

Supraclavicular Brachial Plexus Block

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.

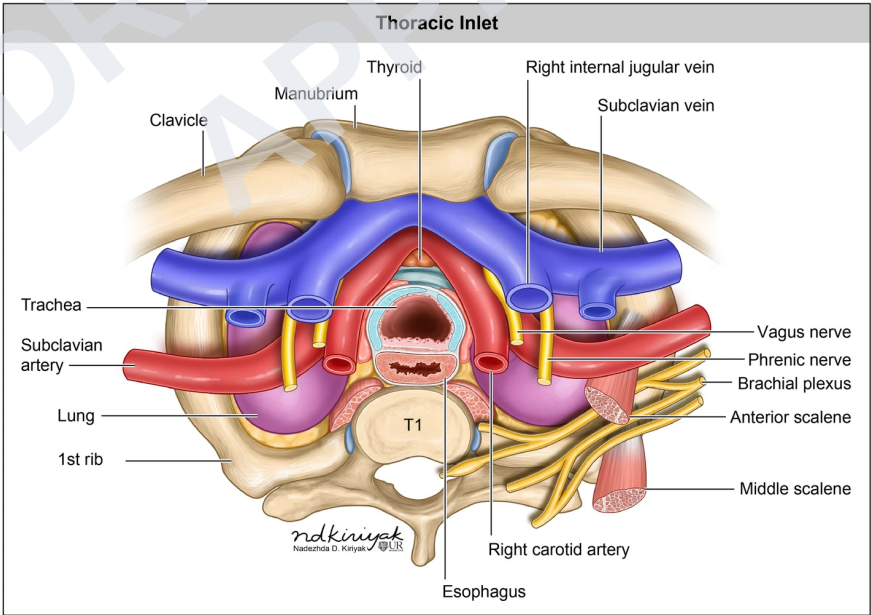
Design	Year	Journal	What it found
Meta-analysis	2025	Journal of clinical anesthesia	This meta-analysis found that a supraclavicular brachial plexus block reduced the
Randomised trial	2025	Anesthesiology	This randomized controlled trial found that for adults having upper extremity
Cohort	2025	Korean journal of anesthesiology	This randomized controlled non-inferiority trial found that the intertruncal
Review	2024	Journal of clinical medicine	This meta-analysis found no significant difference between ultrasound-guided
Meta-analysis	2024	European journal of orthopaedic su	This meta-analysis of 18 RCTs found that supraclavicular blocks had a lower success
Randomised trial	2025	Canadian journal of anaesthesia =	This randomized trial found that administering 0.11 mg/kg of intravenous

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

ANATOMY

The plexus sits on the first rib with the pleural dome immediately medial

Thoracic inlet, superior view: clavicle, first rib, subclavian artery and vein, lung apex, anterior and middle scalene, phrenic nerve and brachial plexus.



Anatomy of the thoracic inlet — Nadezdha D. Kiriya, University of Rochester Medical Center · https://commons.wikimedia.org/wiki/File:Anatomy_of_the_thoracic_inlet.webp
Nadezdha D. Kiriya · CC-BY-4.0 · https://commons.wikimedia.org/wiki/File:Anatomy_of_the_thoracic_inlet.webp

The lung apex lies immediately medial to the target — the anatomical reason this block carries pneumothorax risk, and why needle direction matters more here than depth.

WHERE THE GUIDANCE SITS

What the guidelines and pooled evidence say

2 findings, each on the slide that follows.

JOURNAL OF CLINICAL ANESTHESIA 2025

This meta-analysis found that a supraclavicular brachial plexus block reduced the

This meta-analysis found that a supraclavicular brachial plexus block reduced the incidence of hemidiaphragmatic paralysis by 46% compared with...

This meta-analysis of 18 RCTs found that supraclavicular blocks had a lower success

This meta-analysis of 18 RCTs found that supraclavicular blocks had a lower success rate than infraclavicular blocks (OR 0.61, 95% CI 0.41–0.91) and...

