



GÖĞÜS KALP DAMAR ANESTEZİ
VE YOĞUN BAKIM DERNEĞİ

27. *Ulusal*
Kongresi

24 - 25 Eylül 2021 Wyndham Grand İzmir Özdilek



**Kardiyak cerrahide yeni alan
blokları ve erekör spina bloğu**

Alparslan Kuş





Kardiyak Cerrahide Yeni Alan Blokları & Erektör Spina Plan Bloğu



Alparslan Kuş

Perioperatif Ağrı Yönetimi

- Preemptif & Preventif

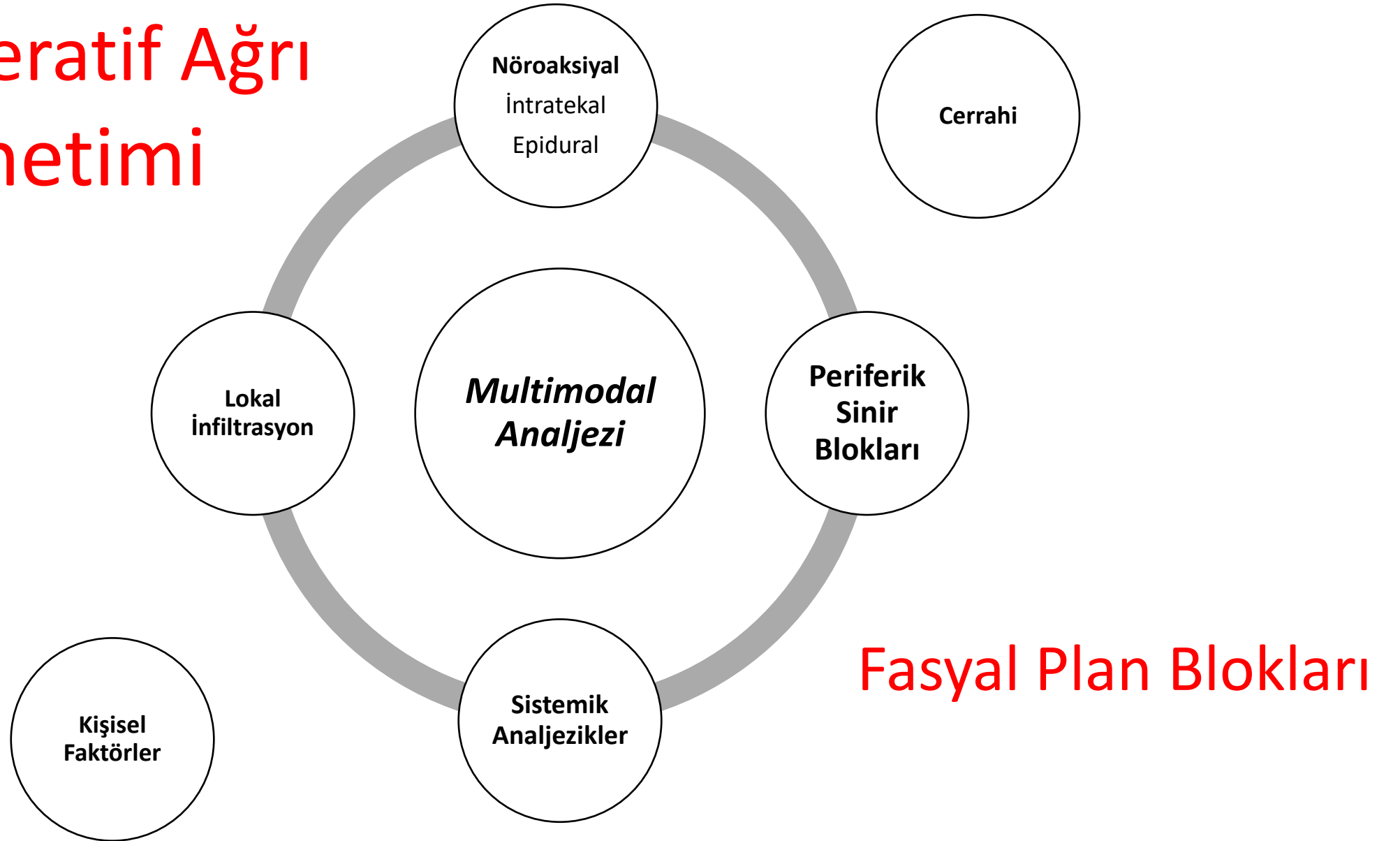
Preemptif		
Cerrahi insizyon öncesi	esnasında	sonrasında
P r e v e n t i f		

- Cerrahiye spesifik ağrı tedavisi



- *Multimodal Analjezi*

Perioperatif Ağrı Yönetimi



Kardiyak Cerrahide Postoperatif Ağrı

Table 39.1 Effects of pain following cardiac surgery

System	Disadvantages
Cardiovascular	↑ Chronotropy↑ Inotropy↑ BP↑ Cardiac work↑ O ₂ demand with ↓ supply, → ischaemia, dysrhythmias
Respiratory	↑ RR and ↓ tidal volume → ↑ work of breathingAtelectasisImpaired cough, retention of secretions↑ Infection risk
CNS	Exhaustion, disorientation, agitation↓ Satisfaction
Peripheral nervous system	↑ Incidence chronic pain
GI	Nausea, vomiting, anorexia
Other	Hypercoagulability → ↑ risk DVT and graft stenosisPoor wound healingImpaired glucose toleranceAltered immunological function → ↑ risk of infectionElectrolyte imbalance → ↑ risk arrhythmias↑ Length of stay
Psychological	AnxietyDepressionStress



Cut Opioid Prescriptions with Ultrasound- Guided Nerve Blocks

Postoperatif Ağrı

- Kronik ağrı
 - % 20 sternotomi
 - %25-60 torakotomi
- Artmış opioid kullanımı
 - Geç ekstübasyon
 - Uzamış taburculuk

Göğüs Duvarı Blokleri

Anterolateral

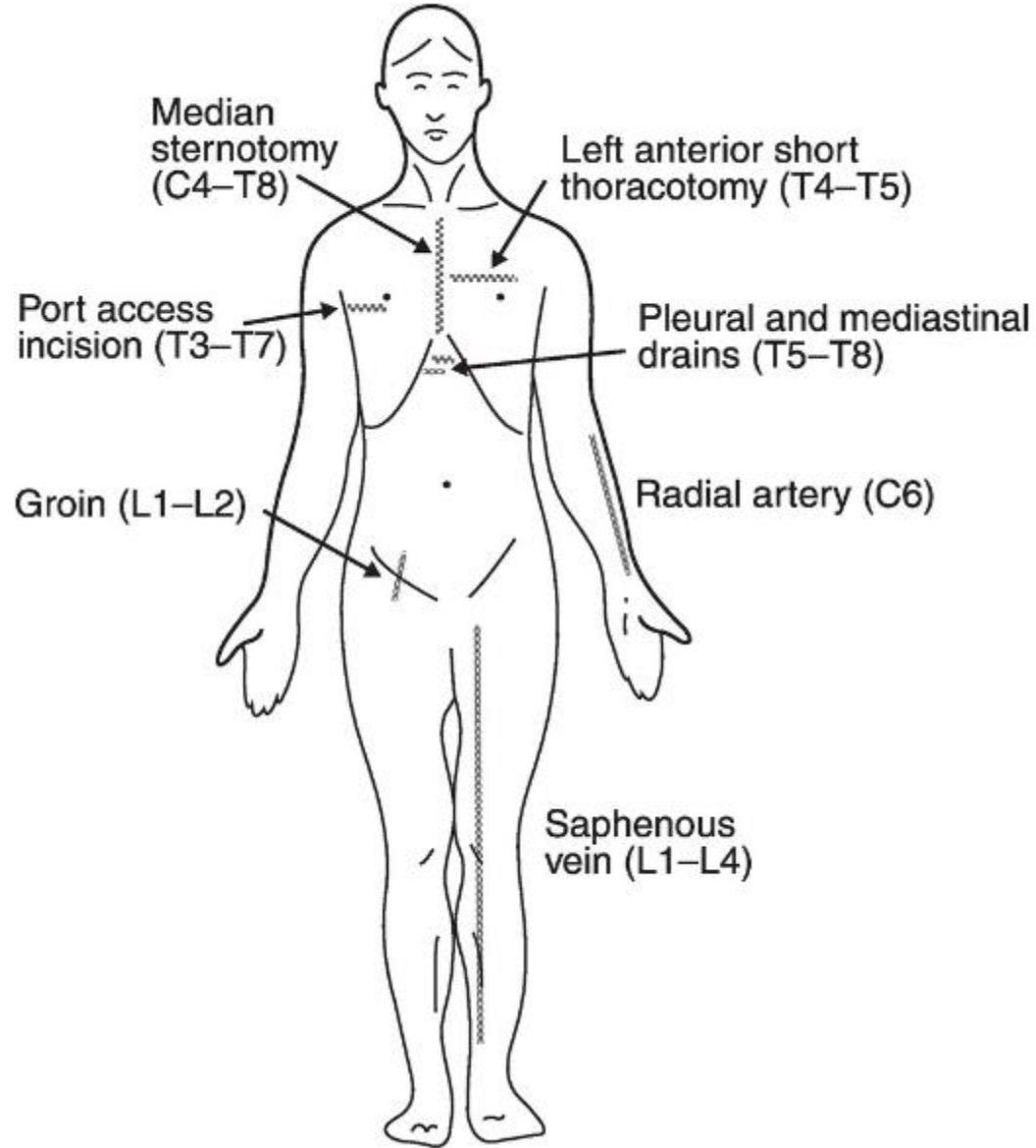
- Pektoral bloklar I-II
- Serratus anterior plan bloğu, yüzeysel-derin

Anteromedial

- Transvers torasik plan bloğu
- Pektointerkostal fasyal plan bloğu

Posterior

- Retrolaminar blok
- Erektör spina plan bloğu
- MTP blok
- Paraspinal interkostal blok
- Romboid interkostal subserratus plan bloğu

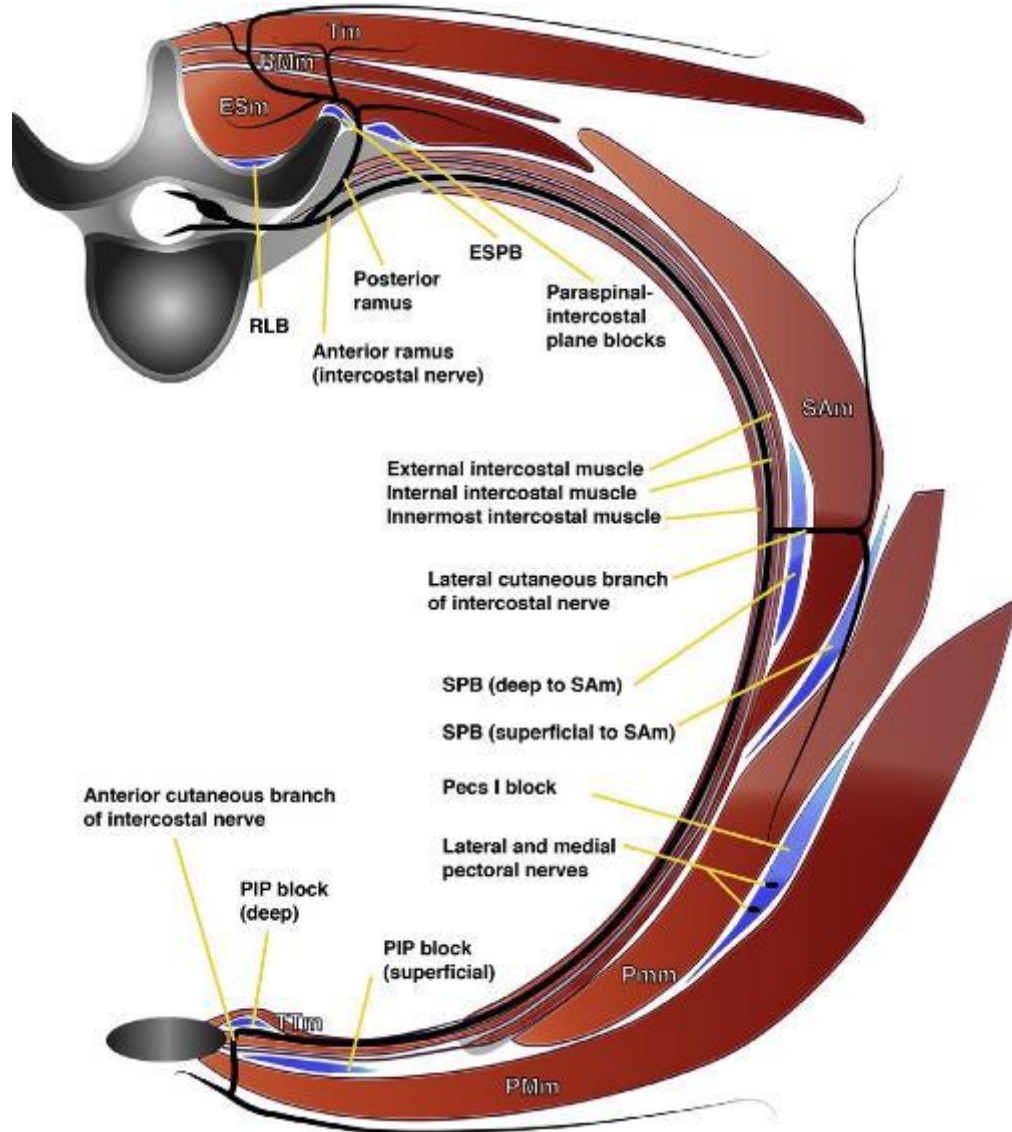


Pektoral Bloklar I-II

Serratus Anterior Plan Blođu

Pektointerkostal fasyal plan blođu
&
Transvers torasik kas plan blođu

Erektör spina plan blođu



Erektör spina plan bloğu

Serratus Anterior Plan Bloğu

Pektoral Bloklar I-II

**Pektointerkostal fasyal plan bloğu
&
Transvers torasik kas plan bloğu**

Pektoral Blok

- Kolay bir alan blođu!
- Kompartman-Fasya blođu
- Motor ve duyuşal sinirlerin blokajı



Anaesthesia
Journal of the Association of Anaesthetists of Great Britain and Ireland

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Anaesthesia » Correspondence by Issue » Vol 65 Issue s1 (April 2010) » Trunk blocks for abdominal sur... » The 'pecs block': a novel technique for providing analgesia after breast surgery

The 'pecs block': a novel technique for providing analgesia after breast surgery

Last post 30 May 2011, 11:23 AM by Rafael Blanco. 0 replies.

