



External Oblique Intercostal Block Catheters for Liver Transplant Postoperative Pain Management A Retrospective Study

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INTRO

- Regional pain management in liver transplants remains difficult due to inherent coagulopathy and limitations of existing block techniques
- This study evaluates the impact of external oblique intercostal (EOI) catheter blocks on postoperative opioid consumption in liver transplant patients

METHODS

- Single center, retrospective study
- N=32, 16 in block group, 16 non-blocked group
- ASA 4E, liver transplant, > 18 years old
- Primary outcome of morphine milligram equivalent (MME) consumption measured at 24, 48, 72, and 96 hour intervals and cumulative MME consumption to 96 hour
- Secondary outcomes included dermatomal coverage, block related complications, ambulation and hospitalization times, pain scores from post-operative day 1-7
- Approved through institution's IRB protocol

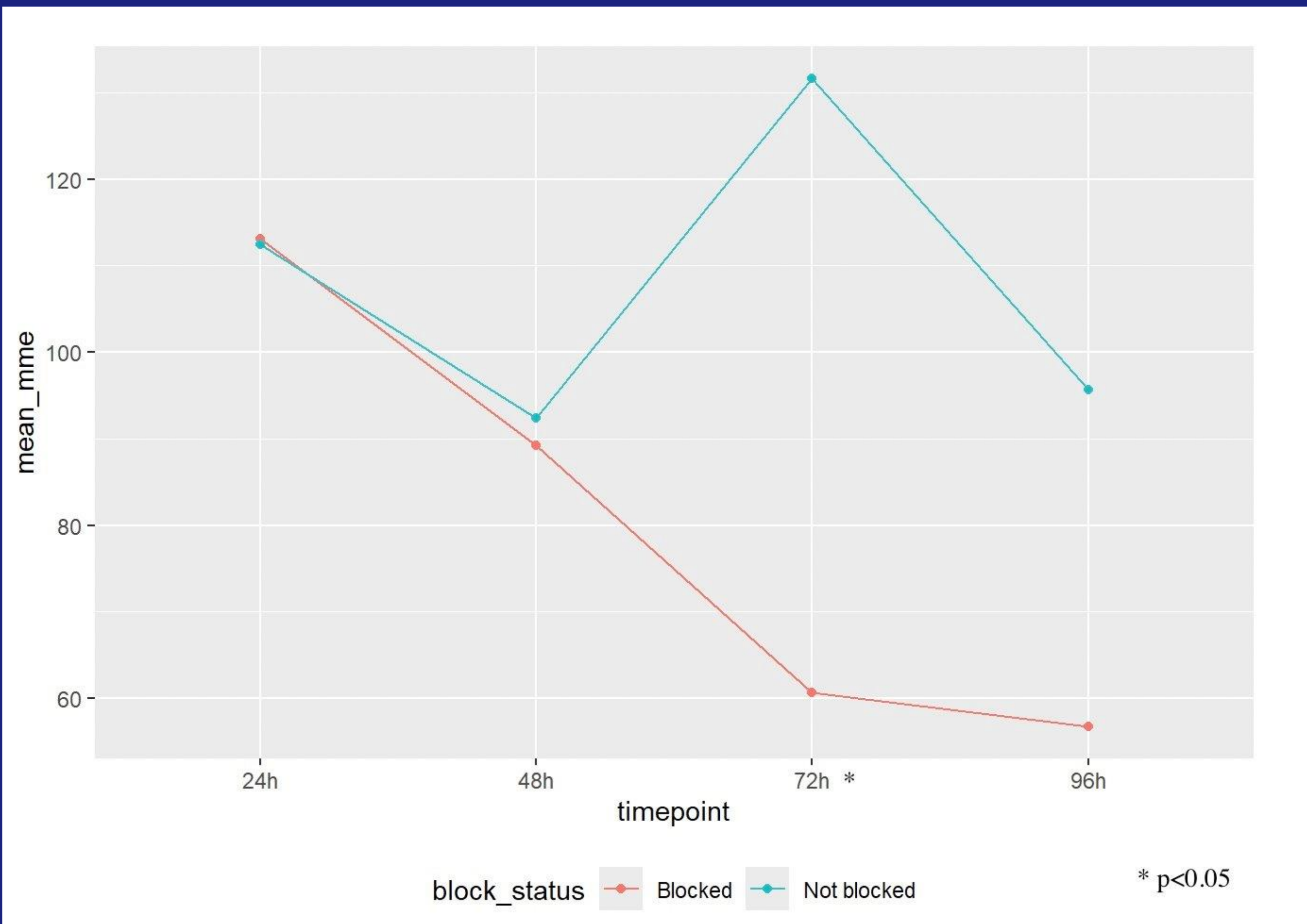
RESULTS

- Reduction in total MME consumption in blocked patients compared to non-blocked patients
- Pain scores, ambulation times, extubation times, and hospitalization times did not differ significantly between groups,
- Block coverage extended from T5 to T9 dermatomes
- No block complications, including bleeding or local anesthetic toxicity

