

Transversus Abdominis Plane (TAP) 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.

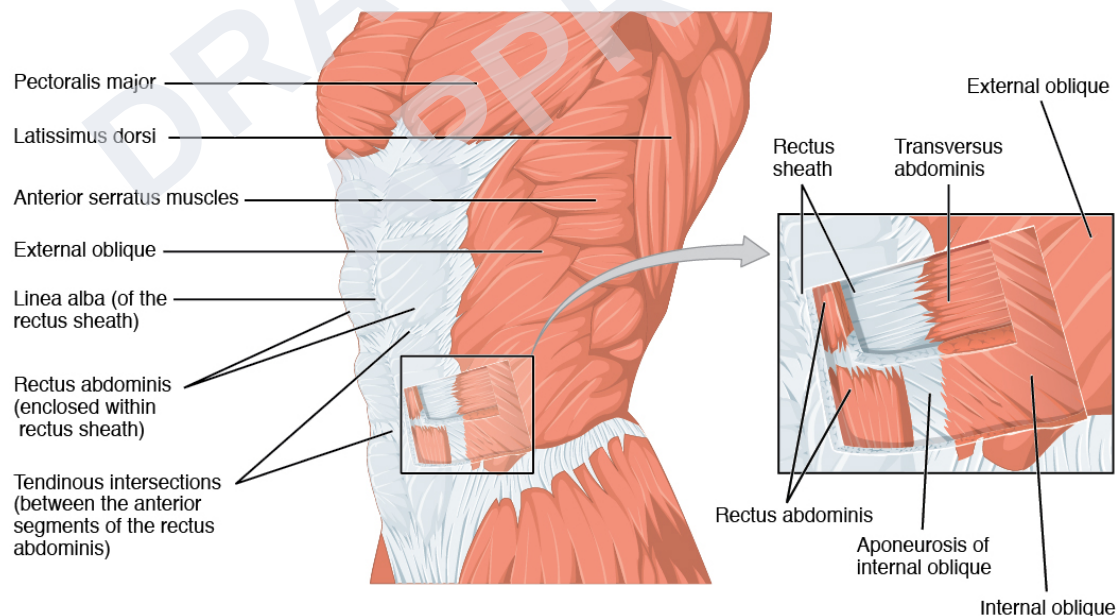
Design	Year	Journal	What it found
Randomised trial	2026	Anesthesiology	This randomised trial found that preincision, single-shot four-quadrant TAP blocks
Review	2025	Current opinion in anaesthesiology	This review notes that while transversus abdominis plane blocks improve
Randomised trial	2025	BJS open	This randomized non-inferiority trial found that for kidney transplantation, a
Review	2024	Switzerland)	This meta-analysis found no significant difference in postoperative pain scores or
Meta-analysis	2023	Hernia : the journal of hernias an	This review found that in laparoscopic inguinal hernia repair, transversus abdominis
Review	2023	Cureus	This meta-analysis found that in abdominoplasty, a TAP block is associated with a

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

ANATOMY

The needle stops between internal oblique and transversus abdominis

Anterolateral abdominal wall: external oblique, internal oblique and transversus abdominis, with a cut-away showing the three layers separated.



*Muscles of the Abdomen (Anterolateral) — OpenStax College, Anatomy & Physiology · https://commons.wikimedia.org/wiki/File:1112_Muscles_of_the_Abdomen_Anterolateral.png
OpenStax College · CC-BY-3.0 · https://commons.wikimedia.org/wiki/File:1112_Muscles_of_the_Abdomen_Anterolateral.png*

The thoracolumbar nerves run in the plane between the inner two layers, so the target is that interface — not the muscle

either side of it.

WHERE THE GUIDANCE SITS

This review found that in laparoscopic inguinal hernia repair, transversus abdominis

Meta-analysis · Hernia : the journal of hernias an

This review found that in laparoscopic inguinal hernia repair, transversus abdominis plane blocks improve postoperative pain and mobility, decrease opiate analgesic usage, and provide superior pain control compared to other regional anesthesia modalities.