Eficacia analgésica del bloqueo de los nervios pectorales en cirugía de mama

R. Blanco¹, M. Garrido García², P. Diéguez García¹, B. Acea Nebril³, S. López Álvarez¹,
A. Pensado Castiñeiras¹

2011



Fig. 1. Colocación de la sonda en el espacio infraclavicular.

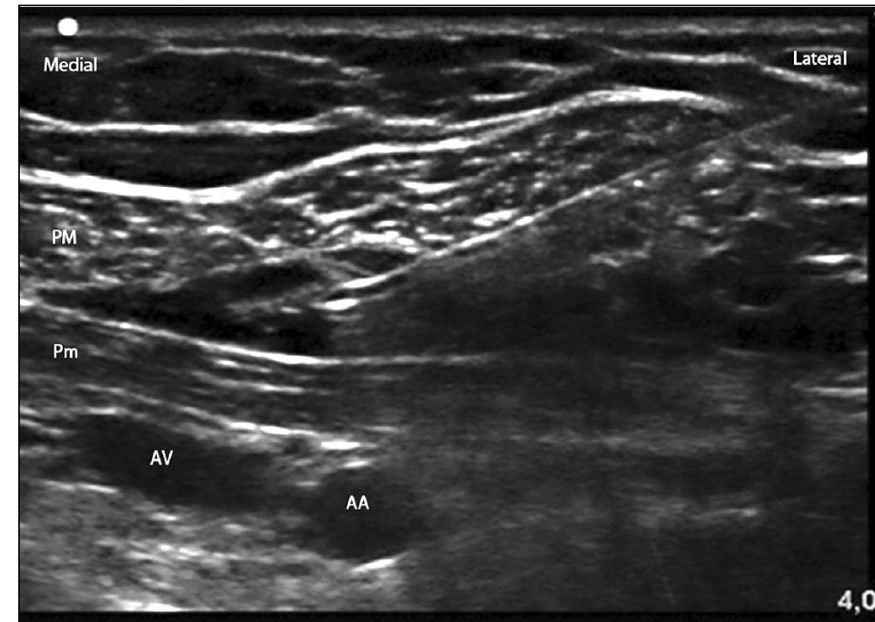


Fig. 2. Imagen sonográfica del pecs block. Se aprecian los músculos pectoral mayor (PM) y pectoral menor (Pm) por encima de la arteria (AA) y vena (AV) axilar.

“We mainly use it for the insertion of breast expanders and subpectoral prosthesis.

Other potential indications are traumatic chest injuries, iatrogenic pectoral muscle dissections, pacemakers, Port-a-caths and chest drains.”

Surgical Anatomy of the Pectoral Nerves and the Pectoral Musculature

ANDREA PORZIONATO,¹ VERONICA MACCHI,¹ CARLA STECCO,¹
 MARIOS LOUKAS,² R. SHANE TUBBS,³ AND RAFFAELE DE CARO^{1*}

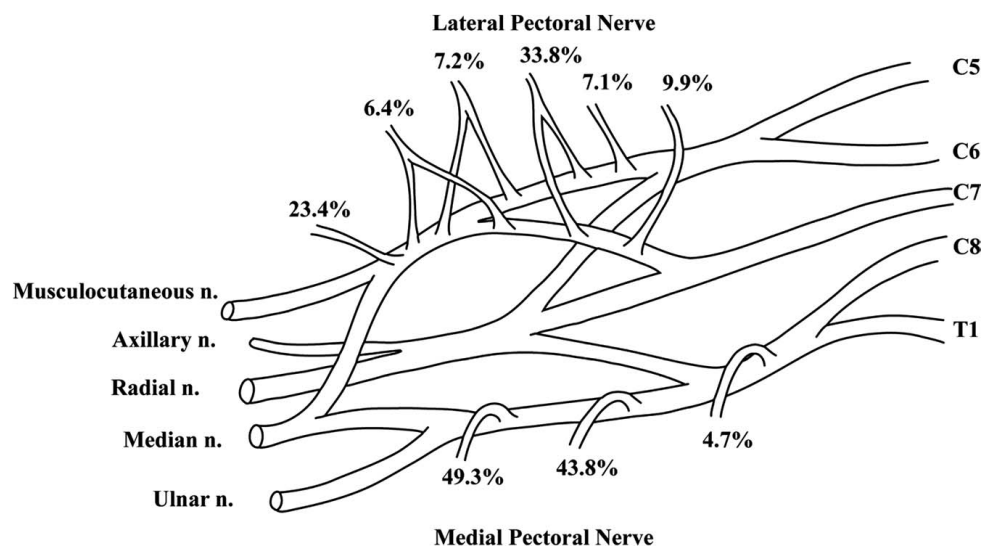
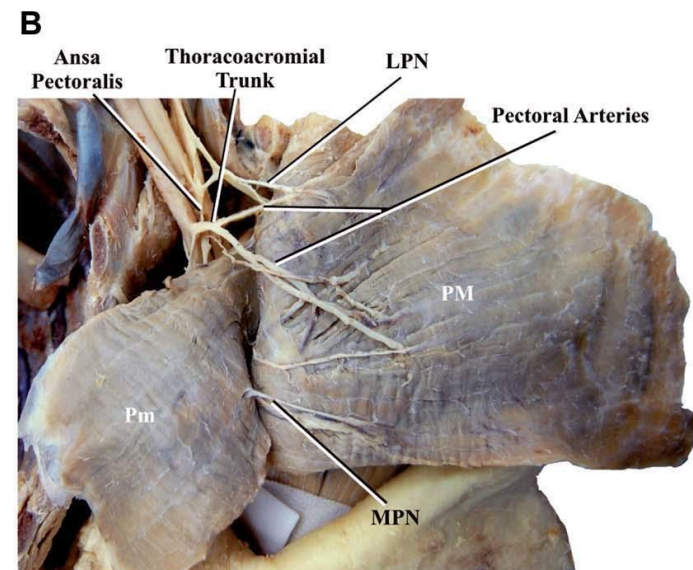
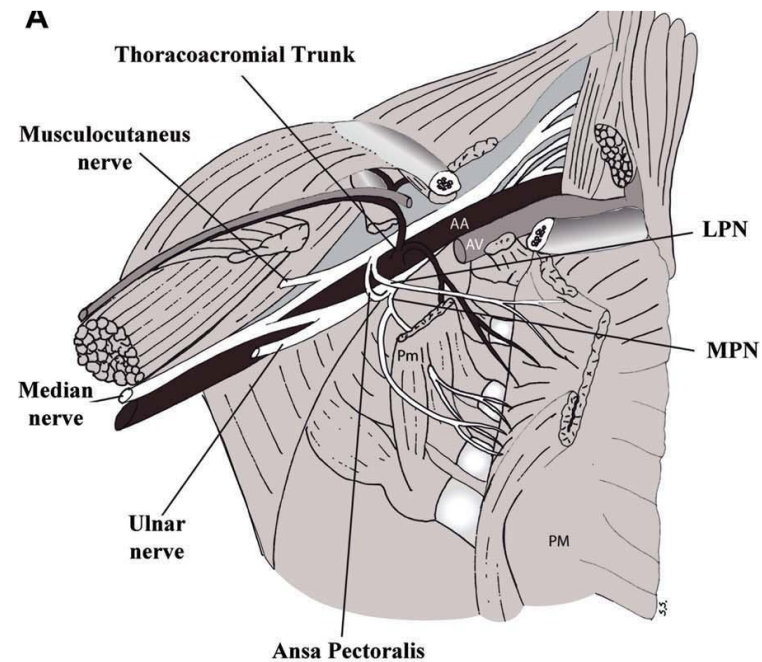


Fig. 1. Schematic drawing of the brachial plexus showing the most frequent patterns of origin of the lateral and medial PNs. Percentages are derived by the meta-analysis of the literature (see also Tables 1 and 2). (Other collateral branches of the brachial plexus not represented).



“subpectoral plexus”

Ultrasound description of Pecs II (modified Pecs I): A novel approach to breast surgery

R. Blanco^{a,*}, M. Fajardo^b, T. Parras Maldonado^c

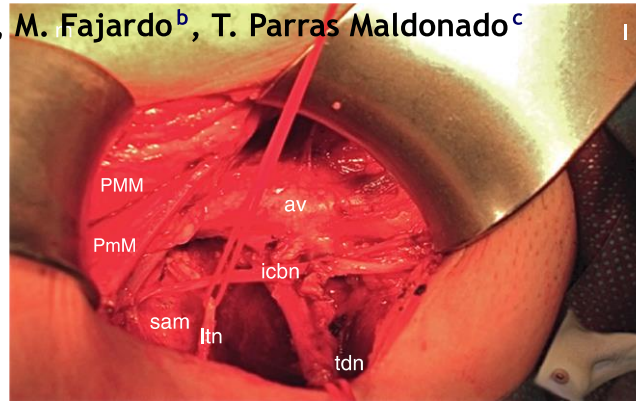


Figure 1 Dissection of the axilla. Pectoralis major muscle (PMM), pectoralis minor (PmM), axillary vein (AV), intercosto-brachial nerve T2 (ICBN), serratus anterior muscle (SAM), long thoracic nerve (LTN) and thoracodorsal nerve (TDN).

- Long thoracic n.
- Intercostabrachial n.
- Intercostal nn. T2-T6

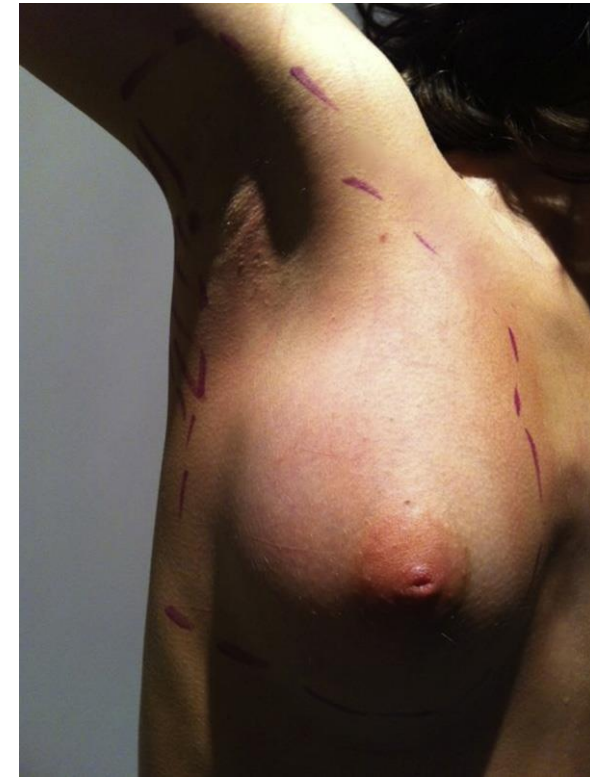


Figure 1 Dermatome distribution when Pecs II is performed between serratus muscle and external intercostal muscle.

