

Pectoral Nerve Blocks

Intraoperative teaching · CA-2

THE QUESTION

Where the evidence disagrees

This topic was selected because an evidence synthesis beats a textbook on it: the trials disagree, or the guidance has moved recently.

THE EVIDENCE

What each source contributes, and how strong it is

Study design first — a cohort and a randomised trial do not carry the same weight.

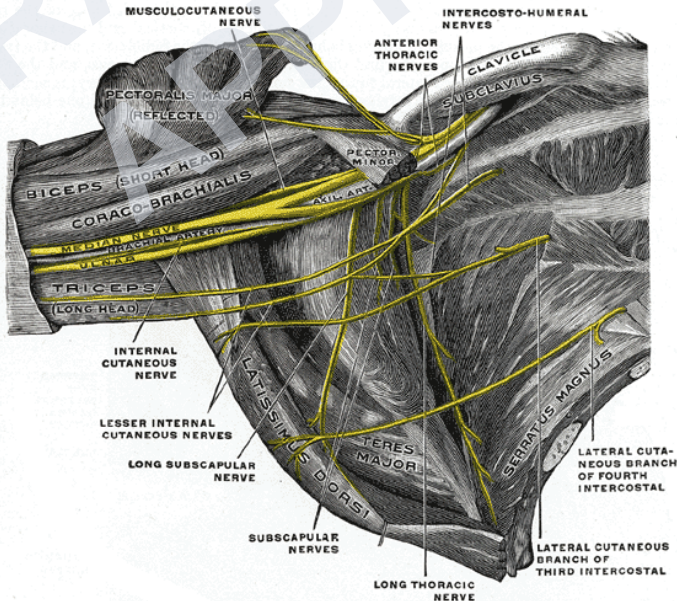
Design	Year	Journal	What it found
Meta-analysis	2025	Anaesthesia	For open thoracotomy surgery, this PROSPECT guideline recommends using erector
Randomised trial	2025	Anesthesiology	This randomised trial found that for patients undergoing uniportal thoracoscopic
Review	2024	Harefuah	This review found that nerve blocks can improve functional outcome in Maigne's
Meta-analysis	2026	AANA journal	This meta-analysis found that PECS I or II blocks for breast cancer surgery
Randomised trial	2025	England)	This randomized trial found that administering i.v. esketamine at 0.3 mg/kg
Review	2022	Journal of back and musculoskeleta	This review identifies focused radiological guided anesthetic blocks as a diagnostic

6 resolved citations behind this deck; every point above traces to one of them.

THE ANATOMY

Two planes, which is why PECS I and PECS II are two injections

The right axilla seen from below and in front with pectoralis major reflected, showing pectoralis minor, the anterior thoracic (pectoral) nerves crossing to the pectoral muscles, the long thoracic nerve on serratus anterior, and the lateral cutaneous branches of the third and fourth intercostal nerves.



Henry Vandyke Carter — The right brachial plexus (infraclavicular portion) in the axillary fossa; viewed from below and in front. The Pectoralis major and minor muscles have been in large part removed; their attachments have been reflected. (Spalteholz.) · <https://commons.wikimedia.org/wiki/File:Gray809.png>
Henry Vandyke Carter · public-domain · <https://commons.wikimedia.org/wiki/File:Gray809.png>

The pectoral nerves arrive between pectoralis major and minor, while the intercostal lateral cutaneous branches surface over serratus anterior.

WHERE THE GUIDANCE SITS

What the guidelines and pooled evidence say

2 findings, each on the slide that follows.

ANAESTHESIA 2026

For open thoracotomy surgery, this PROSPECT guideline recommends using erector

For open thoracotomy surgery, this PROSPECT guideline recommends using erector spinae plane, rhomboid intercostal, or intercostal nerve blocks only...