Transversus abdominis plane blocks in laparoscopic inguinal hernia repair: a review, Hernia : the journal of hernias and abdominal wall surgery 2023 · PMID 37395916

WHAT THE TRIALS FOUND

Where randomised evidence moved the question

2 findings, each on the slide that follows.

ANESTHESIOLOGY 2026

This randomised trial found that preincision, single-shot four-quadrant TAP blocks

This randomised trial found that preincision, single-shot four-quadrant TAP blocks with liposomal bupivacaine, plain bupivacaine, or saline all...

BJS OPEN 2025

This randomized non-inferiority trial found that for kidney transplantation, a

This randomized non-inferiority trial found that for kidney transplantation, a combined TAP and rectus sheath block with PCIA maintained higher mean...

WHAT THE TRIALS FOUND

This randomised trial found that preincision, single-shot four-quadrant TAP blocks

Randomised trial · Anesthesiology

This randomised trial found that preincision, single-shot four-quadrant TAP blocks with liposomal bupivacaine, plain bupivacaine, or saline all produced similar opioid consumption and pain scores at 24, 48, and 72 h after major abdominal surgery, suggesting little analgesic benefit from routine use in this mixed population.

Liposomal Bupivacaine, Plain Bupivacaine, and Saline for Transversus Abdominis Plane Blocks: The CLEVELAND Randomized Trial, Anesthesiology 2026 · PMID 41329063

WHAT THE TRIALS FOUND

This randomized non-inferiority trial found that for kidney transplantation, a

Randomised trial · BJS open

This randomized non-inferiority trial found that for kidney transplantation, a combined TAP and rectus sheath block with PCIA maintained higher mean arterial pressure than epidural analgesia while providing non-inferior quality of recovery on POD1.

Combined transversus abdominis plane and rectus sheath blocks with patient-controlled intravenous analgesia versus epidural analgesia for kidney transplantation: randomized, non-inferiority clinical trial, BJS open 2025 · PMID 41277272

IN PRACTICE

What the cohorts and reviews add

3 findings, each on the slide that follows.

CURRENT OPINION IN ANAESTHESIOLOGY 2025

This review notes that while transversus abdominis plane blocks improve

This review notes that while transversus abdominis plane blocks improve postoperative analgesia in bariatric surgery, quadratus lumborum blocks offer...

SWITZERLAND) 2024

This meta-analysis found no significant difference in postoperative pain scores or

This meta-analysis found no significant difference in postoperative pain scores or opioid consumption between ultrasound-guided TAP blocks performed...

CUREUS 2023

This meta-analysis found that in abdominoplasty, a TAP block is associated with a

This meta-analysis found that in abdominoplasty, a TAP block is associated with a significantly lower time taken to first analgesic and a lower...

IN PRACTICE

This review notes that while transversus abdominis plane blocks improve

Review · Current opinion in anaesthesiology

This review notes that while transversus abdominis plane blocks improve postoperative analgesia in bariatric surgery, quadratus lumborum blocks offer longer-lasting pain relief, and anatomical challenges in obese patients necessitate

optimized ultrasound guidance for successful block placement.

Regional anesthesia in bariatric surgery, Current opinion in anaesthesiology 2025 · PMID 40407104

IN PRACTICE

This meta-analysis found no significant difference in postoperative pain scores or

Review · Switzerland)

This meta-analysis found no significant difference in postoperative pain scores or opioid consumption between ultrasound-guided TAP blocks performed by anesthesiologists and laparoscopic-guided TAP blocks performed by surgeons, though the laparoscopic-guided approach was significantly faster to perform.