WHERE THE GUIDANCE SITS

This meta-analysis found that a supraclavicular brachial plexus block reduced the

Meta-analysis · Journal of clinical anesthesia

This meta-analysis found that a supraclavicular brachial plexus block reduced the incidence of hemidiaphragmatic paralysis by 46% compared with conventional interscalene blockade in adults undergoing shoulder surgery.

Hemidiaphragmatic paralysis after ultrasound-guided brachial plexus blocks for shoulder surgery: A systematic review and meta-analysis of randomized clinical trials, Journal of clinical anesthesia 2025 · PMID 40494113

WHERE THE GUIDANCE SITS

This meta-analysis of 18 RCTs found that supraclavicular blocks had a lower success

Meta-analysis · European journal of orthopaedic su

This meta-analysis of 18 RCTs found that supraclavicular blocks had a lower success rate than infraclavicular blocks (OR 0.61, 95% CI 0.41–0.91) and a higher rate of Horner's syndrome.

Supraclavicular versus infraclavicular brachial plexus block in upper limb orthopaedic surgery: a systematic review and meta-analysis of randomised controlled trials, European journal of orthopaedic surgery & traumatology : orthopedie traumatologie 2024 · PMID 39287814

WHAT THE TRIALS FOUND

Where randomised evidence moved the question

2 findings, each on the slide that follows.

ANESTHESIOLOGY 2025

This randomized controlled trial found that for adults having upper extremity

This randomized controlled trial found that for adults having upper extremity surgery under supraclavicular block, adding perineural dexamethasone to...

This randomized trial found that administering 0.11 mg/kg of intravenous

This randomized trial found that administering 0.11 mg/kg of intravenous dexamethasone before supraclavicular brachial plexus blockade for wrist and...

WHAT THE TRIALS FOUND

This randomized controlled trial found that for adults having upper extremity

Randomised trial · Anesthesiology

This randomized controlled trial found that for adults having upper extremity surgery under supraclavicular block, adding perineural dexamethasone to intravenous dexamethasone did not further prolong sensory block duration, indicating intravenous dexamethasone alone is sufficient.

Exploring the Additive or Synergistic Effects of the Systemic and Perineural Routes of Dexamethasone as Adjuncts to Supraclavicular Block: A Randomized Controlled Trial, Anesthesiology 2025 · PMID 40036049

WHAT THE TRIALS FOUND

This randomized trial found that administering 0.11 mg/kg of intravenous

Randomised trial · Canadian journal of anaesthesia =

This randomized trial found that administering 0.11 mg/kg of intravenous dexamethasone before supraclavicular brachial plexus blockade for wrist and hand surgery reduced the incidence of rebound pain from 79% to 32% and decreased 24-hour cumulative opioid consumption.

The effect of intravenous dexamethasone on rebound pain after wrist and hand surgery under supraclavicular brachial plexus blockade: a randomized placebo-controlled trial, Canadian journal of anaesthesia = Journal canadien d'anesthesie 2025 · PMID 40542311

IN PRACTICE

What the cohorts and reviews add

2 findings, each on the slide that follows.

KOREAN JOURNAL OF ANESTHESIOLOGY 2025

This randomized controlled non-inferiority trial found that the intertruncal

This randomized controlled non-inferiority trial found that the intertruncal approach to supraclavicular block failed to prove non-inferiority to the...

JOURNAL OF CLINICAL MEDICINE 2024

This meta-analysis found no significant difference between ultrasound-guided

This meta-analysis found no significant difference between ultrasound-guided axillary and supraclavicular blocks in adequate surgical anesthesia at...

IN PRACTICE

This randomized controlled non-inferiority trial found that the intertruncal

Cohort · Korean journal of anesthesiology

This randomized controlled non-inferiority trial found that the intertruncal approach to supraclavicular block failed to prove non-inferiority to the classical approach for complete sensory blockade at 20 min, and was associated with inferior musculocutaneous blockade, longer performance time, and higher hemidiaphragmatic paresis incidence.