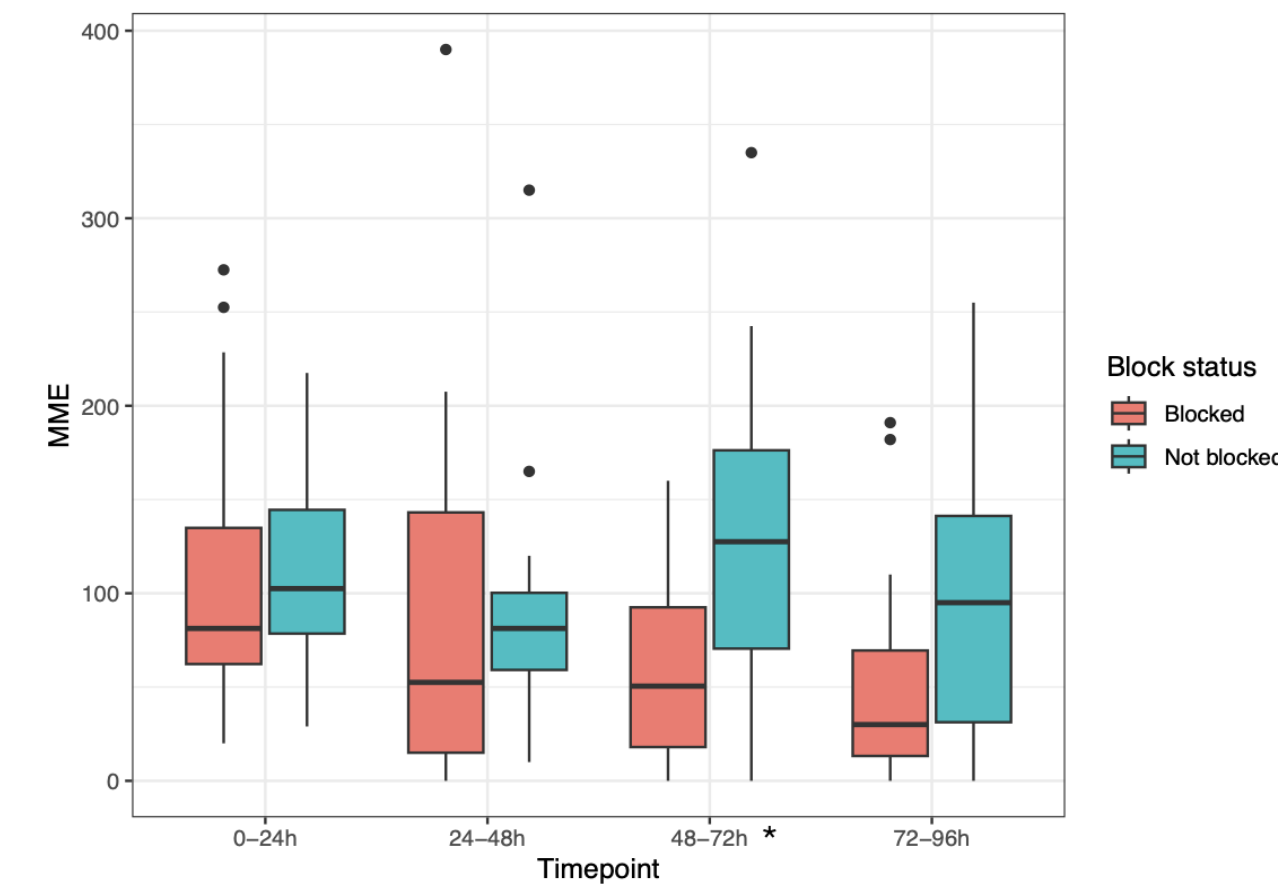
DISCUSSION

- External oblique intercostal block in liver transplant patients significantly reduces MME consumption at the 72 hour postoperative window with absolute reductions in MME values over a 96 hour window
- The block provides consistent somatic pain coverage along lateral and anterior aspects of T5-9 dermatomes of anterolateral upper abdomen.

External oblique intercostal (EOI) catheters decrease opioid consumption in liver transplant patients



	Blocked (N=16)	Not blocked (N=16)	Overall (N=32)
Gender			
Male	8 (50.0%)	7 (43.8%)	15 (46.9%)
Female	8 (50.0%)	9 (56.2%)	17 (53.1%)
Age (years)			
Mean (SD)	55.7 (7.85)	53.6 (11.5)	54.7 (9.72)
Median [Min, Max]	57.0 [44.0, 69.0]	55.0 [30.0, 70.0]	55.0 [30.0, 70.0]
BMI			
Mean (SD)	30.2 (5.99)	27.0 (6.02)	28.6 (6.13)
Median [Min, Max]	29.8 [20.4, 41.7]	24.8 [18.7, 40.7]	27.4 [18.7, 41.7]
MELD score, day of surgery			
Mean (SD)	23.3 (7.95)	25.1 (7.36)	24.2 (7.59)
Median [Min, Max]	24.0 [7.00, 43.0]	24.5 [12.0, 38.0]	24.0 [7.00, 43.0]
CRRT presence			
No	14 (87.5%)	13 (81.3%)	27 (84.4%)
Yes	2 (12.5%)	3 (18.8%)	5 (15.6%)
Chronic pain present			
No	14 (87.5%)	14 (87.5%)	28 (87.5%)
Yes	2 (12.5%)	2 (12.5%)	4 (12.5%)
Chronic pain score			