The Efficacy of Transversus Abdominis Plane (TAP) Blocks When Completed by Anesthesiologists Versus by Surgeons: A Systematic Review and Meta-Analysis, Healthcare (Basel, Switzerland) 2024 · PMID 39766013

IN PRACTICE

This meta-analysis found that in abdominoplasty, a TAP block is associated with a

Review · Cureus

This meta-analysis found that in abdominoplasty, a TAP block is associated with a significantly lower time taken to first analgesic and a lower incidence of postoperative nausea and vomiting (OR 0.18), while total opioid use remains comparable.

The Efficacy of the Transversus Abdominis Plane Block in Abdominoplasty: A Systematic Review and Meta-Analysis, Cureus 2023 · PMID 38111414

INDICATIONS

When this is the right block

TAP BLOCK FOR POSTOPERATIVE ANALGESIA META-ANALYSIS, CAN J ANAESTH 2016

Abdominal surgery where the alternative is systemic analgesia

Across 51 randomised trials, TAP block reduced resting pain scores against placebo by 1.4 points at six hours, 2.0 at 12 hours and 1.2 at 24 hours on a 0-10 scale, and cut 24-hour morphine consumption by 14.7 mg. The effect held across gynaecological, appendicectomy, inguinal, bariatric and urological surgery.

PROSPECT GUIDELINE FOR ELECTIVE CAESAREAN SECTION, ANAESTHESIA 2021

Caesarean section when intrathecal opioid was not given

PROSPECT's caesarean review of 145 studies recommends intrathecal morphine 50-100 µg or diamorphine 300 µg, and reserves wound infiltration, continuous wound infusion and fascial plane blocks such as TAP or quadratus lumborum blocks for cases where intrathecal opioid was not administered.

TAP BLOCK IN BARIATRIC SURGERY META-ANALYSIS, PAIN PHYSICIAN 2021

Bariatric surgery, where opioid-induced respiratory depression is the real risk

Across 15 randomised trials in 1410 patients, TAP block reduced the need for opioid rescue (RR 0.28), cut 24-hour opioid use by 8.3 mg, shortened time to ambulation by 1.1 hours, and lowered pain scores at 6 and 12 hours.

CONTINUOUS TAP VERSUS EPIDURAL ANALGESIA RCT, ANAESTHESIA 2014

Laparoscopic colorectal surgery as an alternative to epidural

In a non-inferiority trial of 61 patients on an enhanced recovery programme, four-quadrant TAP blocks with bilateral posterior catheters infused for 48 hours gave the same median pain score on coughing at 24 hours as epidural infusion, with a 93% versus 87% success rate.

CONTRAINDICATIONS

When it is not

SYMPTOMATIC TOXICITY AND PLASMA ROPIVACAINE AFTER TAP BLOCK, BR J ANAESTH 2013

A dose that treats the abdominal wall as a low-uptake plane

After bilateral TAP block with ropivacaine 2.5 mg/kg at caesarean section, mean peak total plasma concentration was 1.82 µg/mL at 30 minutes and the highest single value was 3.76 µg/mL; three of 30 patients reported symptoms of mild neurotoxicity, and their mean peak was 2.70 µg/mL. Pregnancy adds pharmacokinetic susceptibility on top of that.

INTRATHECAL MORPHINE VERSUS TAP BLOCK FOR CAESAREAN DELIVERY META-ANALYSIS, BMC ANESTHESIOLOGY 2021

As an upgrade on intrathecal morphine

Across six randomised trials in 563 caesarean patients, sensitivity analysis put resting and moving 24-hour pain scores in favour of intrathecal morphine and morphine consumption lower in that group, with TAP block winning only on pruritus and nausea and vomiting. It is a trade, not an improvement.

QL VERSUS TAP BLOCK FOR ABDOMINAL SURGERY META-ANALYSIS, BMC ANESTHESIOLOGY 2020

Where a quadratus lumborum block is available and appropriate

Across eight randomised trials in 564 abdominal surgery patients, the quadratus lumborum block gave lower pain scores at every interval to 24 hours, lower 24-hour morphine consumption and a longer duration of analgesia than TAP block.

