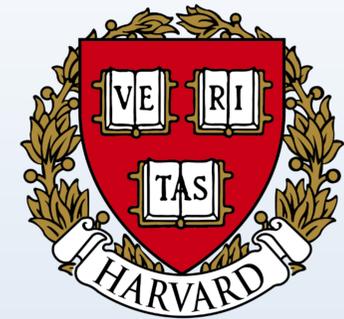




# Successful use of erector spinae plane block for perioperative pain control in patient undergoing coronary artery bypass graft surgery



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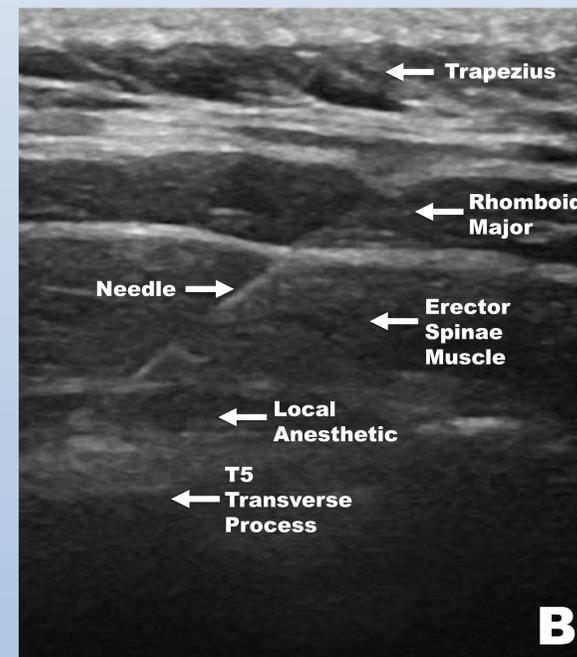
## Background

The Erector Spinae Plane Block (ESPB) has recently risen as a new procedure at the anesthesiologist's disposal for perioperative pain control. With the ongoing opioid crisis in our nation today, many physicians have utilized peripheral nerve blocks to limit narcotic usage. The ESPB in particular has shown immense peri-operative pain control in many operations such as breast, thoracic, and abdominal surgeries (1). The longtime standard of care for many Enhanced Recovery After Surgery (ERAS) protocols to limit opioids is the use of thoracic epidural analgesia (TEA), but recent evidence has shown that TEA does not reliably reduce hospital stay, incidence of ileus, or post-operative complications after abdominal surgery (2). Also, the inherent risks when performing a thoracic epidural (high spinal, pneumothorax, intravascular injection) make it a dangerous option for high morbidity procedures like cardiac surgery. Systemic anticoagulation required for cardiopulmonary bypass tremendously increases the risk of epidural hematoma (3). The potential loss of the sympathetic tone via TEA could be devastating to patients undergoing complex cardiac surgery (4). We utilized the ESPB as an alternative option for peri-operative pain control in this patient population. We present the case of a successful ESPB performed pre-operatively for coronary artery bypass (CABG) surgery to limit opioid consumption.

## Case

A 72-year-old 80 kg male with a history of coronary artery disease received bilateral ESPB at the T5 level prior to CABG surgery. Prior to induction of general anesthesia, the patient was placed in a sitting position at the bedside. Using sterile technique and ultrasound guidance, a single shot ESPB was administered at every third transverse process corresponding to the entire dermatomal length of the planned surgical incision bilaterally. A high-frequency linear ultrasound probe was used. The block was administered via an in-plane technique using a 4 cm 21-gauge stimuplex needle inserted in a cranial to caudal direction. The block needle was advanced through the erector spinae muscles just before reaching the transverse process. Needle placement was confirmed by hydrodissection of interfascial plane. On injection, 20 ml of 0.2% ropivacaine mixed with 4mg preservative-free dexamethasone was delivered into the interfascial plane deep to erector spinae muscles and above the transverse process of the vertebrae.

After surgery, the patient remained intubated and was transferred to the intensive care unit (ICU) in stable condition. He was eventually extubated safely in the ICU later that day. After several hours the patient noted complete sensory blockade over a 6-inch incision corresponding from T1-T7. He rated his pain as a 0/10 during this time despite the fact he just had major cardiac surgery with a sternotomy. The sensory block lasted for 48 hours, during which he required no opioids. On post-operative day 3 he started to complain of 5/10 pain at the incision site. He required no post-operative ventilation nor any intravenous opioid analgesics during his subsequent hospital stay.



**Figure Legend:** A. A high-frequency linear ultrasound probe was used to guide erector spinae plane block placement at the T5 transverse process. B. Ultrasound imaging demonstrating needle tip position at the time of injection.

## Conclusion

The goal of the ERAS protocol is to provide a safe alternative to opioids for surgical patients. As seen here, the use of the ESPB is a viable option for patients undergoing cardiac surgery. The risks associated with TEA for patients undergoing major heart procedures on anticoagulation make the ESPB a much more attractive choice. Further large studies are needed to compare the efficacy of the ESPB versus the TEA for perioperative pain control in this patient population. Also, more studies need to be undertaken to elucidate which comorbidities in the cardiac surgery patient population justify the use of the ESPB over TEA. With a better safety profile, effective analgesia, and more practitioners becoming proficient in regional anesthesia, the ESPB is a feasible alternative to TEA for cardiac surgery.

## References

1. El-Boghdadly K, Pawa A. The erector spinae plane block: plane and simple. *Anaesthesia*. 2017 Apr;72(4):434-438. doi: 10.1111/anae.13830. Epub 2017 Feb 11.
2. Hughes MJ, Ventham NT, McNally S, Harrison E, Wigmore S. Analgesia after open abdominal surgery in the setting of enhanced recovery surgery: a systematic review and meta-analysis. *JAMA Surg*. 2014 Dec;149(12):1224-30. doi: 10.1001/jamasurg.2014.210.
3. Jakobsen CJ. High thoracic epidural in cardiac anesthesia: a review. *Semin Cardiothorac Vasc Anesth*. 2015 Mar;19(1):38-48. doi: 10.1177/1089253214548764. Epub 2014 Sep 7.
4. Landoni G, Isella F, Greco M, Zangrillo A, Royse CF. Benefits and risks of epidural analgesia in cardiac surgery. *Br J Anaesth*. 2015 Jul;115(1):25-32. doi: 10.1093/bja/aev201.
5. Vilite B, Strike E, Rutka K, Leibuss R. Pain management in intensive care unit patients after cardiac surgery with sternotomy approach. *Acta Med Litu*. 2019;26(1):51-63. doi: 10.6001/actamedica.v26i1.3956.
6. Pehora C, Pearson AM, Kaushal A, Crawford MW, Johnston B. Dexamethasone as an adjuvant to peripheral nerve block. *Cochrane Database Syst Rev*. 2017 Nov 9;11:CD011770. doi: 10.1002/14651858.CD011770.pub2.
7. Bjørn S, Linde F, Nielsen KK, Børglum J, Hauritz RW, Bendtsen TF. Effect of Perineural Dexamethasone on the Duration of Single Injection Saphenous Nerve Block for Analgesia After Major Ankle Surgery: A Randomized, Controlled Study. *Reg Anesth Pain Med*. 2017 Mar/Apr;42(2):210-216. doi: 10.1097/AAP.0000000000000538.