Figure 2 Dermatome distribution when Pecs II is performed between serratus muscle and external intercostal muscle.

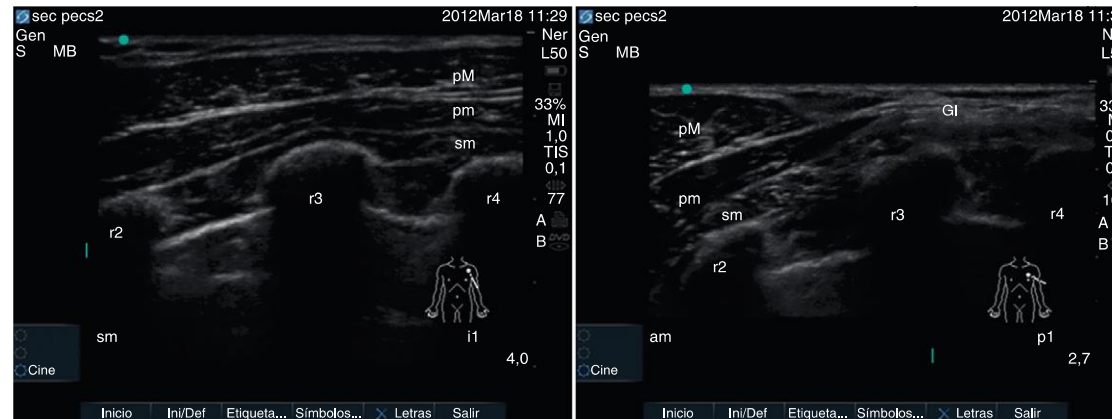


Figure 3 Sonogram of the probe counting the ribs (left) and at the lateral border of pectoralis minor muscle (right). We can identify pectoralis major muscle (PMM), pectoralis minor (PmM), serratus muscle (SM), rib 2 (r2), rib 3 (r3), rib 4 (r4) and Gerdy's ligament (Gl).

Serratus plane block: a novel ultrasound-guided thoracic wall nerve block

R. Blanco,¹ T. Parras,² J. G. McDonnell³ and A. Prats-Galino⁴

Anaesthesia 2013

1 Co:
2 Cli
3 Co:
4 Proc

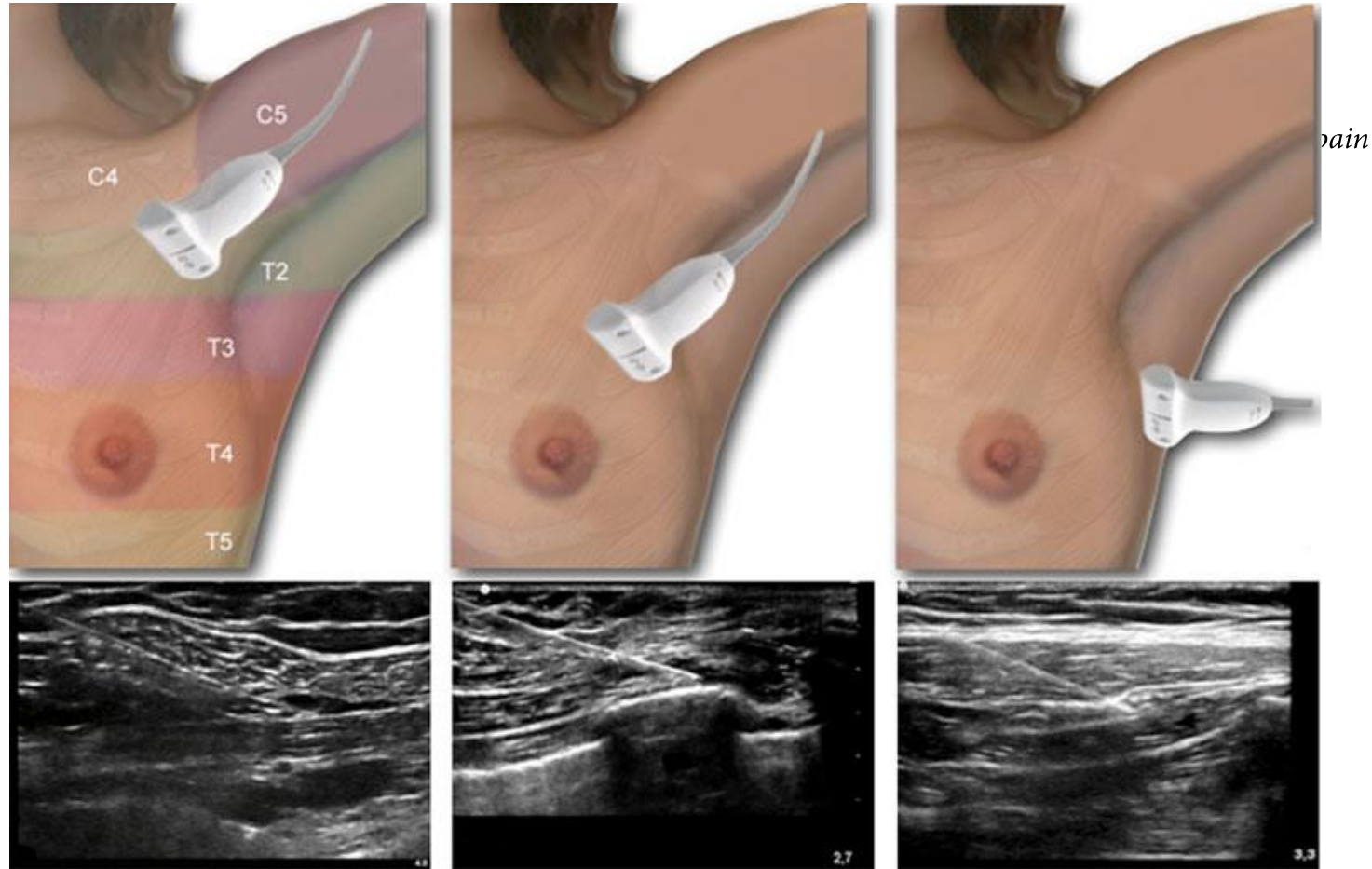


Figure 2 Graphic representing probe position and ultrasound image obtained during a Pecs I block (left), Pecs II block (middle) or a serratus plane block (right).

“All volunteers reported an effective block that provided long-lasting paraesthesia (750–840 min).”

Serratus plane block: a novel ultrasound-guided thoracic wall nerve block

R. Blanco,¹ T. Parras,² J. G. McDonnell³ and A. Prats-Galino⁴

1 Consultant, Anaesthetic Department, King's College Hospital, London, UK

2 Clinical Fellow, Anaesthetic Department, University Hospital of Lewisham, London, UK

3 Consultant, Anaesthetic Department, Galway University Hospital, Galway, Ireland

4 Professor of Human Anatomy and Embryology, Faculty of Medicine, University of Barcelona, Barcelona, Spain

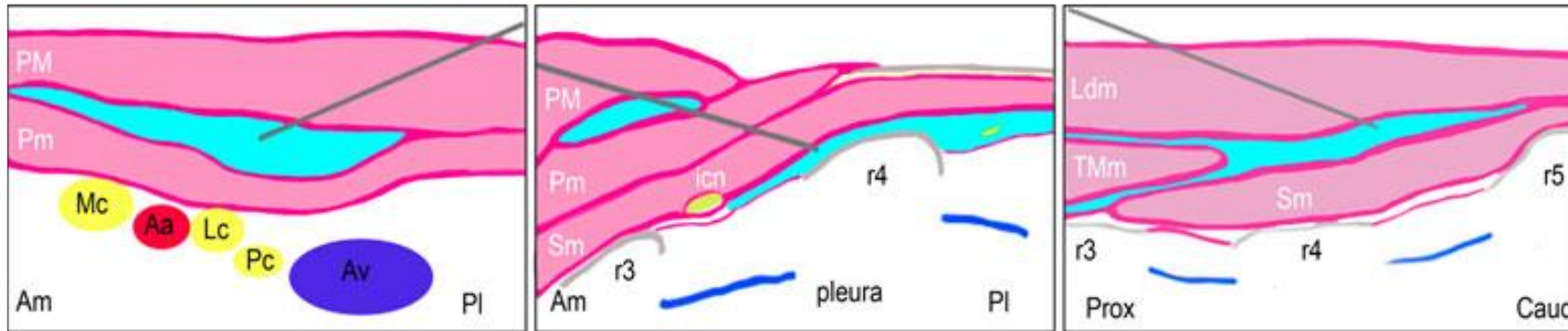


Figure 3 Graphic representing the distribution of local anaesthetic (blue) during a Pecs I block (left), Pecs II block (middle) and serratus plane block (right). PM, pectoralis major; Pm, pectoralis minor; Ldm, latissimus dorsi; Tmm, Teres major; Sm, serratus muscle. Icn, intercostal nerve; Lc, lateral cord; Pc, posterior cord; Mc, medial cord of the brachial plexus. Aa, axillary artery and Av, axillary vein together with the ribs, three (r3), four (r4) and rib five (r5). Am, orientation anteromedial; PI, posterolateral; Prox, proximal and Caud, caudal.

Blockade of the lateral cutaneous branches of the thoracic intercostal nerves (T2– T12)
“.. may achieve complete paraesthesia of the hemithorax.”

Format: Abstract ▾

Send to ▾

Anaesthesia, 2016 Sep;71(9):1064-9. doi: 10.1111/anae.13649. Epub 2016 Jul 20.

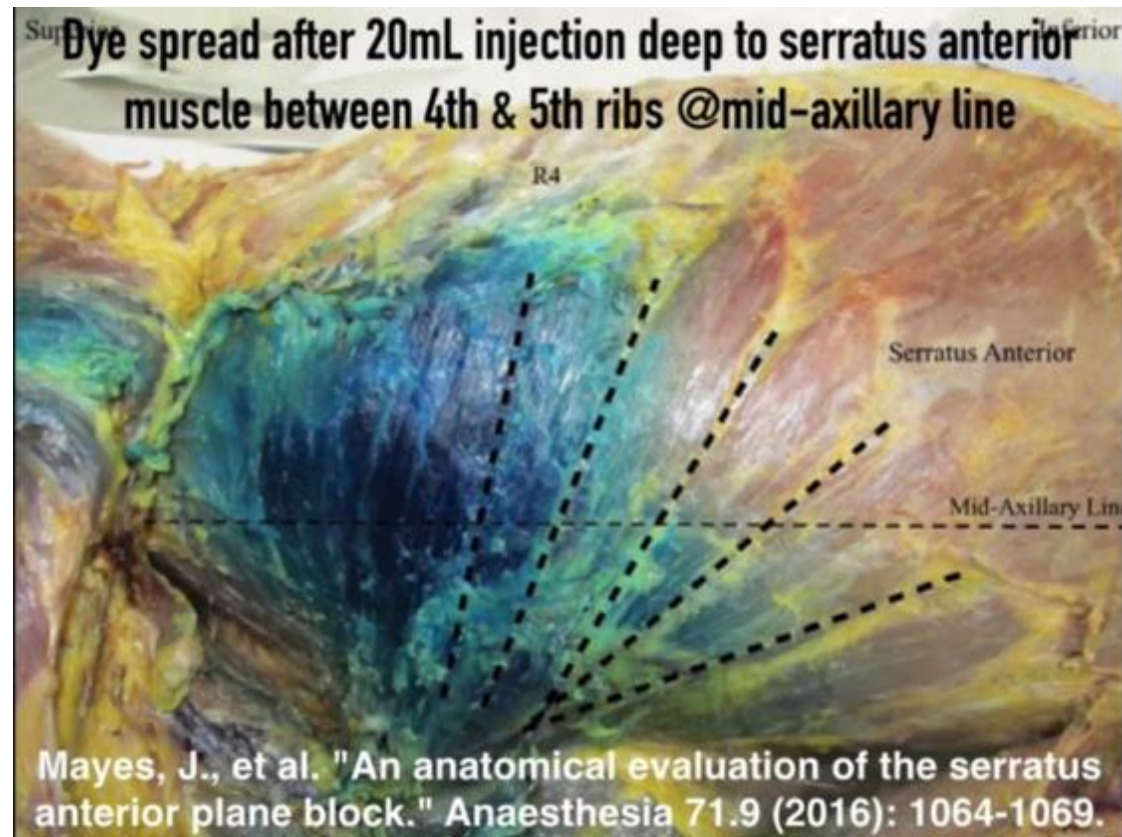
An anatomical evaluation of the serratus anterior plane block.

Mayes J¹, Davison E¹, Panahi P¹, Patten D¹, Etelani F², Womack J³, Varma M³.