Antithrombotic therapy still inside the ASRA interval

ASRA's fifth edition proposes conservative interruption times before neural blockade and, where evidence is limited, keeps an antihaemorrhagic position focused on patient safety. Apply the interval even for a block in the abdominal wall.

PEARLS

What experience adds

PLASMA ROPIVACAINE AFTER ULTRASOUND-GUIDED TAP BLOCK, BR J ANAESTH 2010

3 mg/kg of ropivacaine reaches potentially neurotoxic venous levels

In 28 patients having open gynaecological surgery, bilateral TAP block with ropivacaine 3 mg/kg gave a mean peak venous concentration of 2.54 µg/mL at 30 minutes, a highest measured value of 4.00 µg/mL, and mean concentrations above 2.20 µg/mL for up to 90 minutes.

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

Trade concentration for volume, not the other way round

The fascial plane block pharmacokinetic literature recommends weight-based dose calculation, aspiration before injection, incremental dosing, ultrasound observation of the injectate, considering low-dose epinephrine, and lowering the concentration as volume increases so the total dose stays under the maximum.

Say which TAP you are doing

Subcostal, lateral, posterior, four-quadrant — name it in the record and to the resident, because the dermatomes each one covers are different and 'a TAP block' in the notes tells the next person nothing about where the patient will hurt.

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 review found that in laparoscopic inguinal hernia repair, transversus abdominis plane blocks improve postoperative pain and mobility, decrease opiate analgesic usage, and provide superior pain control compared to other regional anesthesia modalities.
- 2 This randomised trial found that preincision, single-shot four-quadrant TAP blocks with liposomal bupivacaine, plain bupivacaine, or saline all produced similar opioid consumption and pain scores at 24, 48, and 72 h after major abdominal surgery, suggesting little analgesic benefit from routine use in this mixed population.
- 3 This randomized non-inferiority trial found that for kidney transplantation, a combined TAP and rectus sheath block with PCIA maintained higher mean arterial pressure than epidural analgesia while providing non-inferior quality of recovery on POD1.
- 4 This review notes that while transversus abdominis plane blocks improve postoperative analgesia in bariatric surgery, quadratus lumborum blocks offer longer-lasting pain relief, and anatomical challenges in obese patients necessitate optimized ultrasound guidance for successful block placement.
- 5 This meta-analysis found no significant difference in postoperative pain scores or opioid consumption between ultrasound-guided TAP blocks performed by anesthesiologists and laparoscopic-guided TAP blocks performed by surgeons, though the laparoscopic-guided approach was significantly faster to perform.

KEY TAKEAWAYS

What to carry into the next case

This randomised trial found that preincision, single-shot four-quadrant TAP blocks

Anesthesiology 2026

This review notes that while transversus abdominis plane blocks improve

Current opinion in anaesthesiology 2025

This randomized non-inferiority trial found that for kidney transplantation, a

BJS open 2025

This meta-analysis found no significant difference in postoperative pain scores or

Switzerland) 2024

This randomised trial found that preincision, single-shot four-quadrant TAP blocks

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. In the multicentre randomised trial that compared four-quadrant transversus abdominis plane blocks using liposomal bupivacaine against thoracic epidural analgesia after major abdominal surgery, 498 patients were analysed for two co-primary non-inferiority outcomes. What was the result?
 - A. Pain at rest was non-inferior to epidural, opioid consumption failed non-inferiority (ratio of geometric means 1.37, an absolute difference of about 21 mg morphine equivalents over 3 days), and mean arterial pressure below 65 mmHg occurred in 48% of epidural patients versus 31% of TAP patients
 - B. Both pain at rest and opioid consumption met non-inferiority, and rates of hypotension were similar in the two groups
 - C. Pain at rest was inferior to epidural by more than one point on the numeric rating scale, and hypotension was more common with the TAP blocks
 - D. Pain at rest was non-inferior, opioid consumption failed non-inferiority by about 100 mg morphine equivalents over 3 days, and hypotension rates were similar
2. A procedure-specific meta-analysis of six randomised trials in 568 patients compared transversus abdominis plane block with thoracic epidural analgesia in colorectal surgery. Beyond pain scores, list the recovery and safety outcomes on which the block came out ahead, and state where the two were equivalent.
3. Thirty women having elective caesarean section under spinal anaesthesia received bilateral ultrasound-guided transversus abdominis plane blocks after wound closure with ropivacaine 2.5 mg/kg diluted to 40 ml, and venous ropivacaine concentrations were sampled for four hours. Report the peak concentrations, when they occurred, and what symptoms were seen — then say what that means for how you dose this block.

