



Continuous External Oblique Intercostal Catheters vs Continuous TAP Catheters in Partial Hepatectomies: A Retrospective Analysis

Levon Khacheryan, DO, Usha Saldanha, MD, Robin Aldwinckle, MD, Amy Chen, MD
University of California, Davis Medical Center

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Introduction

Upper abdominal surgical incisions are often painful and can lead to an increased length of hospital stay as well as put patients at risk for opioid dependence. Epidural analgesia has been the gold standard for hepatectomy; however, fascial plane blocks are now being increasingly used. Compared to epidurals, fascial plane blocks have fewer side effects such as hypotension and do not have to adhere as strictly to the ASRA anticoagulation guidelines.

The novel external oblique intercostal block is a fascial plane block technique that results in blockade of both the anterior and lateral cutaneous branches of intercostal nerves T6 through T10. These nerves provide most of the cutaneous innervation to the upper anterior and lateral abdominal wall. This is the only fascial plane block described to cover this distribution. So far, only two studies have examined the efficacy of EOI in upper abdominal surgery. Our review adds to the limited data by evaluating the use of this novel block in hepatectomies.

This analysis compares opioid consumption and pain scores of eight patients who received either a continuous external oblique intercostal (EOI) catheter or a transversus abdominis plane (TAP) catheter on the right side of the abdomen following partial hepatectomy surgery with a modified Makuuchi incision. All patients also received a contralateral continuous rectus sheath catheter.

Methods and Materials

Protocol:

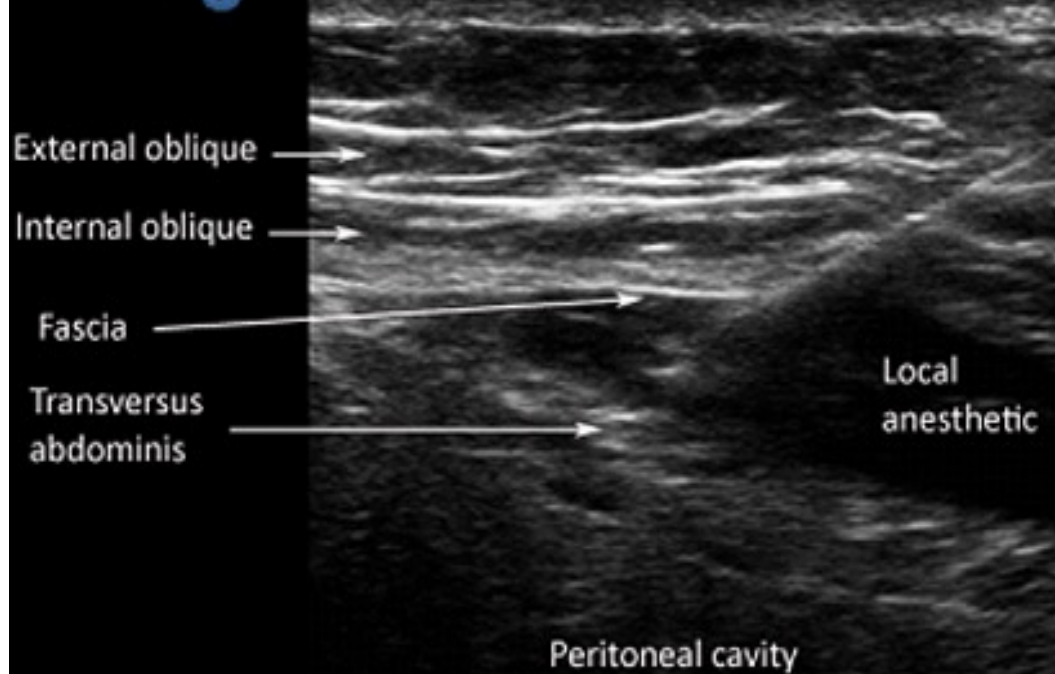
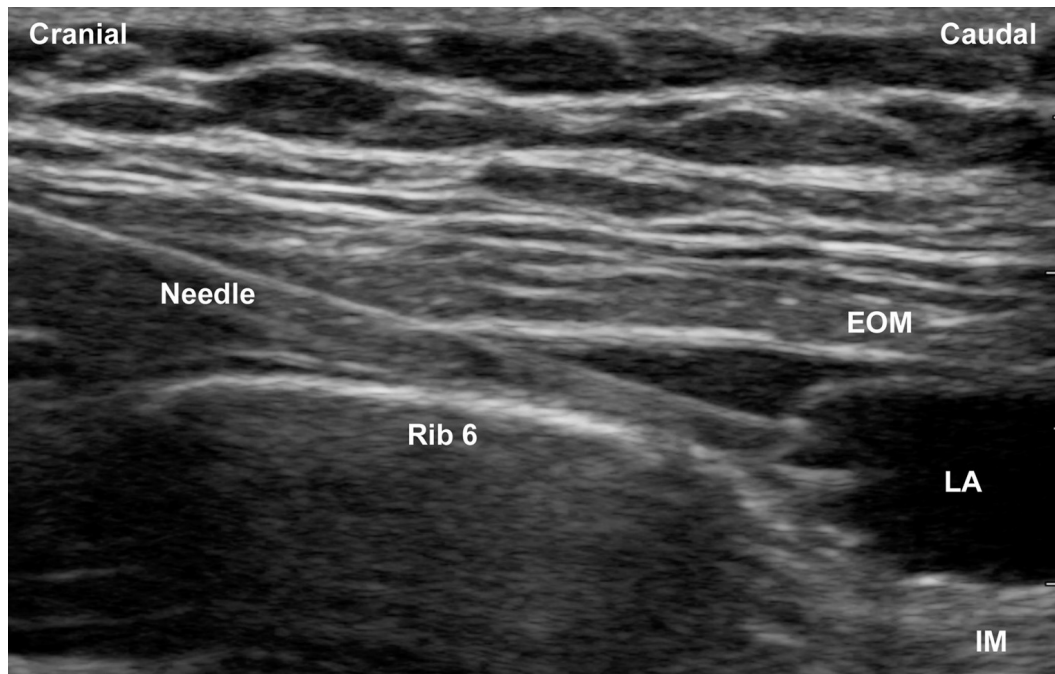
- Retrospective review**
- We reviewed medical records of patients undergoing partial hepatectomy under exempt IRB status per the UC Davis institutional review board.
- Subjects: Patients undergoing partial hepatectomies with right EOI catheter/left RS catheter vs. right TAP catheter/left RS catheter
- Total sample size = **8 patients** (4 right EOI catheter/left RS catheter vs. 4 right TAP catheter/left RS catheter)
- The patients were controlled for the same surgeon, surgery, intraoperative timing (pre-emergence) and contralateral nerve block (rectus sheath catheter)
- Reviewed peri-operative records through postoperative day (POD) 3
- A modified Makuuchi (inversed L-shape) incision was made
- All patients were started on a continuous infusion of 0.1% ropivacaine until at least POD 3
- Both groups had catheters placed intra-operatively with ultrasound pre-emergence **30 mL of 0.25% ropivacaine** deposited between left rectus abdominis muscle and posterior rectus sheath