Author information

Abstract

The serratus anterior plane block has been described for analgesia of the hemithorax. This study was conducted to determine the spread of injectate and investigate the anatomical basis of the block. Ultrasound-guided serratus anterior plane block was performed on six soft-fix embalmed cadavers. All cadavers received bilateral injections, on one side performed with 20 ml latex and on the other with 20 ml methylene blue. Subsequent dissection explored the extent of spread and nerve involvement. Photographs were taken throughout dissection. The intercostal nerves were involved on three occasions with dye, but not with latex. The lateral cutaneous branches of the intercostal nerve contained dye and latex on all occasions. The serratus plane block appears to be mediated through blockade of the lateral cutaneous branches of the intercostal nerves. Anatomically, serratus plane block does not appear to be equivalent to paravertebral block for rib fracture analgesia.



Efficacy of Bilateral Pectoralis Nerve Block for Ultrafast Tracking and Postoperative Pain Management in Cardiac Surgery

Abstract

Background: Good postoperative analgesia in cardiac surgical patients helps in early recovery and ambulation. An alternative to parenteral, paravertebral, and thoracic epidural analgesia can be pectoralis nerve (Pecs) block, which is novel, less invasive regional analgesic technique. **Aims:** We hypothesized that Pecs block would provide superior postoperative analgesia for patients undergoing cardiac surgery compared to parenteral analgesia. **Materials and Methods:** Forty adult patients aged between 20 and 65 years undergoing sternotomy under general anesthesia were enrolled in the study and divided into two groups with 20 in each group. Group 1 patients did not receive Pecs block postoperatively. Patients were monitored for duration of ventilator support, pain scores at rest and cough, and inspiratory flow rate was assessed using incentive spirometry. **Results:** Pecs group patients required lesser duration of ventilator support ($P < 0.0001$) in comparison to control group. Pain scores at rest and cough were significantly low in Pecs group at 0, 3, 6, 12, and 18 h from extubation ($P < 0.05$). At 24 h, VAS scores were comparable between two groups. Peak inspiratory flow rates were higher in Pecs group as compared to control group at 0, 3, 6, 12, 18, and 24 h ($P < 0.05$). Thirty-four episodes of rescue analgesia were given in control group, whereas in Pecs group, there were only four episodes of rescue analgesia. **Conclusion:** Pecs block is technically simple and effective technique and can be used as part of multimodal analgesia in postoperative cardiac surgical patients for better patient comfort and outcome.

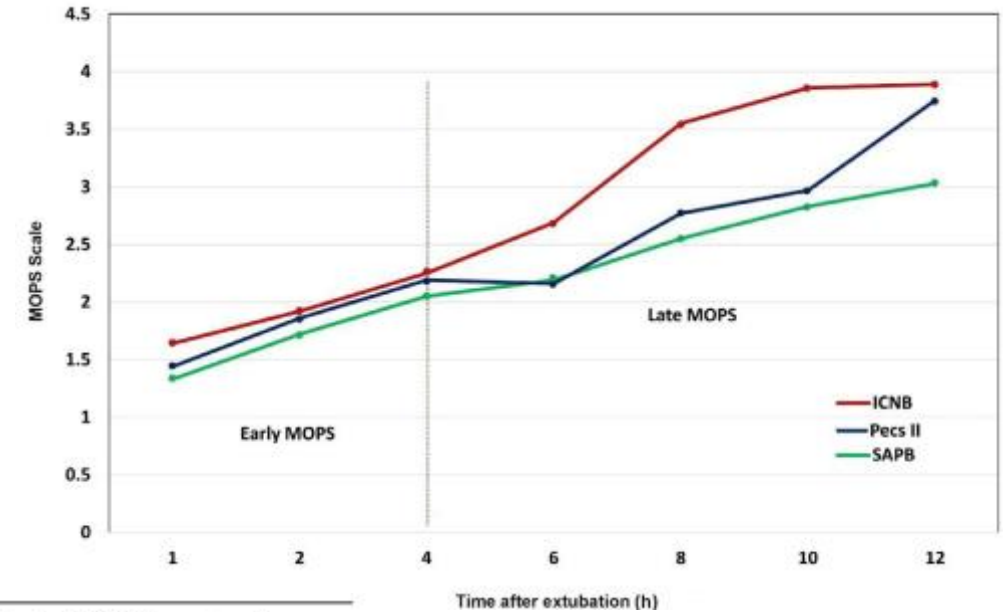
- Sternotomi, 40 hasta
- Bilat Pektoral blok
- VAS skorları anlamlı düşük ilk 24 saat

**Karthik Narendra Kumar,
Ravikumar Nagashetty Kalyane¹,
Naveen G Singh,
PS Nagaraja,
Madhu Krishna,
Balaji Babu,
Varadaraju R¹,
N Sathish,
N Manjunatha**

*Departments of Cardiac Anaesthesiology and
¹Cardiothoracic and Vascular Surgery, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bengaluru, Karnataka, India*

Comparison of the Efficacy of Ultrasound-Guided Serratus Anterior Plane Block, Pectoral Nerves II Block, and Intercostal Nerve Block for the Management of Postoperative Thoracotomy Pain After Pediatric Cardiac Surgery

Brajesh Kaushal, MD^{*}, Sandeep Chauhan, MD^{*},



Objective: The aim of this study was to compare the relative efficacy of ultrasound-guided serratus anterior plane block (SAPB), pectoral nerves (Pecs) II block, and intercostal nerve block (ICNB) for the management of post-thoracotomy pain in pediatric cardiac surgery.

Design: A prospective, randomized, single-blind, comparative study.

Setting: Single-institution tertiary referral cardiac center.

Participants: The study comprised 108 children with congenital heart disease requiring surgery through a thoracotomy.

Interventions: Children were allocated randomly to 1 of the 3 groups: SAPB, Pecs II, or ICNB. All participants received 3 mg/kg of 0.2% ropivacaine for ultrasound-guided block after induction of anesthesia. Postoperatively, intravenous paracetamol was used for multimodal and fentanyl was used for rescue analgesia.

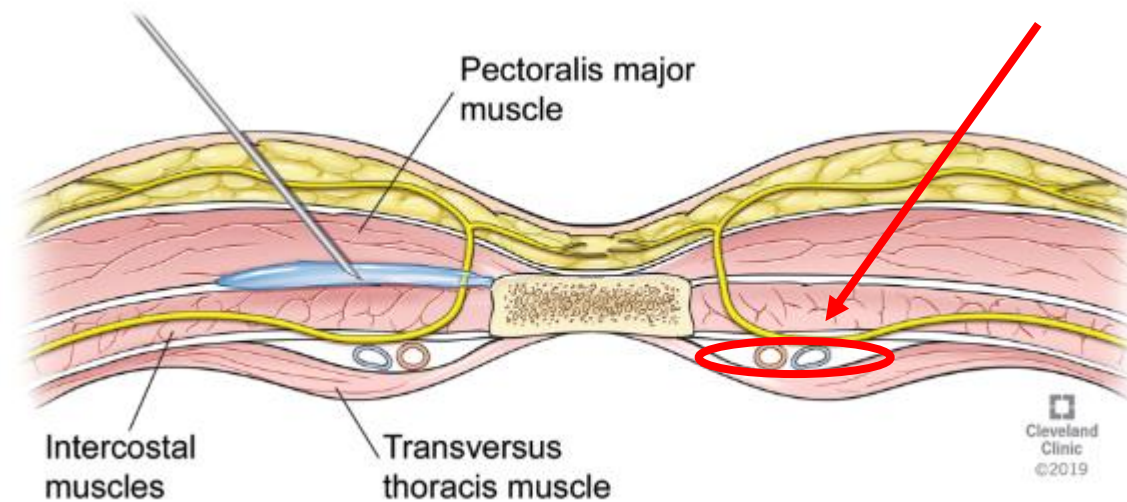
Measurements and Main Results: A modified objective pain score (MOPS) was evaluated at 1, 2, 4, 6, 8, 10, and 12 hours post-extubation. The early mean MOPS at 1, 2, and 4 hours was similar in the 3 groups. The late mean MOPS was significantly lower in the SAPB group compared with that of the ICNB group ($p < 0.001$). The Pecs II group also had a lower MOPS compared with the ICNB group at 6, 8, and 10 hours ($p < 0.001$), but the MOPS was comparable at hour 12 ($p = 0.301$). The requirement for rescue fentanyl was significantly higher in ICNB group in contrast to the SAPB and Pecs II groups.

Conclusion: SAPB and Pecs II fascial plane blocks are equally efficacious in post-thoracotomy pain management compared with ICNB, but they have the additional benefit of being longer lasting and are as easily performed as the traditional ICNB.

- 108 çocuk hasta
- Torakotomi, kardiyak cerrahi
- SAPB, Pecs II, ICNB
- 3 mg/kg %0.2 ropivakain

Pektointerkostal Fasyal Plan Blođu

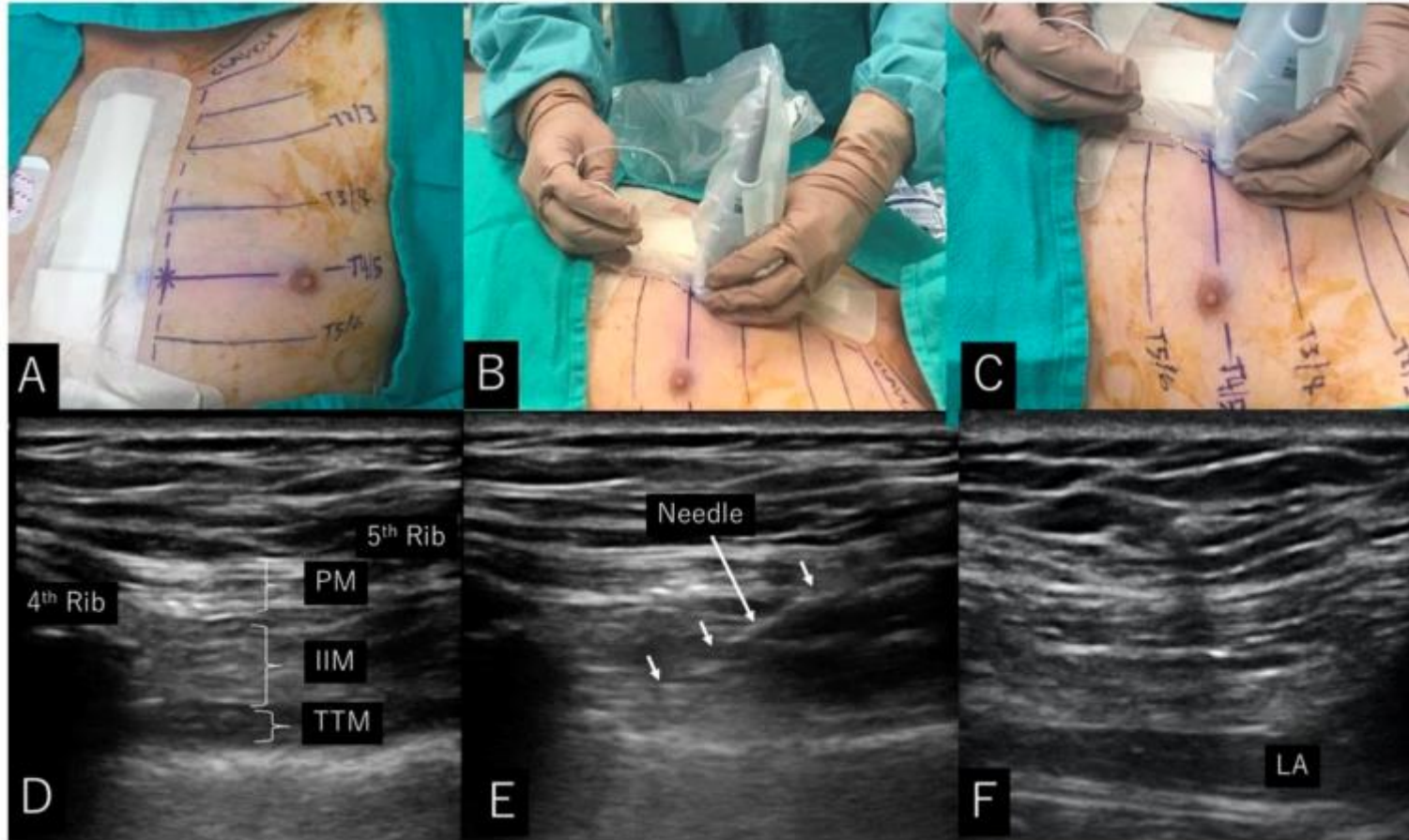
Transvers Torasik Kas Plan Blođu



- Sternotomi
- Sternal kırıklar

- Medial kot kırıkları
- Meme cerrahisinde medial kısım

Transversus thoracis muscle plane block in cardiac surgery: a pilot feasibility study



Fujii S, et al. *Reg Anesth Pain Med* 2019;**44**:556–560. doi:10.1136/rapm-2018-100178

10-20 ml %0.25 bupivakain, her iki tarafa, 3.-4. kot arası

ABSTRACT

Introduction Cardiac surgery patients often experience significant pain after median sternotomy. The transversus thoracis muscle plane (TTP) block is a newly developed, single-shot nerve block technique that provides analgesia for the anterior chest wall. In this double-blind pilot study, we assessed the feasibility of performing this novel block as an analgesic adjunct.