Mean (SD)	7.00 (0.707)	3.00 (4.24)	5.00 (3.39)
Median [Min, Max]	7.00 [6.50, 7.50]	3.00 [0, 6.00]	6.25 [0, 7.50]
Missing	14 (87.5%)	14 (87.5%)	28 (87.5%)



Graph 1: Consumption of opioids at 24 hour intervals in morphine milligram equivalents (MME). Graphs depicting range of values and median MME value for blocked and non-blocked patients. *p<0.05

Patient baseline characteristics

	Blocked (N=16)	Not blocked (N=16)	P-value
0-24 h MME			
Mean (SD)	113 (76.4)	112 (49.4)	0.539
Median [Min, Max]	81.3 [20.0, 273]	103 [29.0, 216]	
24-48 h MME			
Mean (SD)	89.2 (105)	92.3 (70.5)	0.318
Median [Min, Max]	52.5 [0, 390]	81.3 [10.0, 315]	
48-72 h MME			
Mean (SD)	60.7 (51.3)	132 (87.5)	* 0.0115
Median [Min, Max]	50.5 [0, 160]	128 [0, 335]	
72-96 h MME			
Mean (SD)	56.8 (81.3)	95.6 (79.8)	0.119
Median [Min, Max]	30.0 [0, 191]	95.0 [0, 255]	
Missing	1 (6.3%)	1 (6.3%)	
48 h MME cumulative			
Mean (SD)	202 (177)	205 (113)	0.323
Median [Min, Max]	137 [20.0, 663]	174 [39.0, 533]	
72 h MME cumulative			
Mean (SD)	263 (222)	274 (172)	0.381
Median [Min, Max]	166 [31.5, 823]	246 [39.0, 775]	
96 h MME cumulative			
Mean (SD)	301 (266)	336 (235)	0.34
Median [Min, Max]	160 [43.0, 933]	268 [39.0, 1010]	
Missing	1 (6.3%)	1 (6.3%)	

