

## Background

- Video Assisted Thoracic Surgery (VATS) has progressively become the preferred surgical technique to diagnose and treat a variety of thoracic clinical conditions.
- Even so, VATS patients experience a significant amount of postoperative pain from injury to the chest wall, often as a result of scope placement.
- Regional nerve blocks can help achieve greater pain control, fostering a more efficient recovery and increased patient satisfaction. At our institution, both the serratus anterior (CSAPB) and erector spinae (CESPB) continuous plane blocks with catheters have been used to help manage postoperative pain in VATS patients; the CESPB is currently the institution's standard of care.
- This study retrospectively compared the efficacy of CSAPB versus CESPB for postoperative pain management following VATS.

## Methods

**Study Design:** This single-site, retrospective cohort study was approved by the Institutional Review Board (IRB HHC-2021-0348). Patients provided information consent for VATS surgery and regional anesthesia. Since the study involved only minimal risk to the participants, a total waiver of written informed consent was granted by the IRB.

**Study Population:** Adult patients (≥18) who underwent VATS between October 2017 and October 2020 and received multimodal analgesia for postoperative pain control were included. The patients were divided into study groups as follows:

- CSAPB with catheters from September 2018 to October 2019
- CESPB with catheters from November 2019 to October 2020

### Study Objectives and Data Collection:

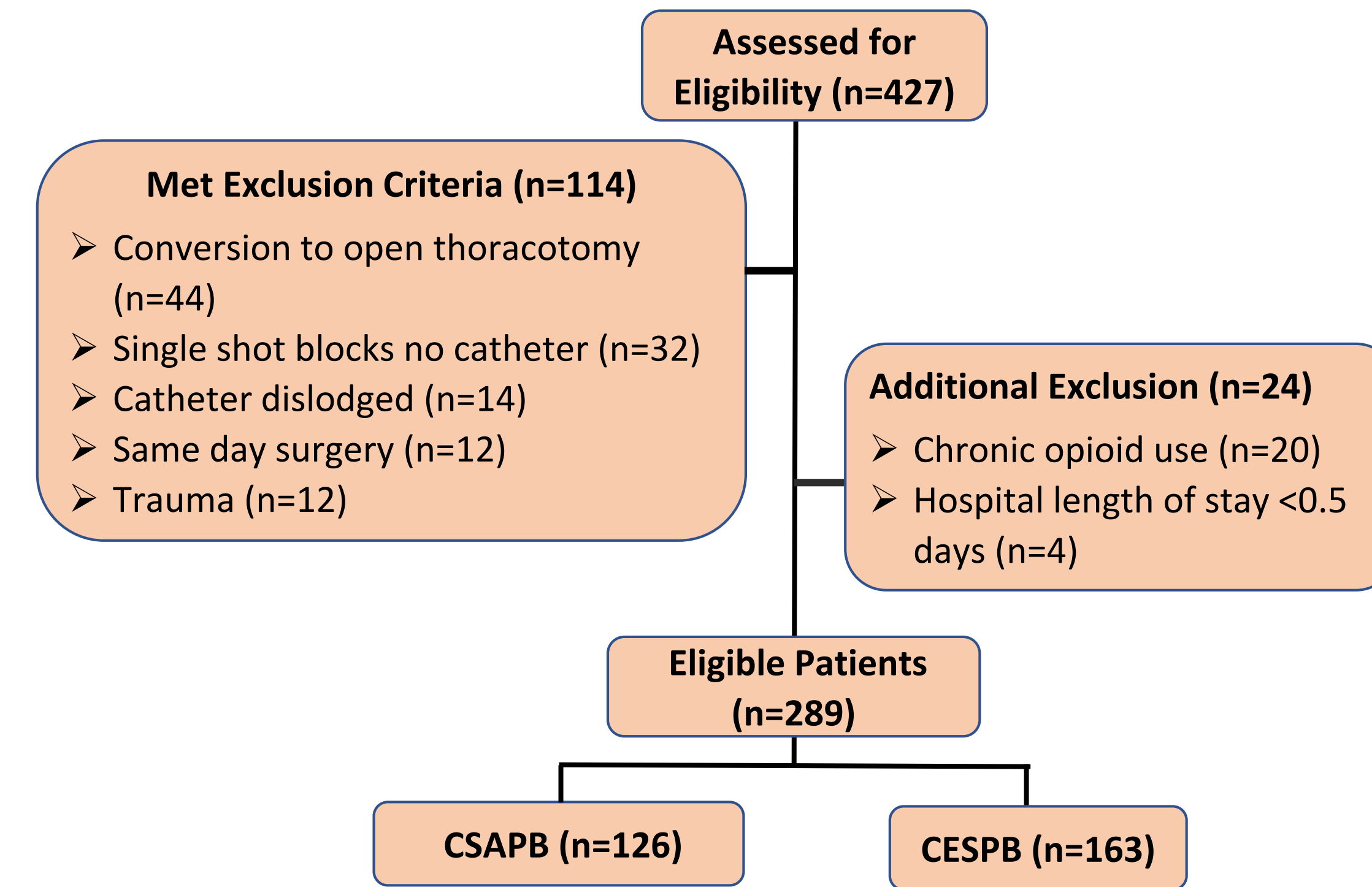
Patient data were retrieved through a retrospective review of the electronic medical record (EMR; EPIC) only.

**Primary Objective:** To compare the opioid consumption and quality of pain control in the first 72 postoperative hours between patients receiving CSAPB or CESPB after VATS.