EOI group:

- Patients were positioned supine, and an aseptic technique was used.
- A linear probe was placed in the parasagittal plane between anterior axillary line and midclavicular line at the level of the 6th rib.
- A Tuohy needle was advanced in plane from cephalic to caudal direction to place the tip in the musculofascial plane between the EOI muscle and the deep intercostal muscle.
- 30 mL of ropivacaine 0.25% was injected while observing for adequate fluid spread between the fascia of EOI and the rib
- Catheter advanced into pocket of local anesthetic

TAP group:

- 30 mL of 0.25% ropivacaine** deposited between right internal abdominal oblique and transversus abdominis muscles. Catheter advanced into pocket of local anesthetic



Left: Ultrasound image of EOI block. Right: Ultrasound image of TAP block.

Results

Demographic Data

There was a differences in age (TAP group: 46.75 vs EOI group: 76.25 years) and gender (TAP group: 4 females vs EOI group 2 males, 2 females) between the two groups. There were no differences in BMI and length of stay.

Table 1: Patient Pain Score

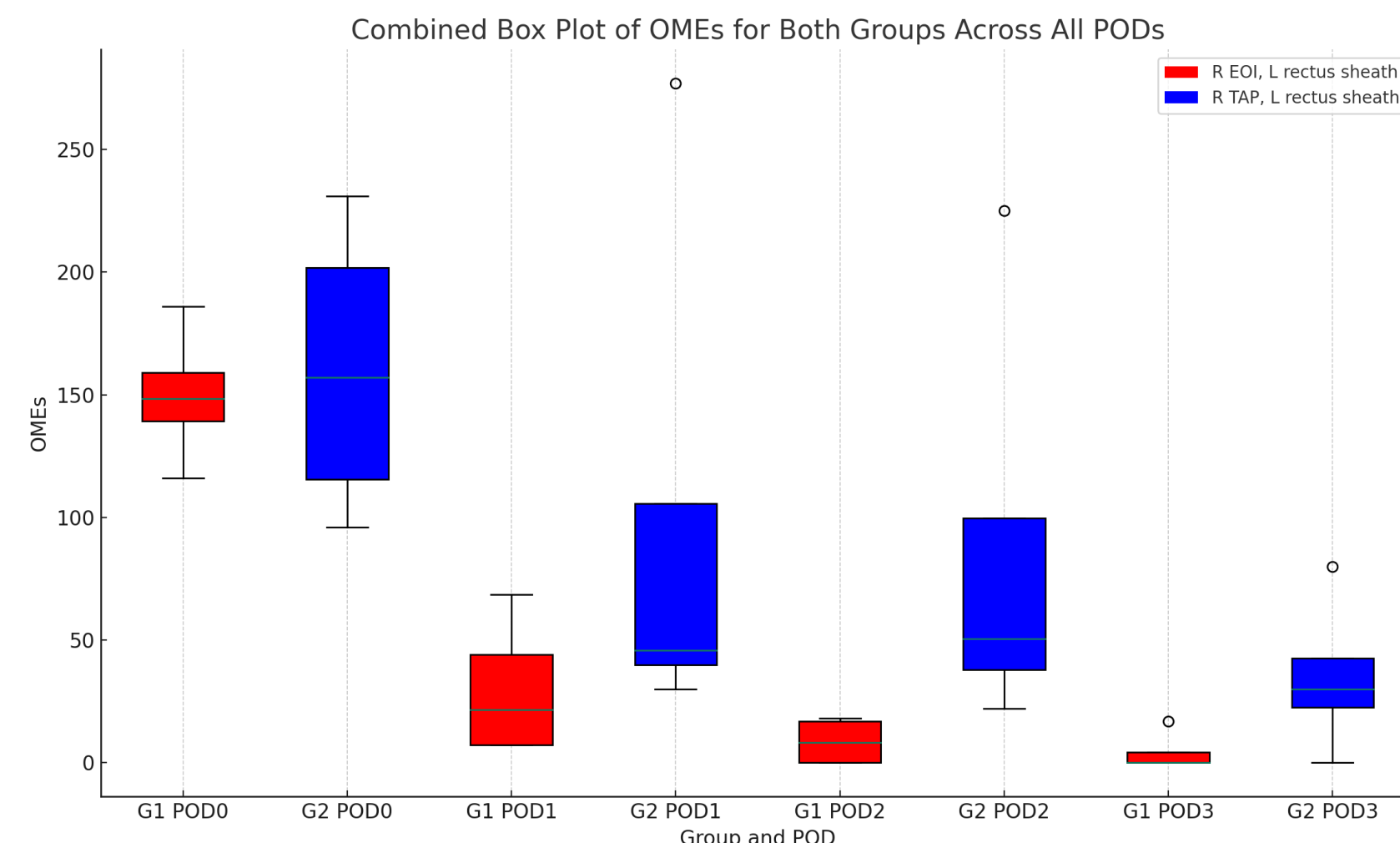
Variable	TAP Group	EOI Group	p-value	Statistical Difference
POD 0	5.98 ± 1.59	4.68 ± 2.76	0.44	No
POD 1	4.58 ± 2.26	4.69 ± 2.25	0.95	No
POD 2	3.83 ± 1.21	2.86 ± 1.52	0.36	No
POD 3	3.22 ± 1.23	1.8 ± 1.33	0.17	No

There was no significant difference in pain scores between the TAP group and EOI group from POD 0 to 3.

Table 2: Postoperative Opioid Consumption (OMEs)

Variable	TAP Group	EOI Group	p-value	Statistical Difference
POD 0	160.25 ± 62.2	149.75 ± 28.64	0.77	No
POD 1	99.65 ± 118.49	29.7 ± 29.15	0.3	No
POD 2	87 ± 93.18	8.62 ± 93.18	0.15	No
POD 3	35 ± 33.17	4.2 ± 8.4	0.12	No

There was no difference in postoperative opioid consumption between the TAP group and EOI group from POD 0 to 3.



Discussion/Conclusion