MME endpoints

* p < 0.05

	Blocked (N=16)	Not blocked (N=16)	P-value
Ambulation time from extubation (h)			
Mean (SD)	46.8 (114)	40.1 (46.3)	0.265
Median [Min, Max]	20.3 [1.50, 472]	21.4 [6.25, 179]	
Ambulation time from anesthesia end (h)			
Mean (SD)	53.2 (116)	50.6 (52.0)	0.221
Median [Min, Max]	21.3 [4.00, 484]	30.5 [12.0, 188]	
Extubation time from anesthesia end (h)			
Mean (SD)	6.38 (8.25)	10.5 (9.95)	0.212
Median [Min, Max]	5.75 [0, 20.0]	8.50 [0, 39.0]	
ICU stay duration			
Mean (SD)	3.19 (3.45)	2.06 (1.18)	0.344
Median [Min, Max]	2.00 [1.00, 15.0]	2.00 [1.00, 5.00]	
Discharge from transplant start (d)			
Mean (SD)	8.25 (5.13)	9.13 (4.46)	0.436
Median [Min, Max]	6.50 [4.00, 25.0]	8.00 [4.00, 18.0]	
Opioid-associated adverse effects			
None	14 (87.5%)	12 (75.0%)	0.689
Emesis	0 (0%)	1 (6.3%)	
Itch	0 (0%)	1 (6.3%)	
Nausea	0 (0%)	1 (6.3%)	
Puritus	2 (12.5%)	1 (6.3%)	
Complications			
No	10 (62.5%)	8 (50.0%)	1
Yes	6 (37.5%)	8 (50.0%)	
Missing	0 (0%)	2 (12.5%)	

Other clinical endpoints

- A longitudinal model was used to estimate the effect of the block at each timepoint:
- At 24 hrs, the blocked group uses 0.63 MME more than the unblocked group (95% CI: 42.55 MME less to 43.80 MME more, p = 0.977).
 - At 48 hrs, the blocked group uses 3.13 MME less than the unblocked group (95% CI: 63 MME less to 56.8 MME more, p = 0.919).
 - At 72 hrs, the blocked group uses 70.8 MME less than the unblocked group (95% CI: 119 MME less to 22.7 MME less, p = 0.0039).
 - At 96 hours, the blocked group uses 32.1 MME less than the unblocked group (95% CI: 80.4 MME less to 16.1 MME more, p = 0.192).

References

- Desai N, El-Boghdady K, Albrecht E. Epidural vs. transversus abdominis plane block for abdominal surgery - a systematic review, meta-analysis and trial sequential analysis. *Anaesthesia*. 2021 Jan;76(1):101-117. doi: 10.1111/anae.15068. Epub 2020 May 8. PMID: 32385856.
- Elsharkawy H, Pawa A, Mariano ER. Interfascial Plane Blocks: Back to Basics. *Reg Anesth Pain Med*. 2018 May;43(4):341-346. doi: 10.1097/AAP.0000000000000750. PMID: 29561295.
- Elsharkawy H, Kolli S, Soliman LM, Self J, Drake RL, Mariano ER, El-Boghdady K. The External Oblique Intercostal Block: Anatomic Evaluation and Case Series. *Pain Med*. 2021 Nov 26;22(11):2436-2442. doi: 10.1093/pm/pnab296. PMID: 34626112.
- Ander M, Mugve N, Crouch C, Kassel C, Fukazawa K, Izaak R, Deshpande R, McLendon C, Huang J. Regional anesthesia for transplantation surgery - A white paper part 1: Thoracic transplantation surgery. *Clin Transplant*. 2023 Aug;37(8):e15043. doi: 10.1111/ctr.15043. Epub 2023 Jun 12. PMID: 37306898; PMCID: PMC10834230.
- Kavakli AS, Sahin T, Koc U, Karaveli A. Ultrasound-Guided External Oblique Intercostal Plane Block for Postoperative Analgesia in Laparoscopic Sleeve Gastrectomy: A Prospective, Randomized, Controlled, Patient and Observer-Blinded Study. *Obes Surg*. 2024 May;34(5):1505-1512. doi: 10.1007/s11695-024-07174-9. Epub 2024 Mar 18. PMID: 38499943; PMCID: PMC11031435.



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