AANA JOURNAL 2026

This meta-analysis found that PECS I or II blocks for breast cancer surgery

This meta-analysis found that PECS I or II blocks for breast cancer surgery decreased intraoperative opioid use by a mean difference of 5.28 and...

WHERE THE GUIDANCE SITS

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Meta-analysis · Anaesthesia

For open thoracotomy surgery, this PROSPECT guideline recommends using erector spinae plane, rhomboid intercostal, or intercostal nerve blocks only as second-line regional analgesia when thoracic epidural analgesia or paravertebral blockade cannot be performed.

Pain management after open thoracotomy 2025: procedure-specific postoperative pain management (PROSPECT) recommendations, Anaesthesia 2026 · PMID 41521792

WHERE THE GUIDANCE SITS

This meta-analysis found that PECS I or II blocks for breast cancer surgery

Meta-analysis · AANA journal

This meta-analysis found that PECS I or II blocks for breast cancer surgery decreased intraoperative opioid use by a mean difference of 5.28 and extended time to first rescue analgesia by 4.95 hours versus placebo.

Pectoral Nerve Blocks for Breast Cancer Surgery: A Systematic Review and Meta-Analysis, AANA journal 2026 · PMID 41632458

WHAT THE TRIALS FOUND

Where randomised evidence moved the question

2 findings, each on the slide that follows.

ANESTHESIOLOGY 2025

This randomised trial found that for patients undergoing uniportal thoracoscopic

This randomised trial found that for patients undergoing uniportal thoracoscopic surgery, surgical intercostal nerve blocks with 30 ml of 0.5%...

ENGLAND) 2025

This randomized trial found that administering i.v. esketamine at 0.3 mg/kg

This randomized trial found that administering i.v. esketamine at 0.3 mg/kg alongside either erector spinae or intercostal nerve blocks improves...

WHAT THE TRIALS FOUND

This randomised trial found that for patients undergoing uniportal thoracoscopic

Randomised trial · Anesthesiology

This randomised trial found that for patients undergoing uniportal thoracoscopic surgery, surgical intercostal nerve blocks with 30 ml of 0.5% ropivacaine significantly reduce 12-h morphine consumption and systemic local anesthetic absorption compared to ultrasound-guided erector spinae plane blocks.

Erector Spinae Plane Block versus Intercostal Nerve Blocks in Uniportal Videoscopic-assisted Thoracic Surgery: A Multicenter, Double-blind, Prospective Randomized Placebo-controlled Trial, Anesthesiology 2025 · PMID 40537064

WHAT THE TRIALS FOUND

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Randomised trial · England)

This randomized trial found that administering i.v. esketamine at 0.3 mg/kg alongside either erector spinae or intercostal nerve blocks improves 24-hour quality of recovery scores in adults undergoing thoracoscopic lung resection.

Esketamine vs. placebo combined with erector spinae plane block vs. intercostal nerve block on quality of recovery following thoracoscopic lung resection: a randomized controlled factorial trial, International journal of surgery (London, England) 2025 · PMID 39172717

IN PRACTICE

What the cohorts and reviews add

2 findings, each on the slide that follows.

HAREFUAH 2024

This review found that nerve blocks can improve functional outcome in Maigne's

This review found that nerve blocks can improve functional outcome in Maigne's syndrome, where referred pain may originate from lesions or nerve...

JOURNAL OF BACK AND MUSCULOSKELETAL REHABILITATION 2022

This review identifies focused radiological guided anesthetic blocks as a diagnostic

This review identifies focused radiological guided anesthetic blocks as a diagnostic key for Maigne syndrome, finding that treatment yields the best...

IN PRACTICE

This review found that nerve blocks can improve functional outcome in Maigne's

Review · Harefuah

This review found that nerve blocks can improve functional outcome in Maigne's syndrome, where referred pain may originate from lesions or nerve impingements at any spinal joint between T9 and L2.