Methods All patients aged 18–90 undergoing elective cardiac surgery were randomized to the block or standard care control group on admission to the intensive care unit after surgery. Under ultrasound guidance, patients in the block group received the TTP block with 20 mL of either 0.3% or 0.5% ropivacaine

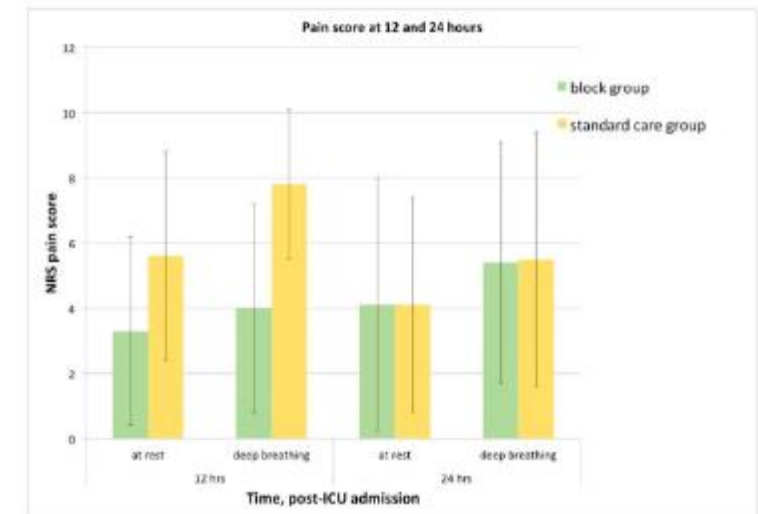


Figure 3 NRS pain scores at 12 and 24 hours. Data expressed as mean and SD. ICU, intensive care unit; NRS, Numeric Rating Scale.

NRS pain scores at rest were 3.3 (3.2) in the block group vs 5.6 (3.2) in the control group at 12 hours. At 24 hours, the pain scores were 4.1 (3.9) vs 4.1 (3.3) in the block and control group, respectively. The mean (SD) 24-hour hydromorphone administration was 1.9 (1.1) mg in the block group vs 1.8 (0.9) mg in the control group.

Discussion The TTP block is a novel pain management strategy poststernotomy. The results reveal a high patient recruitment, adherence, and satisfaction rate, and provide some preliminary data supporting safety.

Trial registration number NCT03128346.

Pectointercostal Fascial Block (PIFB) as a Novel Technique for Postoperative Pain Management in Patients Undergoing Cardiac Surgery

Ashok K. Kumar, MD, DM^{*,1}, Sandeep Chauhan, MD^{*},

Objective: To determine the efficacy of pectointercostal fascial block in relieving postoperative pain in patients undergoing cardiac surgery.

Design: Single-blinded, prospective, randomized controlled trial.

Setting: Single-center tertiary care teaching hospital.

Participants: A total 40 participants undergoing cardiac surgery aged 18 to 80 years.

Interventions: Subjects were categorized into 2 groups of 20 each. In group 2 participants (interventional group), bilateral pectointercostal fascial block was given using ropivacaine injection 0.25% after completion of surgery, before shifting to the intensive care unit.

Measurements and Main Results: Postoperative pain was measured after extubation at 0, 3, 6, and 12 hours, using a numeric rating scale. Pain in group 2 was significantly less and lasted for a longer duration than in group 1. Fentanyl requirement was significantly higher in group 1 ($1.06 \pm 0.12 \mu\text{kg}$) than in group 2 ($0.82 \pm 0.19 \mu\text{kg}$).

Conclusions: Pectointercostal fascial block is an easy and efficient technique to reduce postoperative pain after cardiac surgery.

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- Sternotomi, kardiyak cerrahi
- 40 hasta, 18-80 yaş
- %0.25 ropivakain, bilateral
- Opioid tüketimi

Regional Anesthesia in Cardiac Surgery: An Overview of Fascial Plane Chest Wall Blocks

Marta Kelava, MD, Andrej Alfirevic, MD, FASE, Sergio Bustamante, MD, Jennifer Hargrave, DO, FASA, and Donn Marciniak, MD

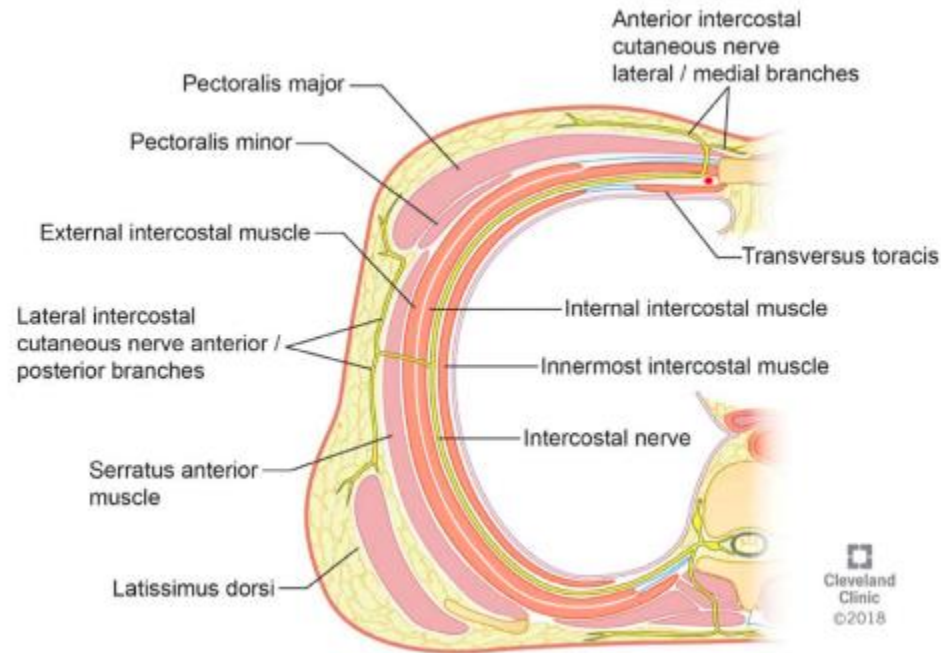


Table 2. Chest Wall Fascial Plane Blocks for Specific Cardiac Surgical Approaches

Surgical Approach	Block Options	UL/BL
Sternotomy	PIF or ESP	BL
Minimally invasive right anterolateral thoracotomy	PECS I, PECS II, and PIF or ESP	UL right
Minimally invasive right thoracotomy (robotic)	PECS II and SAP or ESP	UL right
Transapical TAVR	SAP or ESP	UL left

*“The most significant advantage of the ESP block is its
simplicity and safety.”*



American Society of
Regional Anesthesia and Pain Medicine

Vishal Uppal, MBBS, FRCA, EDRA

Vivian H Y Ip, MBChB, MRCP, FRCA

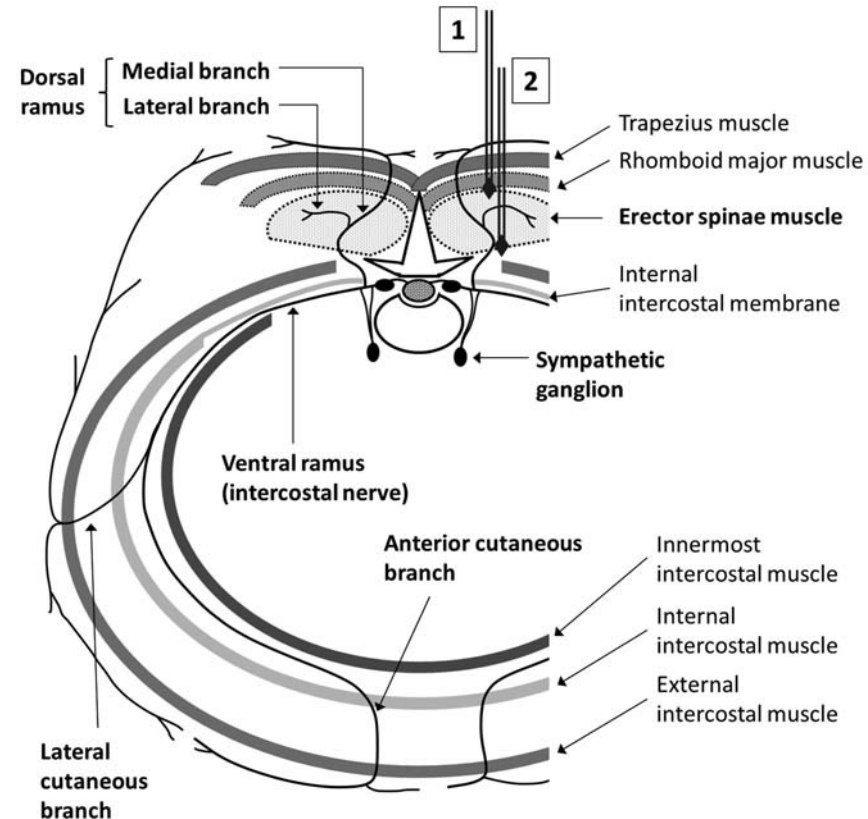
Curb Your Enthusiasm: Erector Spinae Plane Block —‘Because It Is Easy’ Is Not a Good Reason to Do It!

November 2019 Issue

The Erector Spinae Plane Block

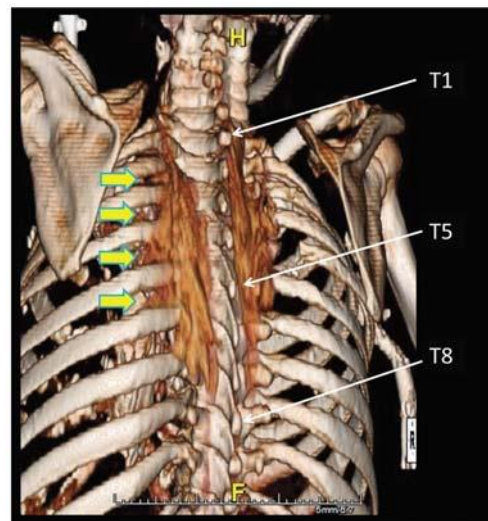
A Novel Analgesic Technique in Thoracic Neuropathic Pain

Mauricio Forero, MD, FIPP,* Sanjib D. Adhikary, MD,† Hector Lopez, MD,‡
Calvin Tsui, BMSc,§ and Ki Jinn Chin, MBBS (Hons), MMed, FRCPC||



(Reg Anesth Pain Med 2016;41: 621–627)

Etki Mekanizması?



*Anatomical and radiological investigation in fresh cadavers indicates that its likely site of action is at the **dorsal and ventral rami of the thoracic spinal nerves!***

The Erector Spinae Plane Block
A Novel Analgesic Technique in Thoracic Neuropathic Pain

Mauricio Forero, MD, FIPP, Sanjib D. Adhikary, MD,† Hector Lopez, MD,‡
Calvin Tsui, BMSc,§ and Ki Jinn Chin, MBBS (Hons), MMed, FRCPC||*

