



# External Oblique—Intercostal (EOI) Fascial Plane Block for Upper Abdominal Surgery: A Case Series and Convenience-Study Report with Literature Integration

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## Abstract

**Importance:** Regional truncal blocks that reliably cover the upper abdomen are desirable for opioid-sparing anesthesia and enhanced recovery after surgery (ERAS). The external oblique–intercostal (EOI) fascial plane block is a recently described technique targeting the anterior and lateral branches of the thoracoabdominal nerves and may provide useful analgesia for procedures above the umbilicus.

**Objective:** To present institutional convenience-study outcomes and a clinical case series experience using the EOI block (often paired with quadratus lumborum [QL] blocks) for outpatient upper abdominal surgery and to place these results in the context of current published evidence.

**Design, Setting, and Participants:** Retrospective convenience review of consecutive outpatient upper-abdominal procedures performed at a community hospital over a 3-month period; comparison made to historic cases receiving QL block only over the prior 6 months. Inclusion/exclusion criteria and procedural details followed institutional IRB guidance (convenience dataset). Outcome measures included opioid use (morphine milligram equivalents, MME), postoperative nausea and vomiting (PONV), and phase-II discharge time.

**Main Outcomes and Measures:** Total opioid consumption (intraop + PACU, reported as MME), requirement for opioid in phase II, PONV incidence, and time to discharge.

**Results:** In the convenience cohort, patients receiving combined bilateral EOI + QL ( $n = 42$ ) had a mean total MME of 4.1 (range 0–17.4) compared with QL-only patients ( $n = 54$ ) mean MME 12.8 (range 0–31.1). Phase-II opioid requirement was 4/42 vs 15/54; PONV in phase II was 2/42 vs 9/54. Mean time to discharge was 98 minutes (EOI+QL) vs 136 minutes (QL only). These data are descriptive and uncontrolled.

**Conclusions and Relevance:** The EOI block—particularly when used as part of a multimodal regimen and combined with QL in this institutional experience—was associated with lower perioperative opioid consumption, reduced PONV, and shorter PACU stays compared with historical QL-only practice. Published literature remains early and comprised largely of cadaveric work, volunteer dermatomal studies, case reports/series; randomized evidence is lacking. Larger controlled studies are warranted.

## Introduction

Effective analgesia for upper abdominal procedures (eg, cholecystectomy, ventral/umbilical hernia repair) is central to opioid-sparing anesthesia and ERAS pathways. Traditional truncal options include subcostal transversus abdominis plane (TAP) blocks, rectus sheath blocks, erector spinae plane (ESP) blocks, quadratus lumborum (QL) blocks, and neuraxial techniques. Each has advantages and limits in dermatomal coverage, technical complexity, and risk profile; no single technique universally addresses the anterior and lateral components of the upper abdominal wall. The EOI fascial plane block was introduced to target the lateral and anterior branches of the thoracoabdominal nerves at the subcostal margin and to provide consistent coverage

of the upper abdomen with a technically straightforward, ultrasound-guided injection that uses a bony rib backstop for safety.

Early anatomical and clinical descriptions demonstrated dermatomal coverage frequently spanning T6–T10 (variable by technique and volume) and suggested potential application for midline and lateral upper abdominal analgesia. However, most available data are lower level (anatomic studies, volunteer mapping, case reports/series), and randomized controlled trials comparing EOI with established techniques are limited or absent at present.

This manuscript (1) presents a pragmatic institutional convenience dataset where EOI (usually combined with bilateral QL) was incorporated into an opioid-sparing pathway for outpatient upper abdominal cases and (2)

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synthesizes the most relevant published evidence (2021–2025) to contextualize findings and highlight knowledge gaps.

## Methods

This convenience analysis follows the institutional presentation and slides prepared for a meeting. Inclusion criteria were outpatient abdominal operations that involved the upper abdomen (ventral hernia repair, umbilical hernia repair, laparoscopic cholecystectomy, laparoscopic appendectomy, and similar procedures) performed by one primary surgeon. Exclusion criteria included existing chronic opioid therapy, chronic pain diagnosis, preoperative gabapentin, psychiatric diagnoses that might affect pain reporting, and cases where the block was not performed or not placed preincision. Ultrasound guided external oblique intercostal nerve blocks were performed by five anesthetists experienced with the technique; blocks were placed under general anesthesia in most cases. Local anesthetic regimen consisted of 15 mL per side of 0.25% bupivacaine (or 0.2% ropivacaine) with dexamethasone added, in combination with bilateral QL blocks in most EOI cases. Perioperative multimodal analgesia included IV acetaminophen and ketorolac where not contraindicated. Pain scores were recorded in PACU by nursing staff and opioid consumption was recorded from the intraoperative and PACU medication records. The EOI+QL cohort (3-month window) was compared descriptively to a historical QL-only cohort from the prior 6 months. Institutional IRB approval for data review and deidentified reporting was obtained per local policy.

## Technique (as performed):

Ultrasound guidance along the subcostal margin with anterolateral probe placement, fascial plane injection between external oblique and the underlying intercostal plane along the rib margin; needle aimed to contact the rib “backstop,” 15–20 mL per side low-concentration local anesthetic with adjunctive dexamethasone. Strict ultrasound guidance and aspiration checks were followed.

## Results

Descriptive outcomes (EOI+QL cohort, n = 42; QL-only, n = 54):

Outcome	EOI + QL (n=42)	QL Only (n=54)
Mean total opioid consumption (MME)	4.1 (0–17.4)	12.8 (0–31.1)
Patients requiring opioid in phase II	4/42	15/54
PONV in phase II (additional antiemetic)	2/42	9/54
Mean time to discharge (minutes)	98	136

Anecdotal replication occurred during a medical mission setting with open cholecystectomies (n ≈ 16), where minimal opioid use, zero same-day PONV, and same-day or next-day discharge were reported. These mission results are descriptive and uncontrolled.

