
5. H. Ueshima and H. Otake: Erector spinae plane block provides effective pain management during pneumothorax surgery *Journal of Clinical Anesthesia*, vol. 40, p. 74, 2017.
6. K. J. Chin, S. Adhikary, N. Sarwani, and M. Forero: The analgesic efficacy of pre-operative bilateral erector spinae plane (ESP) blocks in patients having ventral hernia repair *Anaesthesia*, vol. 72, no. 4, pp. 452–460, 2017.
7. H.-J. Shin, A.-Y. Oh, J.-S. Baik, J.-H. Kim, S.-H. Han, and J.-W. Hwang : Ultrasound-guided oblique subcostal transversus abdominis plane block for analgesia after laparoscopic cholecystectomy: A randomized, controlled, observer-blinded study *Minerva Anestesiologica*, vol. 80, no. 2, pp. 185–193, 2014.
8. S.Tulgar, O.Selvi and M.S.Kapakli: Erector Spinae Plane Block for Different Laparoscopic Abdominal Surgeries: Case Series. *Case Reports in Anesthesiology* vol. 2018, Article ID 3947281, 3 pages 2018.
9. Thiruvenkatarajan V., Eng H.C., Adhikary S.D.: An update on regional anaesthesia for rib fractures. *Curr Opin Anesthesiol* 2018, 31: 601-607
10. Nagaraja P.S. et al.: Comparison of Continuous Thoracic Epidural Analgesia with Bilateral Erector Spinae Plane Block for Perioperative Pain Management in Cardiac Surgery. *Annals of Cardiac Anaesthesia* 2018, 21; 3: 323-327
11. Hamilton D.L., Manickam B. : Erector spinae plane block for pain relief in rib fractures. *Br J Anaesth* 2017, 118: 474-5