25 ml LA T5 seviyesi

LA yayılımı : T1-11

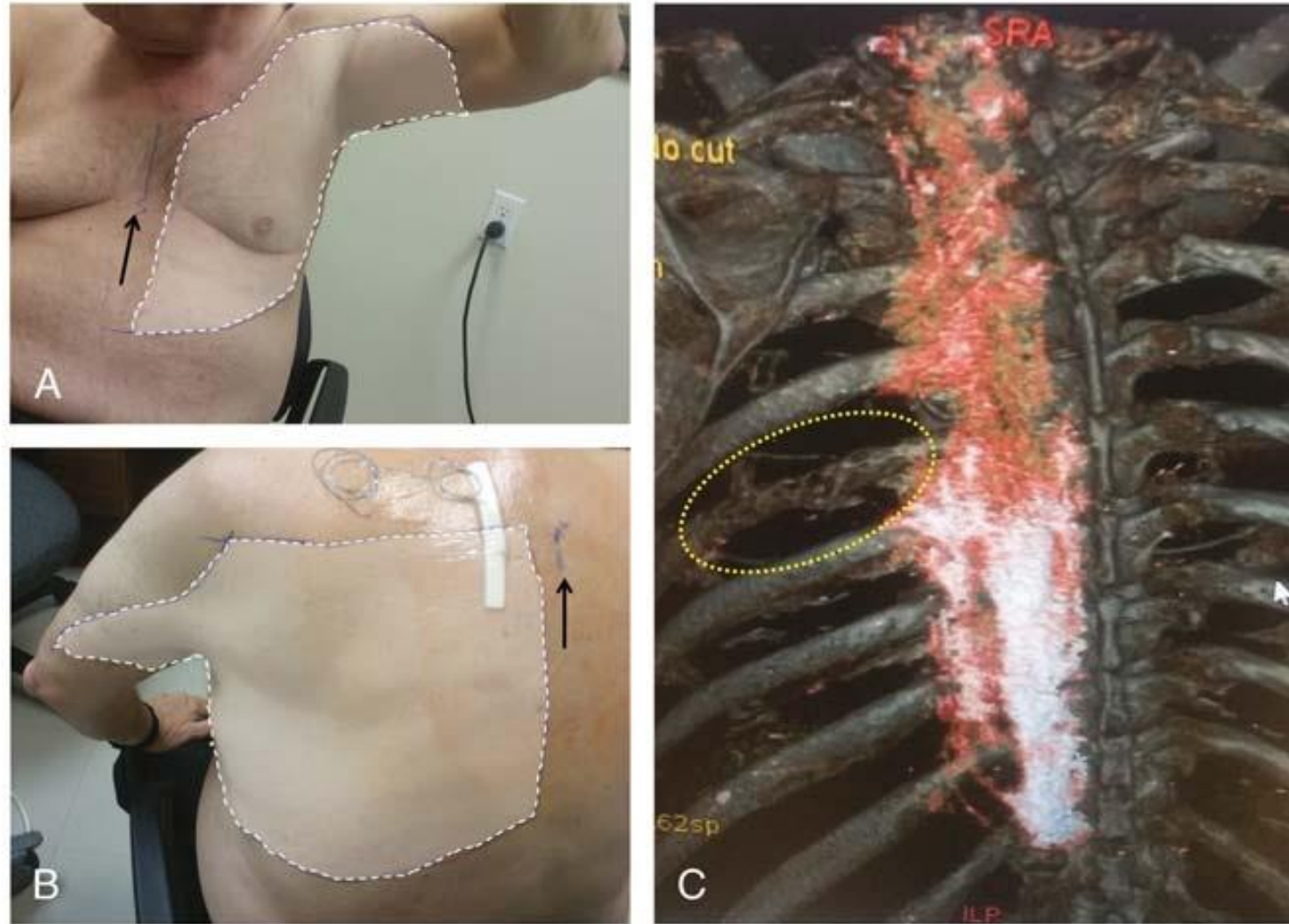


FIGURE 2. Extent of cutaneous sensory loss over the anterior (A) and posterior thorax (B) in the first patient of the case series, which was consistently reproduced each time the block was performed. The black arrows indicate the location of the midline. Note the site of catheter insertion approximately 3 cm lateral to the midline. C, Three-dimensional CT reconstruction demonstrating extensive cephalocaudal spread of injectate from T1 to T11 vertebrae after injection of 25 mL of fluid superficial to erector spinae muscle at T5. There is spread medially toward the midline but limited lateral spread. The dotted ellipse highlights the lytic lesion of the sixth rib causing the patient's pain.

Endikasyonlar 2016-

- **HER DERDE DEVA**

Correspondence

Journal of Clinical Anesthesia 57 (2019) 95–96

The Maltepe combination: Novel parasacral interfascial plane block and lumbar erector spinae plane block for surgical anesthesia in transfemoral knee amputation

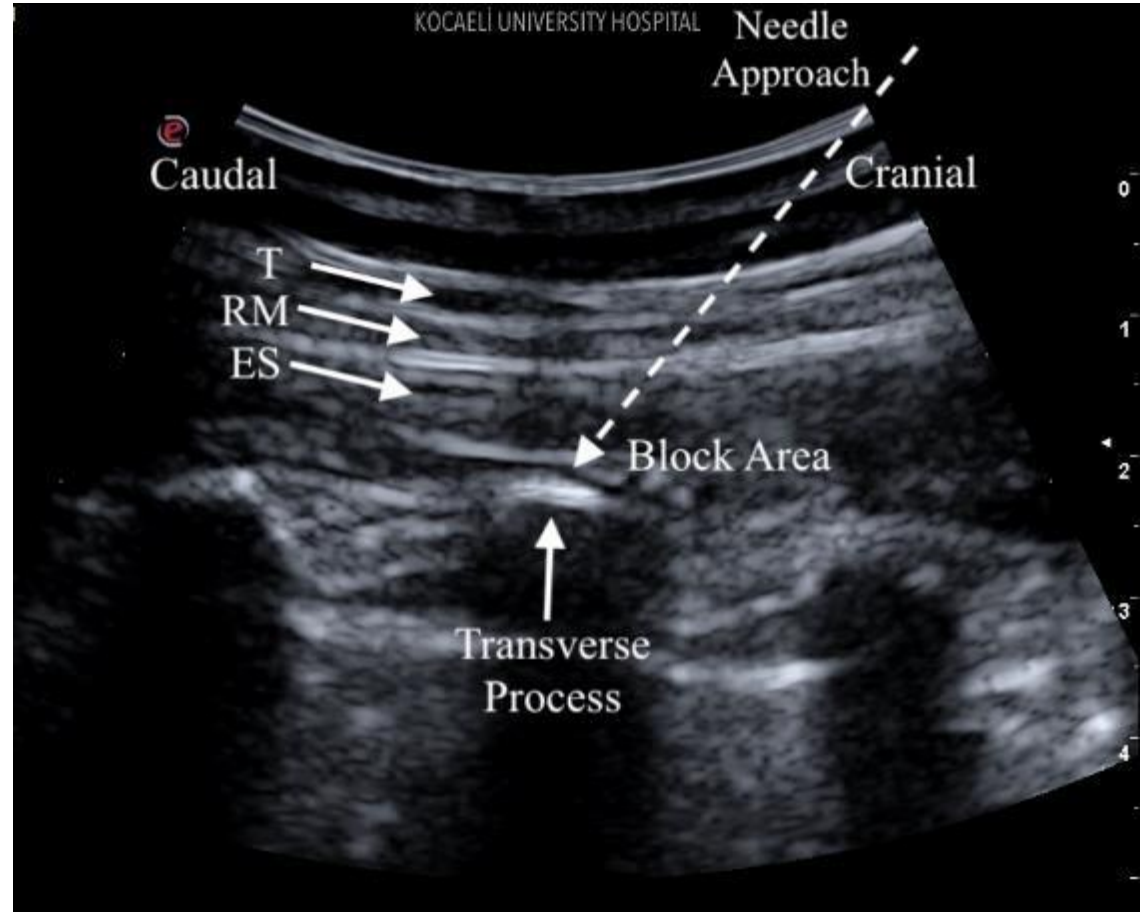
Letter to the Editor

Successful cases of bilateral erector
spinae plane block for treatment of
tension headache

<https://doi.org/10.1016/j.jclinane.2018.12.009>

ENDİKASYONLAR

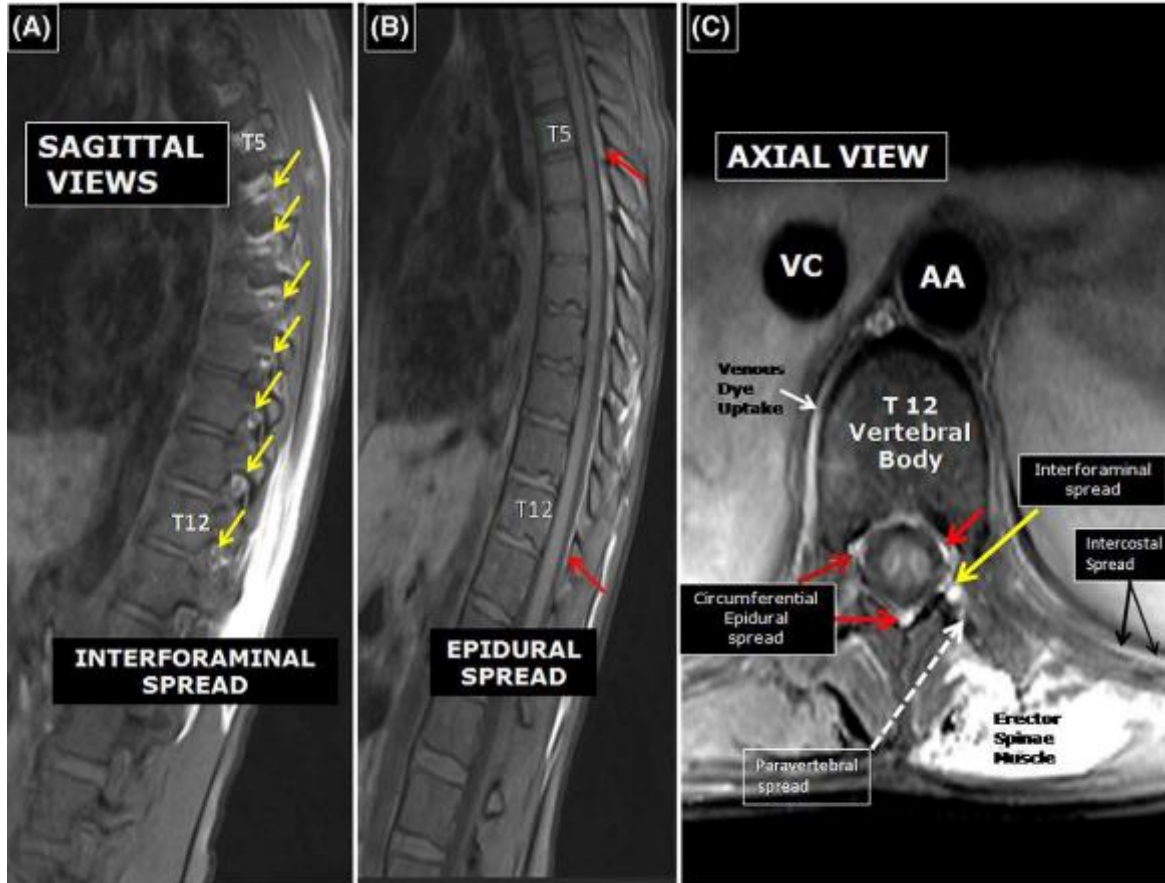
- Omuz Ağrısı
- Toraks Cerrahisi
- Meme Cerrahisi
- Spinal Cerrahi
- Abdominal Cerrahi
- Kalça Cerrahisi
- .
- ..
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-



Mechanism of the erector spinae plane block: insights from a magnetic resonance imaging study

Ana Schwartzmann, MD · Philip Peng, MD, MBBS, FRCPC · Mariano Antunez Maciel, MD ·
Mauricio Forero, MD, FIPP

Can J Anesth/J Can Anesth (2018) 65:1165–1166
<https://doi.org/10.1007/s12630-018-1187-y>