## Adverse events

No pneumothorax, diaphragmatic injury, or LAST events were reported in the convenience dataset; formal surveillance for delayed complications was limited.

## Review of the Literature and Integration of Recent Evidence

### Anatomical and early clinical descriptions

Elsharkawy et al [1] described the EOI block with cadaveric correlation and an early clinical series, noting that the technique may provide predictable anterior midline and lateral upper abdominal analgesia, often covering T6–T10 depending on injection site and volume. The block is performed parallel to the subcostal margin, with a rib contact used as a safety backstop..

### Volunteer and pilot studies

Pilot volunteer studies and related early reports have mapped dermatomal coverage (commonly T7–T12 in some series, with variable T6 coverage) and highlighted that lateral coverage can be inconsistent depending on approach and volume. These volunteers/pilot data help explain why some investigators combine EOI with other blocks (eg, QL or rectus sheath) for fuller coverage.

### Case series and case reports

Several small case series and case reports have described EOI use for hepatic resections, cholecystectomy, and other upper abdominal operations with favorable short-term analgesic outcomes and opioid-sparing effects. Liotiri and colleagues [2] described EOI for enhanced recovery after liver surgery (case series), reporting clinically meaningful analgesia and facilitating early recovery. A number of single-site experiences echo improved analgesia and reduced opioid requirements, but all are small and uncontrolled.

### Comparative/controlled work and evolving trials

A small but growing set of prospective comparative studies and trials (2023–2025) have started to compare EOI with other truncal techniques (eg, subcostal TAP, rectus sheath, ESPB). Some 2024–2025 reports suggest noninferiority for early postoperative analgesia in limited surgical populations; however, results vary by incision type, analgesic regimen, and whether EOI is performed alone or in combination. Randomized evidence of adequate size and external validity is still lacking.

### Safety considerations

EOI is a fascial plane block performed adjacent to the inferior ribs and diaphragm; potential risks described in the literature and manufacturer/author advisories include pneumothorax, diaphragmatic puncture, intravascular injection, intraabdominal perforation, and local anesthetic systemic toxicity (LAST). The rib backstop is commonly used by practitioners to reduce risk of deep structures penetration. Reported complication rates in small series are low, but absence of large-scale surveillance limits reliable safety estimates.

### Synthesis

Current evidence supports biologic plausibility (anatomic targeting of the anterior/lateral branches of T6–T10) and promising early clinical results when EOI is used alone or combined with other blocks. However, evidence remains at lower levels (case reports/series and small comparative cohorts). Ongoing controlled trials and larger observational registries are needed to determine effect size, technique standardization (single vs multiple injections, catheter use, optimal volumes/concentrations), and safety.

### Discussion

The institutional convenience data reported here are consistent with the hypothesis that targeted EOI blocks—

especially when used synergistically with QL blocks in a multimodal pathway—may meaningfully decrease perioperative opioid consumption, reduce PONV, and shorten PACU time for outpatient upper abdominal procedures. The observed reductions (60% lower average MME and nearly 30–40 min shorter discharge times in this dataset) are clinically relevant for ambulatory throughput and patient experience, but interpretation must be cautious.

**Strengths:** Practical, real-world application in an ambulatory setting; reproducible technique with photos and ultrasound documentation; concordance of findings in mission setting.

**Limitations:** Retrospective, nonrandomized, historical comparison; potential selection and provider effects (five providers trained similarly, single primary surgeon); lack of standardized pain score reporting beyond PACU snapshots; potential confounding by intraoperative opioid techniques and by adjunctive medications; no long-term follow-up for chronic pain or delayed complications. Importantly, the EOI cohort commonly received concomitant QL blocks, so the independent contribution of EOI cannot be isolated from QL in this dataset. These limitations mirror those in the early published literature where small series predominate.

**Technique considerations and practical advice:** Based on institutional experience and published descriptions: use strict ultrasound guidance, a rib contact backstop, conservative total local anesthetic dose accounting for bilateral injection and adjunct QL blocks, consider adding perineural dexamethasone to prolong analgesia where appropriate, and perform a perioperative multimodal analgesic plan (acetaminophen, NSAID if possible, minimization of intraop opioids). Place EOI preincision when feasible to maximize preemptive analgesia. Training and competency in sonoanatomy are necessary.

**Research priorities:** (1) Randomized controlled trials comparing EOI vs subcostal TAP, ESPB, or QL for specific procedure types (lap cholecystectomy, open upper abdominal cases); (2) dose-finding and single- vs multi-injection studies; (3) safety surveillance registries to estimate rare complications; (4) mechanistic dermatomal mapping using standardized sensory testing; (5) catheter/continuous infusion feasibility and outcomes for major open procedures.

## Conclusion

The EOI fascial plane block is a promising and technically accessible regional technique for providing upper abdominal analgesia. Institutional convenience data presented here suggest meaningful opioid reduction, lower PONV, and shorter PACU times when EOI is used as part of a multimodal pathway and often combined with QL blocks. Published literature through 2024–2025 remains early—predominantly anatomical evaluations, volunteer dermatomal mapping, case reports, and small case series—so equipoise remains for higher-quality trials. Clinicians using EOI should do so within a multimodal strategy, with attention to ultrasound technique, dosing safety, and appropriate informed consent about the evolving evidence base.

## Limitations of this Report

This manuscript synthesizes a convenience, retrospective dataset and the available literature. The institutional data

are descriptive, uncontrolled, and subject to confounding variables. Readers should interpret the institutional findings as experimental rather than definitive.

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