

BACKGROUND

- Cardiac surgical pain is multifactorial, arising from sternotomy incision, rib retraction, saphenous vein, internal mammary artery harvesting, and **chest tube placement, a significant source that may impair postoperative respiratory mechanics.**¹
- Inadequate analgesia** following cardiac surgery is **associated with increased opioid consumption, prolonged hospital stays, and higher rates of complications** such as atelectasis and pneumonia.²
- The **rectus sheath block**, which targets the anterior cutaneous branches of the intercostal nerves, **has the potential to reduce postoperative pain, improve recovery, and decrease opioid requirements.**²

STUDY AIMS

- This study aims to determine **whether RSB provides superior analgesia compared to conventional pain management alone** in patients requiring chest tubes after cardiothoracic surgery.
- The **primary endpoint is total opioid consumption** (in IV morphine milligram equivalents [MME]) on postoperative days (POD) 0, 1, 2, 3, 4 and 5.
- Secondary endpoints** include **Intensive Care Unit (ICU) length of stay (LOS), total postoperative LOS, incidence of postoperative nausea or vomiting (PONV),** and the need for a rescue block.

METHODS

- Prospective, randomized controlled trial at a tertiary medical center in NYC with IRB approval.
- Eligibility included **patients aged 18–85 undergoing cardiothoracic surgery requiring chest tube placement.** Participants were **randomly assigned** to either RSB or control group.
- Investigators **collected postop opioid usage, ICU LOS, total LOS, incidence of PONV, and frequency of rescue block administration. Univariate analyses** were completed.

RESULTS

	Control (N=40)	RSB (N=44)	<i>p-value</i>	Total (N=84)
Baseline Variables				
Age, years	65.0 [61.8, 70.3]	65.0 [57.8, 70.3]	0.62	65.0 [60.0, 70.3]
Sex			0.08	
Female	4 (10.0%)	12 (27.3%)		16 (19.0%)
Male	36 (90.0%)	32 (72.7%)		68 (81.0%)
Weight, kg	81.9 [73.8, 88.9]	80.2 [71.7, 92.3]	0.61	81.2 [72.1, 91.7]
Height, cm	170 [168, 175]	170 [165, 176]	0.73	170 [165, 175]
BMI	28.1 [25.2, 31.5]	29.2 [25.0, 31.7]	0.98	28.5 [25.1, 31.7]
Obesity	15 (37.5%)	19 (43.2%)	0.76	34 (40.5%)
Tobacco use			0.55	
Never	20 (50.0%)	21 (47.7%)		41 (48.8%)
Former	16 (40.0%)	15 (34.1%)		31 (36.9%)
Current	4 (10.0%)	8 (18.2%)		12 (14.3%)
Alcohol use	19 (47.5%)	26 (59.1%)	0.40	45 (53.6%)
Recreational drug use	2 (5.0%)	4 (9.1%)	0.68	6 (7.1%)
Hypertension	39 (97.5%)	38 (86.4%)	0.11	77 (91.7%)
Hyperlipidemia	32 (80.0%)	32 (72.7%)	0.60	64 (76.2%)
Diabetes	25 (62.5%)	22 (50.0%)	0.35	47 (56.0%)
Asthma	1 (2.5%)	4 (9.1%)	0.36	5 (6.0%)

Table 1: Comparison of Control and RSB groups across baseline variables

	Control (N=40)	RSB (N=44)	<i>p-value</i>	Total (N=84)
MME POD0	16.0 [8.00, 24.0]	12.0 [8.00, 19.6]	0.41	12.0 [8.00, 23.6]
MME POD1	24.6 [15.0, 46.4]	19.3 [10.4, 35.4]	0.19	22.5 [11.5, 38.0]
MME POD2	9.63 [7.50, 31.0]	15.0 [4.00, 31.1]	0.80	11.8 [6.63, 31.1]
MME POD3	7.50 [0, 20.8]	15.0 [0, 27.4]	0.27	8.75 [0, 26.5]
MME POD4	7.50 [0, 18.2]	7.50 [0, 15.0]	0.74	7.50 [0, 15.0]
MME POD5	0 [0, 0]	0 [0, 7.50]	0.08	0 [0, 7.50]
Total MME	63.9 [40.9, 131]	74.4 [49.6, 119]	0.9	70.5 [42.0, 123]
ICU LOS	6.00 [5.00, 7.00]	6.00 [5.00, 7.00]	0.81	6.00 [5.00, 7.00]
Total LOS	8.00 [6.00, 9.00]	8.00 [6.25, 10.8]	0.56	8.00 [6.00, 10.0]
Postop Nausea/Vomiting	3 (7.5%)	1 (2.3%)	0.35	4 (4.8%)

Table 2: Comparison of Control and RSB groups across outcome variables

Numerical variables are presented as Median [IQR] and Mann-Whitney U test for median comparison are used. Categorical variables are presented as n (%). Chi-square test or Fisher's exact test is applied as appropriate.

RESULTS (CONTINUED)

- 84 patients** (44 RSB; 40 control) have been enrolled to date.
- The **median age was 65 years** for both the control and RSB groups.
- Of total patients, sixteen (19%) were female and sixty-eight (81%) were male, with the **RSB group having a higher proportion of females** (27.3%) compared to the control group (10%) (p=0.08).
- There were no significant differences in BMI or history of HTN, HLD, DM, or alcohol or drug use between the two groups.
- Our preliminary analysis revealed **no significant differences** in opioid consumption (MME) on POD0-5, ICU and total postoperative LOS, or PONV.

CONCLUSIONS

- This trial examines whether rectus sheath block (RSB) can reduce postoperative opioid requirements and improve recovery metrics following chest tube placement.
- Preliminary results demonstrated **no significant differences in opioid consumption, postoperative nausea and vomiting, or length of stay** between the RSB and control groups, with further analysis planned once the target sample size is achieved.
- Future research** will assess final quantitative outcomes, explore long-term complications associated with chest tube insertion, and evaluate whether RSB provides additional benefit when combined with erector spinae or pecto-intercostal fascial plane blocks.

REFERENCES

- Kleiman AM, Sanders DT, Nemergut EC, Huffmyer JL. Chronic Poststernotomy Pain: Incidence, Risk Factors, Treatment, Prevention, and the Anesthesiologist's Role. Reg Anesth Pain Med. 2017;42(6):698-708. doi:10.1097/AAP.0000000000000663
- Makkad B, Heinke TL, Sherifdeen R, et al. Practice Advisory for Postoperative Pain Management of Thoracic Surgical Patients: A Report from the Society of Cardiovascular Anesthesiologists. Journal of Cardiothoracic and Vascular Anesthesia. Published online December 12, 2024. doi:10.1053/j.jvca.2024.12.004