ANSWER KEY

1. **A. Pain at rest was non-inferior to epidural, opioid consumption failed non-inferiority (ratio of geometric means 1.37, an absolute difference of about 21 mg morphine equivalents over 3 days), and mean arterial pressure below 65 mmHg occurred in 48% of epidural patients versus 31% of TAP patients**

The trial stopped early for futility at the third interim analysis. It is the honest version of the enhanced-recovery recommendation: the blocks match the epidural for pain at rest, cost about 21 mg morphine equivalents over three days, and buy a meaningful reduction in hypotension. The authors' own conclusion is that clinicians should reconsider epidural analgesia in patients at risk from hypotension.

Turan A et al., Transversus abdominis plane block with liposomal bupivacaine versus continuous epidural analgesia for major abdominal surgery: The EXPLANE randomized trial, J Clin Anesth 2022 · PMID 34969004

2. **Pain control was comparable at rest and on movement. The block came out ahead on 24-hour and total opioid consumption, time to ambulation, urinary catheter duration, and the incidence of sensory disturbance and postoperative hypotension. When laparoscopic surgery was the only approach, the block additionally shortened time to first flatus and lowered the incidence of postoperative nausea and vomiting. The two were equivalent on 48-hour opioid consumption, on postoperative nausea and vomiting overall, and on hospital stay.**

The advantages here are almost all downstream of what the epidural does to sympathetic tone and to the bladder — earlier walking, earlier catheter removal, less hypotension. In a minimally invasive operation those are the outcomes that decide the pathway, not the pain score.

Hamid HKS et al., Transversus abdominis plane block versus thoracic epidural analgesia in colorectal surgery: a systematic review and meta-analysis, Langenbecks Arch Surg 2021 · PMID 32974803

3. **The mean peak total ropivacaine concentration was 1.82 micrograms/ml (SD 0.69) and occurred 30 minutes after injection; the highest concentration in any patient was 3.76 micrograms/ml, at 10 minutes. Three patients reported symptoms of mild neurotoxicity, and their mean peak level was higher at 2.70 micrograms/ml (SD 0.46). What the study establishes is that a bilateral block — a large volume of local anaesthetic injected between the muscles of the abdominal wall, at a weight-based dose — can raise plasma ropivacaine to concentrations that may be associated with neurotoxicity. So the quantity to think about is the total dose across both sides rather than the dose per side, systemic absorption rather than needle placement is what limits it, and the patient is worth watching through the first half hour when the peak arrives. The authors also note pharmacokinetic reasons why pregnancy may increase susceptibility to local anaesthetic toxicity — background they cite for studying this population, not something this study measured.**

The three symptomatic patients differed from the rest in plasma level; the study reports nothing to suggest they differed in technique. A fascial plane block has no aspiration test that protects you from absorption, and the mean peak arrived at about 30 minutes — often after the patient has left theatre.

Griffiths JD et al., Symptomatic local anaesthetic toxicity and plasma ropivacaine concentrations after transversus abdominis plane block for Caesarean section, Br J Anaesth 2013 · PMID 23454825

This randomised trial found that preincision, single-shot four-quadrant TAP blocks

SOURCES

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