Intertruncal versus classical approach to supraclavicular brachial plexus block on sensory-motor blockade for upper extremity surgery: a randomized controlled non-inferiority trial, Korean journal of anesthesiology 2025 · PMID 40740147

IN PRACTICE

This meta-analysis found no significant difference between ultrasound-guided

Review · Journal of clinical medicine

This meta-analysis found no significant difference between ultrasound-guided axillary and supraclavicular blocks in adequate surgical anesthesia at 30 minutes, block performance time, or onset time for distal upper limb surgery.

Axillary Brachial Plexus Block Compared with Other Regional Anesthesia Techniques in Distal Upper Limb Surgery: A Systematic Review and Meta-Analysis, Journal of clinical medicine 2024 · PMID 38892896

INDICATIONS

When this is the right block

PNEUMOTHORAX AFTER ULTRASOUND-GUIDED PERICLAVICULAR BLOCKS, ANAESTHESIA 2014

Surgery of the arm, forearm and hand under ultrasound

In a prospective series of 6366 ultrasound-guided periclavicular plexus blocks, clinically manifest and radiologically confirmed pneumothorax occurred in four patients (0.06%, 95% CI 0.001-0.124), against a historical risk reported as high as 6.1% without ultrasound.

HEMIDIAPHRAGMATIC PARALYSIS AFTER SUPRACLAVICULAR VERSUS INTERSCALENE BLOCK, BRAZ J ANESTHESIOLOGY 2019

Shoulder surgery, with analgesia that matched interscalene

With 20 mL of ropivacaine 0.375% targeted to the corner pocket, morphine consumption and the highest 24-hour numerical rating score did not differ from interscalene block in a prospective comparison of 85 shoulder surgery patients.

DIAPHRAGM-SPARING TECHNIQUES VERSUS INTERSCALENE BLOCK, J CLIN ANESTH 2025

As a lower-phrenic-burden alternative to conventional interscalene

In a systematic review of 28 randomised trials in 1737 shoulder surgery patients, supraclavicular blockade reduced the incidence of hemidiaphragmatic paralysis by 46% compared with conventional interscalene block — although the authors graded that particular comparison as low-level evidence.

CONTRAINDICATIONS

When it is not

HEMIDIAPHRAGMATIC PARALYSIS AFTER SUPRACLAVICULAR VERSUS INTERSCALENE BLOCK, BRAZ J ANESTHESIOLOGY 2019

Altered respiratory function

Hemidiaphragmatic paralysis followed ultrasound-guided supraclavicular block in 59.5% of patients, and no predictive factor — sex, age, weight, smoking or functional capacity — identified who it would happen to. The authors conclude the technique cannot be recommended for patients with altered respiratory function.

SUPRACLAVICULAR VERSUS INFRACLAVICULAR HEMIDIAPHRAGMATIC PARALYSIS RCT, REG ANESTH PAIN MED 2015

When phrenic sparing is the point, an infraclavicular approach is better

In a randomised comparison using 30 mL of ropivacaine 0.5%, complete hemidiaphragmatic paralysis occurred in 11 of 32 supraclavicular patients (34%) versus 1 of 32 infraclavicular patients (3%), and any paralysis in 44% versus 13%. The infraclavicular approach greatly reduced the risk but did not eliminate it.

Antithrombotic therapy still inside the ASRA interval

The needle sits beside the subclavian artery and above the pleura, where bleeding is neither visible nor compressible. ASRA's fifth edition proposes conservative interruption times before neural blockade; check the agent, the dose band and the interval first.

PEARLS

What experience adds

COSTOCLAVICULAR VERSUS SUPRACLAVICULAR HEMIDIAPHRAGMATIC PARALYSIS RCT, SCI REP 2021

Costoclavicular does the phrenic job better still

In 75 analysed patients randomised to costoclavicular or supraclavicular block with 25 mL of local anaesthetic, hemidiaphragmatic paralysis occurred in 11.4% versus 47.5% (risk difference -36%), and pulmonary function was better preserved in the costoclavicular group.