[MAIGNE'S THORACOLUMBAR JUNCTION SYNDROME], Harefuah 2024 · PMID 39692376

IN PRACTICE

This review identifies focused radiological guided anesthetic blocks as a diagnostic

Review · Journal of back and musculoskeleta

This review identifies focused radiological guided anesthetic blocks as a diagnostic key for Maigne syndrome, finding that treatment yields the best outcomes when administered during the early disease stages.

Maigne Syndrome - A potentially treatable yet underdiagnosed cause of low back pain: A review, Journal of back and musculoskeletal rehabilitation 2022 · PMID 34151827

INDICATIONS

When this is the right block

PROSPECT GUIDELINE FOR ONCOLOGICAL BREAST SURGERY, ANAESTHESIA 2020

Major oncological breast surgery

PROSPECT's breast surgery review found intra-operative opioid requirements lower when a pectoral nerves block was performed, along with lower postoperative pain scores and opioid consumption, and recommends a regional technique such as paravertebral or pectoral nerves block for major breast surgery on top of paracetamol and an NSAID.

PECS II BLOCK META-ANALYSIS, ANAESTHESIA 2019

When the alternative is systemic analgesia alone

Across 13 randomised trials in 815 patients, the Pecs II block cut 24-hour opioid consumption by 13.6 mg oral morphine equivalents and reduced pain at every measured interval in the first 24 hours compared with systemic analgesia alone.

PECS BLOCK FOR BREAST SURGERY META-ANALYSIS, EUR J ANAESTHESIOLOGY 2021

As a substitute when paravertebral block is unattractive

Pooling 24 trials in 1565 women, pain at rest at 24 hours differed by only 0.18 cm between PECS and paravertebral block, so the two may be equally effective — but that comparison rests on very low quality evidence, so treat equivalence as a working assumption rather than a settled one.

CONTRAINDICATIONS

When it is not

LOCAL ANESTHETIC DOSING FOR FASCIAL PLANE BLOCKS, CAN J ANAESTH 2025

A total dose that crosses the weight-based maximum

Fascial plane blocks push toward maximum recommended dosing to buy spread, and in the pharmacokinetic literature several patients crossed the toxic threshold, with reports of neurologic symptoms and seizures. Calculate the weight-based dose, drop the concentration as volume rises, and stop rather than round up.

ASRA ANTITHROMBOTIC GUIDELINES, 5TH EDITION, REG ANESTH PAIN MED 2025

Antithrombotic therapy still inside the ASRA interval

ASRA's fifth edition maintains an antihaemorrhagic approach and proposes conservative interruption times for antithrombotic therapy before neural blockade. Check the interval against the specific agent and its low- or high-dose indication before the block, not after.

Pre-existing neurologic disease in the field

ASRA's review of regional anaesthesia in pre-existing neurologic disease reports strengthened evidence that diabetic nerves are more sensitive to local anaesthetic and perhaps more susceptible to injury, and describes postsurgical inflammatory neuropathy as a further contributor to postoperative neurologic dysfunction. Document the baseline deficit before you block.

PEARLS

What experience adds

CONVENTIONAL PECS II VERSUS SUBSERRATUS PLANE, ANESTH ANALG 2020

The axilla decides which plane you inject

In a cadaveric comparison, conventional Pecs II stained the intercostobrachial, third intercostal, thoracodorsal, long thoracic and both pectoral nerves, whereas a subserratus injection produced significantly less axillary spread and only minimal lateral pectoral staining. For axillary dissection, take the harder plane.

PROSPECT GUIDELINE FOR ONCOLOGICAL BREAST SURGERY, ANAESTHESIA 2020

The block sits on top of the basics, not instead of them

PROSPECT recommends paracetamol and an NSAID given pre- or intra-operatively and continued afterwards, with pre-operative gabapentin and dexamethasone, and reserves opioids as rescue. The pectoral block is an addition to that regimen.