Overall, the results of our retrospective analysis suggests that a continuous EOI catheter may provide superior analgesia to a continuous TAP catheter when a modified Makuuchi incision is made for open partial hepatectomy. The EOI group had decreased pain scores and opioid consumption compared to the TAP group on almost every postoperative day. The lack of statistical difference in comparing our outcomes is mostly likely due to the limited sample size in each group. The number of patients needed in each group to increase the statistical power for a further study is approximately 25.

While the TAP block has been shown to decrease postoperative analgesic consumption in open hepatectomies as well as in living liver donors, the EOI block has recently emerged as a promising block for upper abdominal incisions. It provides sensory blockade of T6-10 of the anterior axillary line and T6-9 at the midline. The EOI block is unique in that it is the only fascial plane block thus far that has been described to cover upper abdominal incisions. The EOI block is promising for hepatectomy surgery due to analgesic coverage of T6-10 dermatomes while also being a safer alternative in potentially coagulopathic postoperative liver patients.

Conclusion/Future Directions:

- Collect more patient data as they undergo partial hepatectomy to potentially identify a stronger statistically significant outcome and clinically important difference.
- RCT: subcostal TAP vs. EOI catheter
- RCT: thoracic epidural vs. EOI catheter
- RCT: ESP catheter vs. EOI catheter

This review demonstrates the potential applicability of a continuous external oblique intercostal catheter infusion as a superior analgesic technique compared to a continuous TAP catheter for those undergoing partial hepatectomies.

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