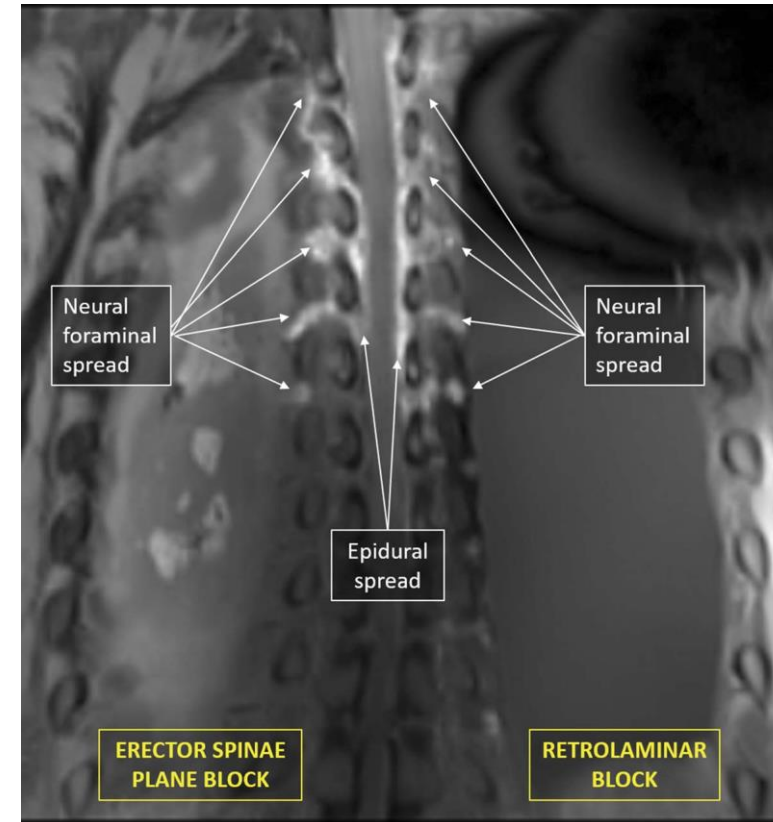
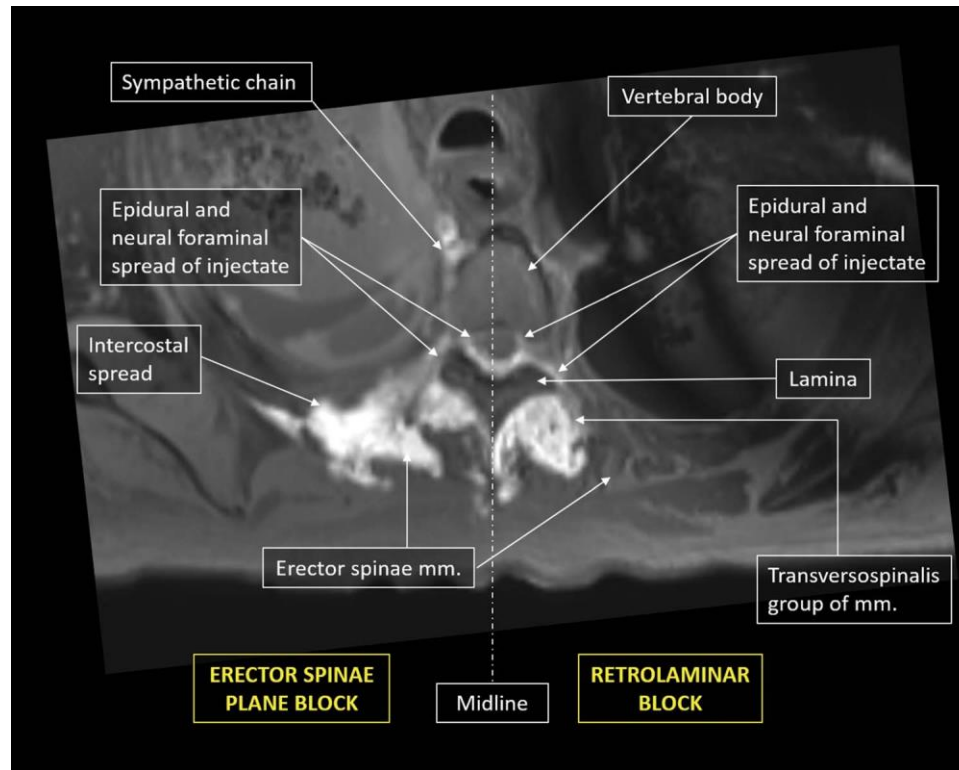


1 hasta
Kronik cerrahi sonrası abdominal ağrı
30 ml % 0.25 bupivakain 0.3 ml gadolinium T 10 seviyesi
MRI 45-90 dk sonra
T6-T12 his kaybı
Paravertebral ve interkostal signal intensity T6-T12

Erector Spinae Plane Block Versus Retrolaminar Block A Magnetic Resonance Imaging and Anatomical Study

Sanjib Das Adhikary, MD,* Stephanie Bernard, MD,† Hector Lopez, MD,‡ and Ki Jinn Chin, FRCPC§

Regional Anesthesia and Pain Medicine • Volume 43, Number 6, August 2018



epidural and neural foraminal spread of LA + intercostal spread,

Bilateral Erector Spinae Plane Block for Acute Post-Surgical Pain in Adult Cardiac Surgical Patients: A Randomized Controlled Trial

Siva N. Krishna, DNB^{*,1}, Sandeep Chauhan, MD^{*},
Debesh Bhoi, MD[†], Brajesh Kaushal, MD^{*}, Suruchi Hasija, DM^{*},
Tsering Sangdup, Mch[‡], Akshav K Bisoi, Mch[‡]

Objectives: To examine the analgesic efficacy of bilateral erector spinae plane (ESP) block compared with conventional treatment for pain after cardiac surgery in adult patients.

Design: A prospective, randomized, controlled, single-blinded study.

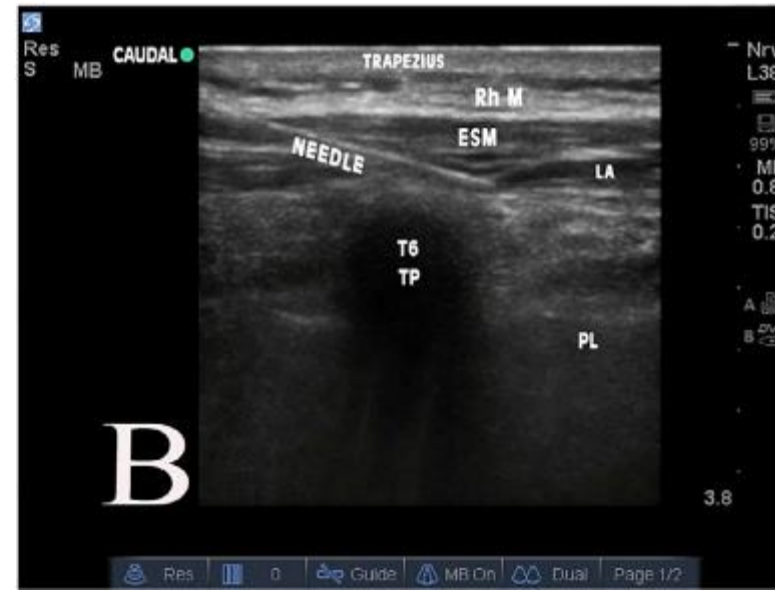
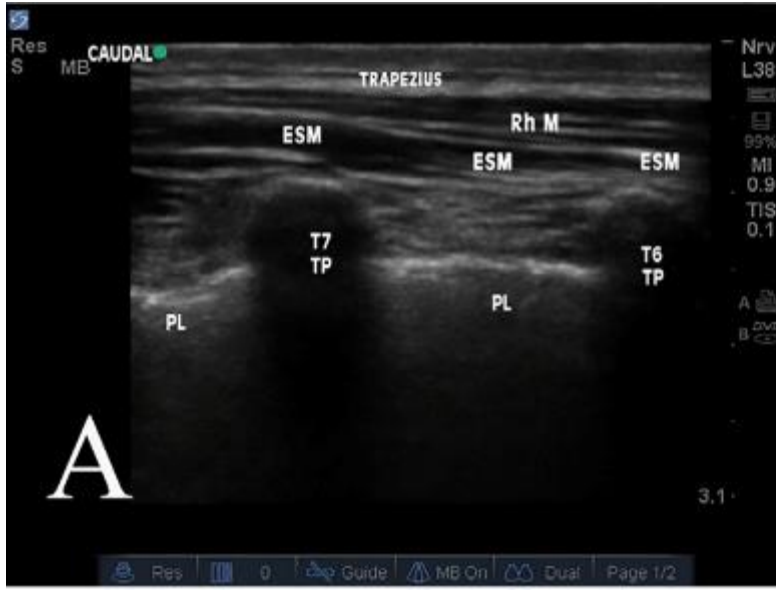
Setting: Single-center tertiary teaching hospital.

Participants: One hundred and six adult patients undergoing elective cardiac surgery with cardiopulmonary bypass.

Interventions: Patients were randomized into 2 groups. Patients in group 1 (ESP block group, n = 53) received ultrasound-guided bilateral ESP block with 3 mg/kg of 0.375% ropivacaine before anesthesia induction at the T6 transverse process level. Patients in group 2 (paracetamol and tramadol group, n = 53) received paracetamol (1 gm every 6 hours) and tramadol (50 mg every 8 hours) intravenously in the postoperative period. The primary study outcome was to evaluate pain at rest using an 11-point numeric rating scale (NRS). Mann-Whitney U test was used for comparing NRS scores.

Measurements and Main Results: The postoperative pain level after extubation and duration of analgesia during which NRS was < 4 of 10 was compared between the groups. The median pain score at rest after extubation in group 1 was 0 of 10 until hour 6, 3 of 10 at hour 8, and 4 of 10 at hours 10 and 12 postextubation. These were significantly less in comparison with group 2 (p = 0.0001). Patients in group 1 had a significantly higher mean duration of analgesia (8.98 ± 0.14 hours), during which NRS was < 4 of 10, compared with group 2 (4.60 ± 0.12 hours) (p = 0.0001).

Conclusion: ESP block safely provided significantly better pain relief at rest for longer duration as compared to intravenous paracetamol and tramadol.



Variable	Group 1 Mean ± SE (95% CI)	Group 2 Mean ± SE (95% CI)	p Value
Time to extubation/total duration of mechanical ventilation (min)	63.09 ± 1.30 (60.48-65.69)	102.62 ± 2.52 (97.56-107.67)	0.0001
Total rescue analgesia used (µg)	82.92 ± 4.29 (74.31-91.52)	214.25 ± 5.09 (204.03-224.46)	0.0001
Total opioid usage (µg)	231.42 ± 6.95 (217.47-245.36)	935.66 ± 21.99 (891.53-979.78)	0.0001
Duration of analgesia postextubation during which NRS score was <4/10 (h)	8.98 ± 0.14 (8.69-9.26)	4.60 ± 0.12 (4.35-4.84)	0.0001
Time to ambulation (h)	36.17 ± 0.18 (35.8-36.53)	62.70 ± 0.40 (61.89-63.50)	0.0001
Time to first oral intake (h)	30.11 ± 0.20 (29.70-30.51)	49.43 ± 0.28 (48.86-49.99)	0.0001
Total length of ICU stay (h)	42.17 ± 0.18 (41.8-42.53)	69.34 ± 0.36 (68.61-70.06)	0.0001

Ultrasound-guided blocks for cardiovascular surgery: which block for which patient?

Lauren M. Smith^a and Michael J. Barrington^{a,b},
St Vincent's Hospital, Melbourne

Table 1. Summary of original research articles investigating ultrasound-guided blocks for cardiovascular surgery

Reference	Block type	Surgery	N (total)	Primary outcome	Comparators	Injectate	Results	JADAD score	Comments
Lockwood <i>et al.</i> [22 ^{***}]	Paravertebral	Median sternotomy cardiac surgery	50	48-h PCA morphine consumption	Subcutaneous Lidocaine infusion catheters	20–30 ml 0.5% Lidocaine bilaterally (3 mg/kg, total), then 1 mg/kg/h 0.5% Lidocaine	Paravertebral block not superior to subcutaneous catheter	5	Mode of initial injection (via needle or through catheter) not clarified
Nagaraja <i>et al.</i> [28 ^{**}]	ESPB	Median sternotomy cardiac surgery	50	VAS pain scores	TEA (15 ml bolus dose 0.25% Bupivacaine then 0.125% Bupivacaine 0.1 ml/kg/h)	15 ml bolus dose 0.25% Bupivacaine bilaterally then 0.125% Bupivacaine 0.1 ml/kg/h bilaterally.	Improved pain scores 24–48 h in patients receiving ESPB	0	Lack of blinding
Krishna <i>et al.</i> [29 ^{***}]	ESPB	Median sternotomy cardiac surgery	106	Pain at rest using NRS for first 12 post extubation hours	No block: IV paracetamol 1 g every 6 h, IV tramadol 50 mg every 8 h	3 mg/kg 0.375% Ropivacaine (20–25 ml) bilaterally (single shot)	Improved quality and duration of analgesia in patients receiving ESPB	2	Young surgical cohort. Short cross-clamp time (24–27 min)
Macaire <i>et al.</i> [30 [*]]	ESPB	Median sternotomy cardiac surgery	67	48-h opioid consumption	1 ml Ropivacaine 0.5% in interclavicular ligament (injected by surgeon), continuous IV morphine 0.5 mg/h, Nefopam 100 mg/24 h	0.25 ml/kg Ropivacaine 0.5% bilaterally followed 8 h later by automatic 6 hourly boluses of 0.2% ropivacaine 6–12 ml bilaterally	Significant reduction in opioid use in ESPB group	N/A	Consecutive patient matched, controlled before and after study. Multiple confounders inherent to nonrandomized study design
Kumar <i>et al.</i> [46 ^{***}]	Pectoral nerves	Median sternotomy cardiac surgery	40	VAS pain scores, inspiratory flow rate and ventilator hours on the first post operative day	No block: IV paracetamol 1 g 6 hourly	30 ml 0.25% Bupivacaine with Dexmedetomidine 25 µg bilaterally	Pectoral nerve block patients required reduced duration of ventilator support and had reduced pain scores at rest and cough for 18 postextubation hours	3	Lack of blinding, use of dexmedetomidine favored block group
Kaushal <i>et al.</i> [47 ^{***}]	Serratus anterior or pectoral II	Pediatric patients undergoing thoracotomy for cardiac surgery	108	Postoperative pain in the first 12 h using the MOPS	Intercostal nerve block: 0.2% Ropivacaine in divided doses at the level of incision and two spaces above and below to a total of 3 mg/kg	Serratus anterior block: 0.2% Ropivacaine, 3 mg/kg. Pectoral nerves II block: 3 mg/kg 0.2% Ropivacaine in total (Pecs I and II)	Statistically significant reduced pain scores in patients receiving serratus anterior or pectoral II nerve block compared with intercostal nerve blockade	3	No measurements beyond 12 h, lack of blinding of research/clinical personnel or patients/families

vascular anesthesia

ESPB, erector spinae plane block; IV, intravenous; MOPS, modified objective pain score; NRS, numeric rating scale; PCA, patient controlled analgesia; TEA, thoracic epidural analgesia; VAS, visual analog scale.