Scan and name the layers before anything is sterile

Abduct the arm, put the probe below the lateral clavicle, and identify pectoralis major, pectoralis minor and serratus anterior — out loud, to the resident — before you prep. A plane you could not find on the survey scan will not appear once your hands are committed.

IN THE ROOM

What this changes about the next case

Colour is the strength of the evidence behind each step, not the urgency.

- 1 For open thoracotomy surgery, this PROSPECT guideline recommends using erector spinae plane, rhomboid intercostal, or intercostal nerve blocks only as second-line regional analgesia when thoracic epidural analgesia or paravertebral blockade cannot be performed.
- 2 This meta-analysis found that PECS I or II blocks for breast cancer surgery decreased intraoperative opioid use by a mean difference of 5.28 and extended time to first rescue analgesia by 4.95 hours versus placebo.
- 3 This randomised trial found that for patients undergoing uniportal thoracoscopic surgery, surgical intercostal nerve blocks with 30 ml of 0.5% ropivacaine significantly reduce 12-h morphine consumption and systemic local anesthetic absorption compared to ultrasound-guided erector spinae plane blocks.
- 4 This randomized trial found that administering i.v. esketamine at 0.3 mg/kg alongside either erector spinae or intercostal nerve blocks improves 24-hour quality of recovery scores in adults undergoing thoracoscopic lung resection.
- 5 This review found that nerve blocks can improve functional outcome in Maigne's syndrome, where referred pain may originate from lesions or nerve impingements at any spinal joint between T9 and L2.

KEY TAKEAWAYS

What to carry into the next case

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Anaesthesia 2026

This randomised trial found that for patients undergoing uniportal thoracoscopic
Anesthesiology 2025

This review found that nerve blocks can improve functional outcome in Maigne's
Harefuah 2024

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AANA journal 2026

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QUESTIONS I'LL ASK YOU IN THE ROOM

1. How does your plan change if the patient is not optimised?
2. What is the physiology behind what we just did?
3. Talk me through the trade-off you made there.
4. What would make you abandon this plan and do something else?

BOARD QUESTIONS

1. Forty women having modified radical mastectomy were randomised to an ultrasound-guided PECS II block or a thoracic paravertebral block, each with 25 ml of ropivacaine 0.5% given before induction, with patient-controlled morphine afterwards. What did the trial find for duration of analgesia and for 24-hour morphine consumption?
 - A. Analgesia lasted longer with the PECS II block (mean 295 vs 198 minutes) and 24-hour morphine was lower with it (3.9 vs 5.3 mg)
 - B. Analgesia lasted longer with the paravertebral block (mean 295 vs 198 minutes) and 24-hour morphine was lower with it (3.9 vs 5.3 mg)
 - C. Duration of analgesia was the same in the two groups, and 24-hour morphine differed by less than 1 mg
 - D. Analgesia lasted longer with the PECS II block, but 24-hour morphine consumption was higher in the PECS II group
2. A meta-analysis of 13 randomised trials including 815 patients compared the PECS II block against systemic analgesia alone and against a thoracic paravertebral block for breast cancer surgery. State what it found for each of the two comparisons, and say how you should therefore describe the block to a surgeon who already offers paravertebral blocks.
3. A randomised, double-blind, placebo-controlled trial in 128 patients tested the PECS I block against saline for breast cancer surgery, with a multimodal analgesic regimen and surgeon-administered local infiltration in every patient. What was the result for the primary outcome, and what does the design of that trial tell you about when a PECS I is worth doing?

ANSWER KEY

1. **A. Analgesia lasted longer with the PECS II block (mean 295 vs 198 minutes) and 24-hour morphine was lower with it (3.9 vs 5.3 mg)**

In this single trial the PECS II block outlasted the paravertebral block by roughly an hour and a half and saved about 1.4 mg of morphine over 24 hours. Seventeen of 20 PECS II patients had T2 dermatomal spread against four of 20 in the paravertebral group — a difference in coverage that sits well with the analgesic result for an operation reaching the axilla, though the trial reports the two findings alongside each other rather than showing that one produced the other.

