



Background

- Rib fractures in older adults are associated with severe pain, pulmonary complications, and delirium¹
- ESP blocks may improve analgesia after rib fractures²
- ESP mechanism incompletely understood; systemic local anesthetic absorption possible³
- IV lidocaine proposed as systemic analgesic alternative⁴
- **Study Objective:**
Compare ESP block to lidocaine infusion and multimodal analgesia alone for rib fracture analgesic outcomes.

Methods

- Pilot RCT; IRB approval and patient consents obtained
- Inclusion: age ≥55 years, ≥3 unilateral rib fractures; exclusion: distracting injuries, coagulopathy, weight <40 kg
- Study Groups:
 1. ESP block and catheter w/ ropivacaine
 2. IV lidocaine (1–1.5 mg/kg/hr)
 3. Multimodal analgesia alone
- Multimodal analgesia and pulmonary care for all participants
- **Primary outcomes:** 72-hour median opioid consumption (OMEs) and mean current pain (Brief Pain Inventory)
- Secondary outcomes: delirium (3D-CAM), sedation (RASS), vital capacity, pulm cx, Duke Activity Status Index⁵ (DASI) and correlation to baseline vital capacity
- Statistical analysis: primary outcomes analyzed using ANOVA
- As pilot study, sample size set at 24 based on practical considerations

References

1.

Martin TJ, Eltorai AEM, Dunn R, et al. *Injury* 2019; 50:1159-1165.

2.

Jiang M, Peri V, Yang BO, et al. *Local Reg Anesth* 2023; 16:81-90.

3.

Chin KJ, El-Boghdadly K. *Can J Anaesth* 2021; 68:387-408.

4.

King S, Smith L, Harper C, et al. *Am Surg* 2022; 88:734-739.

5.

Wijeyesundera DN, Beattie WS, Hillis GS, et al. *Br J Anaesth* 2020; 124:261–270.

Table 1. Baseline characteristics, hospital analgesics, and baseline measurements

	ESP Block (N=7)	Lidocaine Infusion (N=9)	Control (N=8)	P value
Mean age (SD) in years	73.4 (9.2)	78.3 (9.0)	82.4 (13.0)	NA
Sex, n (%)				NA
Male	4 (57.1)	4 (44.4)	5 (62.5)	
Female	3 (42.9)	5 (55.6)	3 (37.5)	
Race, n (%)				NA
White	5 (71.4)	9 (100)	7 (87.5)	
Black	2 (28.6)	0 (0)	1 (12.5)	
Mean BMI (SD) in kg/m²	27.3 (6.2)	27.4 (5.6)	25.0 (7.8)	NA
Mean number of fractured ribs (SD)	5.3 (2.0)	5.1 (2.1)	4.3 (1.2)	NA
Mean RibScore (SD)	0 (0.0)	0.6 (0.9)	0.1 (0.4)	NA
Mean Injury Severity Score (SD)	9.4 (5.4)	10.1 (3.1)	9.4 (0.5)	NA
Mean Duke Activity Status Index (SD)	34.3 (14.1)	26.4 (18.5)	23.9 (17.5)	0.484
Current smoking status, n (%)				NA
Yes	0 (0)	2 (22.2)	1 (12.5)	
No	7(100)	7 (77.8)	7 (87.5)	
Respiratory disease, n (%)				NA
Asthma	1/7 (14.3)	1/8 (12.5)	1/8 (12.5)	
COPD	0/7 (0)	2/9 (8.3)	1/8 (12.5)	
OSA	0/7 (0)	1/9 (11.1)	2/8 (25.0)	
Gabapentin, n (%)	1/6 (14.3)	7/9 (77.8)	2/8 (25)	0.019
Ibuprofen, n (%)	1/6 (14.3)	0 (0)	0 (0)	0.282
Ketorolac, n (%)	4/6 (66.7)	4/9 (44.4)	3/8 (37.5)	0.197
Pregabalin, n (%)	2/6 (33.3)	0/9 (0)	1/8 (12.5)	0.230

Table 2. Pain, delirium, vital capacity, and pulmonary complication outcome data

	ESP Block (N=7)	Lidocaine Infusion (N=9)	Control (N=8)	P value
Mean BPI current pain (SD), 0-10				
Baseline	5.4 (3.5)	6.8 (1.9)	4.9 (3.6)	
Day 1	4.9 (3.1)	5.8 (3.1)	5.6 (3.3)	0.70
Day 2	4.4 (3.3)	5.4 (3.0)	7.4 (2.6)	
Day 3	4.4 (2.1)	5.8 (2.6)	5.2 (3.5)	
Day 30	4.2 (3.6)	5.4 (2.4)	4.7 (3.2)	
Day 90	2.5 (3.1)	2.8 (2.8)	1.9 (2.3)	
Mean BPI interference (SD), 0-10				
Baseline	7.49 (1.96)	7.81 (2.07)	6.57 (2.00)	
Day 1	6.28 (2.20)	6.97 (1.95)	7.69 (2.59)	0.685
Day 2	6.24 (1.86)	5.54 (1.97)	7.69 (2.59)	
Day 3	5.43 (2.56)	6.66 (2.44)	6.59 (3.10)	
Median [IQR] cumulative opioid use for days 1-3 in OMEs	25.0 [66.8]	26.7 [89.2]	20.03 [101.4]	0.684
Positive delirium screen by 3D-CAM, n (%)				0.031
Baseline	2/7 (28.6)	2/9 (22.2)	2/8 (25)	
Day 1	1/7 (14.3)	3/9 (33.3)	2/8 (25)	
Day 2	0/7 (0)	4/9 (44.4)	3/8 (42.9)	
Day 3	0/7 (0)	5/9 (62.5)	3/8 (42.9)	
Total	7/24 (31.8)	8/24 (36.4)	7/24 (31.8)	
Mean vital capacity (SD) in mL				
Baseline	1535 (1100)	1411 (606)	1171 (593)	
Day 1	1133 (351)	1330 (345)	958 (519)	0.832
Day 2	1664 (865)	1300 (896)	1429 (1179)	
Day 3	1897 (1085)	1843 (1622)	1533 (818)	
Pneumonia, n (%)				
Day 30	0	0	3/7 (42.9)	0.030
Day 90	No new cases	No new cases	No new cases	-
Pleural effusion, n (%)				
Day 30	1/6 (16.7)	0	2/7 (28.6)	0.283
Day 90	1/6 (16.7)	0	0	0.269