PNEUMOTHORAX AFTER ULTRASOUND-GUIDED PERICLAVICULAR BLOCKS, ANAESTHESIA 2014

Three of the four pneumothoraces declared themselves two days later

In the 6366-block series, three of the four symptomatic pneumothoraces appeared after a two-day latency, and every operator involved had performed fewer than 20 blocks. Faulty image settings, losing the needle tip and inadequate supervision were the authors' candidate risk factors.

Do not advance anything you cannot see the tip of

Set the depth and gain before you puncture, keep the needle in plane from skin to corner pocket, and stop the moment the tip disappears — then find it again by moving the probe, not the needle.

IN THE ROOM

What this changes about the next case

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

- 1 This meta-analysis found that a supraclavicular brachial plexus block reduced the incidence of hemidiaphragmatic paralysis by 46% compared with conventional interscalene blockade in adults undergoing shoulder surgery.
- 2 This meta-analysis of 18 RCTs found that supraclavicular blocks had a lower success rate than infraclavicular blocks (OR 0.61, 95% CI 0.41–0.91) and a higher rate of Horner's syndrome.
- 3 This randomized controlled trial found that for adults having upper extremity surgery under supraclavicular block, adding perineural dexamethasone to intravenous dexamethasone did not further prolong sensory block duration, indicating intravenous dexamethasone alone is sufficient.
- 4 This randomized trial found that administering 0.11 mg/kg of intravenous dexamethasone before supraclavicular brachial plexus blockade for wrist and hand surgery reduced the incidence of rebound pain from 79% to 32% and decreased 24-hour cumulative opioid consumption.
- 5 This randomized controlled non-inferiority trial found that the intertruncal approach to supraclavicular block failed to prove non-inferiority to the classical approach for complete sensory blockade at 20 min, and was associated with inferior musculocutaneous blockade, longer performance time, and higher hemidiaphragmatic paresis incidence.

KEY TAKEAWAYS

What to carry into the next case

This meta-analysis found that a supraclavicular brachial plexus block reduced the

Journal of clinical anesthesia 2025

This randomized controlled trial found that for adults having upper extremity

Anesthesiology 2025

This randomized controlled non-inferiority trial found that the intertruncal

Korean journal of anesthesiology 2025

This meta-analysis found no significant difference between ultrasound-guided

Journal of clinical medicine 2024

This meta-analysis found that a supraclavicular brachial plexus block reduced the

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. Sixty-four patients having right upper-limb surgery were randomised to an ultrasound-guided supraclavicular or infraclavicular block, both with 30 ml of ropivacaine 0.5%, and complete hemidiaphragmatic paralysis at 30 minutes was measured by M-mode ultrasound with a sniff test. What were the rates?
 - A. About one-third after the supraclavicular block versus about 3% after the infraclavicular block
 - B. Essentially all patients after the supraclavicular block versus about one-third after the infraclavicular block
 - C. About 3% after the supraclavicular block versus about one-third after the infraclavicular block
 - D. No difference between the approaches — about 15% in each group
2. A prospective observational study followed 6366 ultrasound-guided periclavicular brachial plexus blocks for clinically manifest, radiologically confirmed pneumothorax. Give the rate, compare it with the pre-ultrasound figure, and state the detail about timing that changes what you tell a day-case patient.
3. A meta-analysis of 12 randomised trials compared supraclavicular with interscalene brachial plexus block for shoulder surgery. Describe what it found for analgesia and for the three adverse effects it examined, and say how firmly you can act on it.

ANSWER KEY

1. A. About one-third after the supraclavicular block versus about 3% after the infraclavicular block

Eleven of 32 versus 1 of 32 for complete paralysis; counting partial paralysis too, 44% versus 13%. About a third of supraclavicular patients still lost the hemidiaphragm, so the approach is not phrenic-sparing in any absolute sense, and the authors' own reading is that the infraclavicular approach greatly reduced the risk without eliminating it. Note the comparison this trial actually made: supraclavicular against infraclavicular. It says nothing about how either compares with an interscalene block.