Kulhari S et al., Efficacy of pectoral nerve block versus thoracic paravertebral block for postoperative analgesia after radical mastectomy: a randomized controlled trial, Br J Anaesth 2016 · PMID 27543533

2. **Against systemic analgesia alone the PECS II block reduced 24-hour opioid consumption by about 13.6 mg oral morphine equivalents (95% CI -21.2 to -6.1) and lowered acute pain scores at every interval in the first 24 hours. Against a thoracic paravertebral block it was no better: opioid consumption differed by 8.7 mg oral morphine equivalents with a confidence interval crossing zero (-18.2 to 0.7, $p = 0.07$), and pain scores were similar after the first measurement. So the honest description is that PECS II clearly beats no block and is a comparable alternative to a paravertebral block, not an improvement on one.**

Two comparisons in one paper answer two different questions. "Better than nothing" is not "better than the standard", and the confidence interval crossing zero is what separates them here.

Versyck B et al., Analgesic efficacy of the Pecs II block: a systematic review and meta-analysis, Anaesthesia 2019 · PMID 30957884

3. **It was negative. Pain score in recovery was a median of 3.0 in both the bupivacaine and the saline groups ($p = 0.55$), and cumulative morphine consumption up to 24 hours did not differ. Only in the subgroup having major surgery — mastectomy or tumourectomy with axillary clearance, 29 patients — was there a difference, and the authors describe it as statistically significant although not clinically significant. The design is the point: against a background of multimodal analgesia plus surgical infiltration, a block that covers only the pectoral nerves has very little left to add. Note what the authors themselves conclude from the subgroup — not that PECS I is worthwhile for extensive operations, but that its role in extended breast surgery may warrant further investigation.**

In this trial the comparator was not nothing: every patient, in both arms, also received multimodal analgesia and surgeon-administered local infiltration. Read what else the patient is already getting before concluding from a negative trial that the block does not work.

Cros J et al., Pectoral I Block Does Not Improve Postoperative Analgesia After Breast Cancer Surgery: A Randomized, Double-Blind, Dual-Centered Controlled Trial, Reg Anesth Pain Med 2018 · PMID 29672368

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SOURCES

- [1] Pain management after open thoracotomy 2025: procedure-specific postoperative pain management (PROSPECT) recommendations, Anaesthesia 2026 · PMID 41521792
- [2] Erector Spinae Plane Block versus Intercostal Nerve Blocks in Uniportal Videoscopic-assisted Thoracic Surgery: A Multicenter, Double-blind, Prospective Randomized Placebo-controlled Trial, Anesthesiology 2025 · PMID 40537064
- [3] [MAIGNE'S THORACOLUMBAR JUNCTION SYNDROME], Harefuah 2024 · PMID 39692376
- [4] Pectoral Nerve Blocks for Breast Cancer Surgery: A Systematic Review and Meta-Analysis, AANA journal 2026 · PMID 41632458
- [5] Esketamine vs. placebo combined with erector spinae plane block vs. intercostal nerve block on quality of recovery following thoracoscopic lung resection: a randomized controlled factorial trial, International journal of surgery (London, England) 2025 · PMID 39172717
- [6] Maigne Syndrome - A potentially treatable yet underdiagnosed cause of low back pain: A review, Journal of back and musculoskeletal rehabilitation 2022 · PMID 34151827
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- [11] ASRA antithrombotic guidelines, 5th edition, Reg Anesth Pain Med 2025 · PMID 39880411
- [12] Regional anesthesia in patients with preexisting neurologic disease, Reg Anesth Pain Med 2015 · PMID 26115188
- [13] Conventional Pecs II versus subserratus plane, Anesth Analg 2020 · PMID 32701547

DRAFT — NOT
APPROVED