Literature!

erector spinae block



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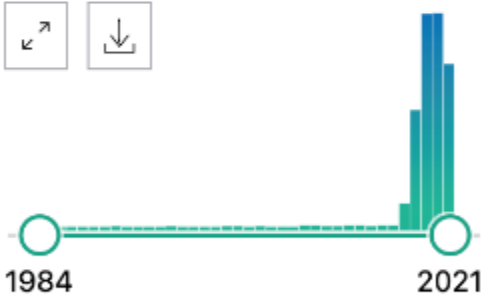
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Erector spinae plane block: a new option for managing acute axial low back pain in the emergency department.

1

Cite

Anshus AJ, Oswald L.

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Pain Manag. 2021 Nov;11(6):631-637. doi: 10.2217/pmt-2021-0004. Epub 2021 Jun 9.

PMID: 34112865

Aim: To evaluate pain and length of stay outcomes in six patients who received an **erector spinae plane block** (ESPB) in the emergency department (ED) for low back pain. ...**Lay abstract** Acute low back pain is one of the most common reasons patients present to t ...



In Response to "Preoperative Fluoroscopically Guided Regional Erector Spinae Plane Blocks Reduce Opioid Use, Increase Mobilization, and Reduce Length of Stay Following Lumbar Spine Fusion" by Owen et al.

2

Cite

Jadon A, Bakshi A.

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Global Spine J. 2021 Oct;11(8):1315. doi: 10.1177/21925682211024560.

Scientific Evidence?



ESP

Erector spinae plane block: A narrative review with systematic analysis of the evidence pertaining to clinical indications and alternative truncal blocks[☆]

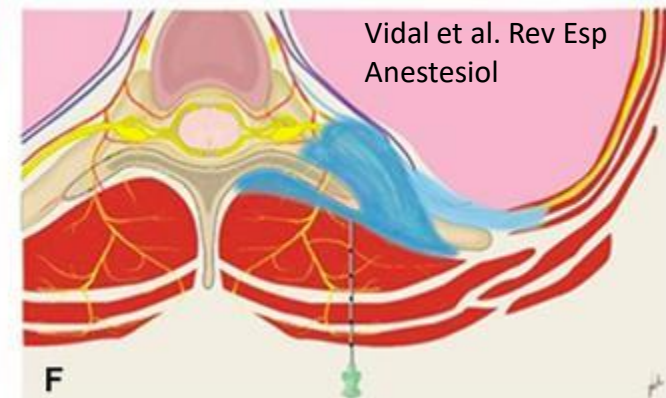
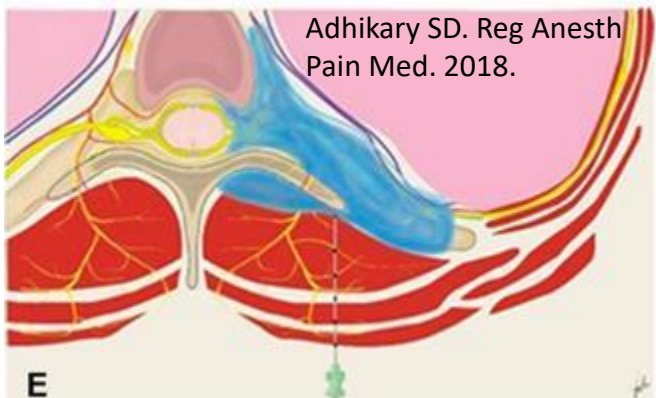
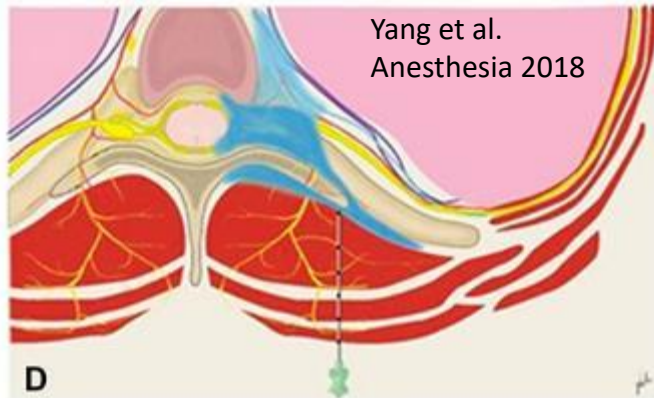
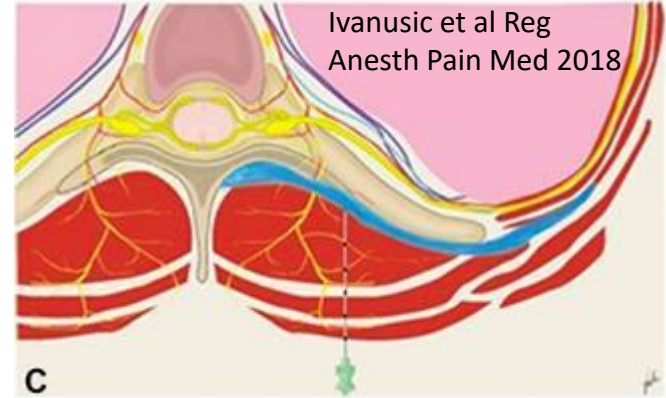
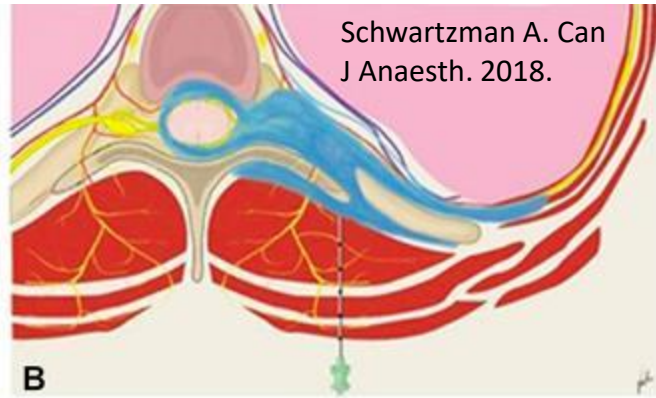
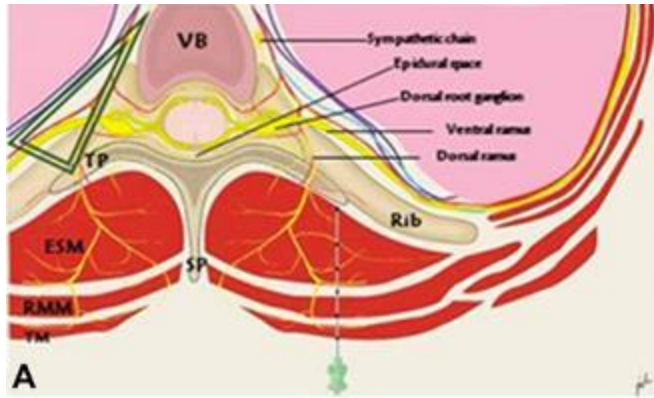
Journal of Clinical Anesthesia 68 (2021) 110063

Mohammed Saadawi^a, Sebastián Lavera^b, Julián Aliste^b, Daniela Bravo^b

- Genellikle çeşitli cerrahi girişimlerde postoperatif analjezi amacıyla fasyal plan blokları ile karşılaştırılmış (PECs, serratus, subcostal TAP, QLB)
- Etkinliğin epidural ve paravertebral blok ile karşılaştırıldığı yeterli sayıda çalışma yok
- Çalışmaların çoğunda tek enjeksiyon tekniği uygulanmış
- Ağrı ve opioid ilişkili yan etkilerin azaltıldığı belirtilse de kontrol gruplarında da bu şikayetler çok belirgin değil
- Örneklem büyüklüğü sınırlı ve bias riski yüksek
 - Yeni tekniklerde pozitif bulgular negatif bulgulara oranla daha erken basılır

additional investigation should compare ESP blocks with robust multimodal analgesic regimens as well as truncal blocks such as thoracic epidural block, midpoint transverse process to pleura block, PECS block, quadratus lumborum block, and transversus abdominis plane block.

Lokal Anestezik Yayılımının Varyasyonları



Tulgar et al.
Journal of Pain Research 2019:12

Mohammed Saadawi et al.

Journal of Clinical Anesthesia 68 (2021) 110063

- Lokal anestezi dağılımı hastada
 - Solunum hareketi
 - Kas tonusu ve gevşemesi
 - Vücut pozisyonu

Table 1
Anatomical studies investigating mechanism of action of thoracic and lumbar ESPB.

Authors (year)	Cadavers/ESP blocks	Type of cadaver	Contrast or dye injectate	Imaging vs. dissection	Ventral ramus	Dorsal ramus	Epidural space	Thoracic paravertebral space	Intercostal space	Comments
Ivanusic (2018) [38]	10/20	Unembalmed	Bilateral T5 ESPB with 20 mL of methylene blue per side	Dissection	X (stained in only 5% cases)	✓		X	X	Extensive cephalocaudal spread superficial and deep to erector spinae muscle Lateral spread reaching attachment of serratus anterior muscle Dorsal ramus frequently stained after exiting costotransverse foramen DRG stained in only 10% cases
Yang (2018) [39]	10/10	Unembalmed	Unilateral T5 ESPB with 20 mL of water-latex-green ink	Dissection				✓ (mainly T4–6)		No spread to costotransverse foramen Spread to sympathetic ganglion at T5 only
Choi (2019) [43]	7/12	Unembalmed	5 ESPBs at T5 with 10 mL of water-latex-green ink 7 ESPBs at T5 with 30 mL of water-latex-green ink	Thoracoscopy and dissection			X (only 1 instance in 30 mL-group)	X with 10 mL ✓ with 30 mL (mainly T4–6)	X	30 mL-group: 1 instance of spread to sympathetic nerve at T5
Dautzenberg (2019) [44]	11/22	Fresh frozen	Bilateral ESPB at T2 or T8 with 20 mL of methylene blue per side	Dissection	T2: 36% T8: 9%	T2: 36% T8: 9%	T2: 36%? T8: 9%?	T2: 36% T8: 9%		T8 ESPB: more cephalocaudal spread than T2 ESP block T2 ESPB: paravertebral spread always accompanied by contralateral spread (presumably through epidural space?) Cephalocaudal spread: L2–5 vertebral levels
De Lara Gonzalez (2019) [35]	6/12	Fresh frozen	Bilateral L4 ESPB with 20 mL of saline-iodinated contrast-methylene blue per side	CT (all cadavers) and dissection (4 cadavers)	X (ventral ramus spread in only 1 cadaver)	✓ L2–4		NA	NA	

CT = computed tomography; DRG = dorsal root ganglion; ESPB = erector spinae plane block; MRI = magnetic resonance imaging; NA = not applicable.

The physically detectable spread in cadaveric studies may underestimate the true extent of injectate spread. This is apparent even in live human subjects.

Understanding ESP
and Fascial Plane Blocks
A Challenge to Omniscience

Reg Anesth Pain Med, 2018 43(7), 807-808

Lucas Rovira, MD, PhD, EDAIC
Jorge Úbeda, MD

José de Andrés, MD, PhD,

LA'in Değişken Dağılımı

- Torakal ESP
 - Anatomik değişkenler nasıl etkiliyor?
- İdeal lokal anestezi volümü?
 - 10-40 ml LA
 - pediatrik 0.5 ml/kg LA
- Tek veya birden fazla seviye, unilateral veya bilateral
 - Her bir seviye için 3.6 ml? De Cassai and Tonetti.
- Hasta pozisyonu ve iğne yönlendirmesi

Hasta Pozisyonu ve İğne Yönlendirme



Erektör Spina Plan Blođu

- ***Neden tercih ediliyor:***

- Göreceli olarak emniyetli
 - Enjeksiyon noktası plevradan/majör damarlardan/spinal kordtan uzak
- Paravertebral blok uygulamasından kolay
- Torasik epidural uygulamasından kolay
 - Minimal hemodinamik deđişiklikler
- Antikoagölan kullanan hastalarda daha güvenli

*“The most significant advantage of the ESP block is its
simplicity and safety.”*

- Teşekkürler



**GÖĞÜS KALP DAMAR ANESTEZİ
VE YOĞUN BAKIM DERNEĞİ**

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