Petrar SD et al., Hemidiaphragmatic paralysis following ultrasound-guided supraclavicular versus infraclavicular brachial plexus blockade: a randomized clinical trial, *Reg Anesth Pain Med* 2015 · PMID 25650633

2. Four patients had a symptomatic, radiologically confirmed pneumothorax — 0.06% (95% CI 0.001 to 0.124) — against a historical rate reported as high as 6.1% without ultrasound monitoring. The detail that matters is that three of the four presented after a two-day latency period. A pneumothorax from a supraclavicular block is not reliably apparent before the patient goes home, so discharge advice has to name breathlessness and pleuritic chest pain over the following days as reasons to seek help, rather than relying on a normal immediate recovery.

A complication with a delayed presentation is a communication problem as much as a technical one. Note too that all the anaesthetists involved in these four complications had previously performed fewer than 20 of these blocks, though the study could not confirm an experience of 20 blocks or fewer as a statistically significant risk factor.

Gauss A et al., Incidence of clinically symptomatic pneumothorax in ultrasound-guided infraclavicular and supraclavicular brachial plexus block, *Anaesthesia* 2014 · PMID 24641639

3. Analgesia was comparable: 24-hour pain scores differed by -0.34 (95% CI -0.75 to 0.07) and morphine equivalent consumption by 1.84 mg per 24 hours (95% CI -0.00 to 3.69), neither reaching significance. On adverse effects the supraclavicular approach was better for two of the three — hemidiaphragmatic paresis risk ratio 0.56 (95% CI 0.39 to 0.82) and Horner's syndrome risk ratio 0.29 (95% CI 0.19 to 0.44) — with no significant difference in hoarseness (risk ratio 0.73, 95% CI 0.48 to 1.13). How firmly can you act on it? Not very: the authors' own wording is that the supraclavicular approach might be an efficient alternative, but that the available evidence is inadequate and prevents a firm conclusion. Read the numbers at their true strength — a risk ratio of 0.56 is a reduction in hemidiaphragmatic paresis, not abolition of it, and the meta-analysis reports no respiratory outcomes in patients with limited respiratory reserve, so it cannot tell you how the two blocks behave in the patient for whom that reduction would matter most.

"Fewer adverse effects, equal analgesia, inadequate evidence" is a common shape in regional anaesthesia meta-analyses. Read the reviewers' own confidence statement before you change practice on the point estimate.

Schubert AK et al., Interscalene versus supraclavicular plexus block for the prevention of postoperative pain after shoulder surgery: A systematic review and meta-analysis, *Eur J Anaesthesiol* 2019 · PMID 31045699

This meta-analysis found that a supraclavicular brachial plexus block reduced the

SOURCES

- [1] Hemidiaphragmatic paralysis after ultrasound-guided brachial plexus blocks for shoulder surgery: A systematic review and meta-analysis of randomized clinical trials, *Journal of clinical anesthesia* 2025 · PMID 40494113
- [2] Exploring the Additive or Synergistic Effects of the Systemic and Perineural Routes of Dexamethasone as Adjuncts to Supraclavicular Block: A Randomized Controlled Trial, *Anesthesiology* 2025 · PMID 40036049
- [3] Intertruncal versus classical approach to supraclavicular brachial plexus block on sensory-motor blockade for upper extremity surgery: a randomized controlled non-inferiority trial, *Korean journal of anesthesiology* 2025 · PMID 40740147
- [4] Axillary Brachial Plexus Block Compared with Other Regional Anesthesia Techniques in Distal Upper Limb Surgery: A Systematic Review and Meta-

Analysis, Journal of clinical medicine 2024 · PMID 38892896

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- [10] ASRA antithrombotic guidelines, 5th edition, Reg Anesth Pain Med 2025 · PMID 39880411
- [11] Costoclavicular versus supraclavicular hemidiaphragmatic paralysis RCT, Sci Rep 2021 · PMID 34548555

DRAFT — NOT
APPROVED