**Secondary Outcomes:** To compare post anesthesia care unit (PACU) length of stay and time to discharge from procedure end, as well as time to first postoperative opioid; To compare use of antiemetics and the incidence of block-related, postoperative complications in CSAPB vs CESPB after VATS

**Hypothesis:** CESPB provides superior postoperative analgesia while reducing opioid requirements, postoperative complications, and hospital length of stay as compared to CSAPB in the setting of VATS.

**Figure 1.** Flow diagram of study population



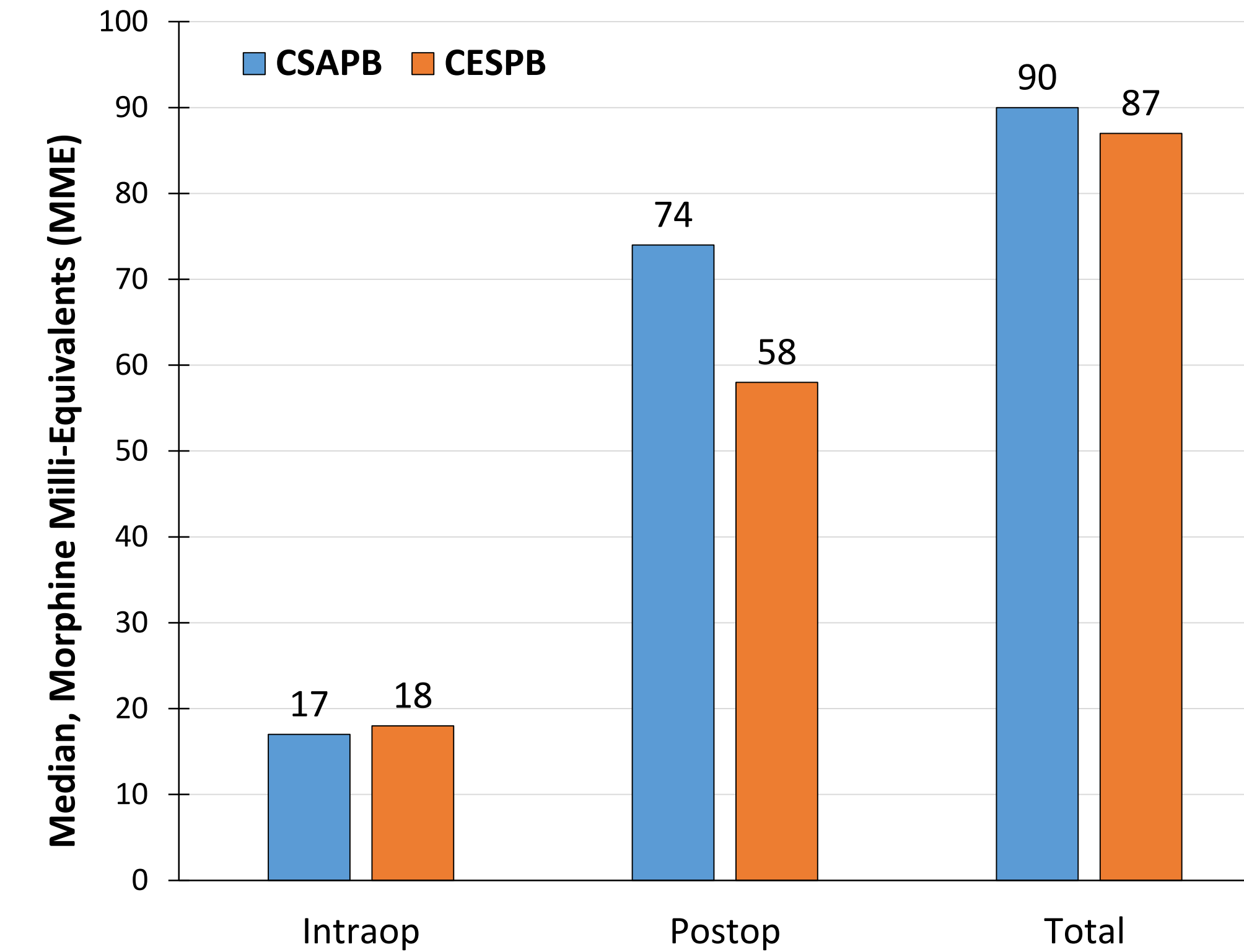
**Table 1.** Patient Demographics and Characteristics

Variable	CSAPB (n=126)	CESPB (n=163)	p-value
Age, median (IQR)	67 (58-72)	65 (57-73)	0.948
BMI, kg/m <sup>2</sup> , median (IQR)	27.0 (23.3-30.9)	27.4 (22.6-31.8)	0.676
Sex, n (%)			0.599
Female	75 (59.5)	92 (56.4)	
Male	51 (40.5)	71 (43.6)	
Ethnicity, n (%)			0.764
Hispanic or Latino	8 (6.4)	9 (5.6)	
Not Hispanic or Latino	118 (93.6)	154 (94.4)	
White race, n (%)	111 (88.8)	138 (86.3)	0.520
ASA Physical Status			0.638
1	0 (0.0)	1 (0.6)	
2	25 (19.8)	25 (15.4)	
3	95 (75.4)	128 (79.0)	
4	6 (4.8)	8 (4.9)	
5	0 (0)	0 (0)	
CCI, age-adjusted, n (%)			0.651
1. None (0)	36 (28.6)	42 (25.8)	
2. Mild (1-2)	59 (46.8)	70 (42.9)	
3. Moderate (3-4)	21 (16.7)	36 (22.1)	
4. Severe (≥5)	10 (7.9)	15 (9.2)	
Pre-surgery Hospital Stay, median days (IQR)	0.2 (0.2-0.3)	0.2 (0.2-0.4)	0.056

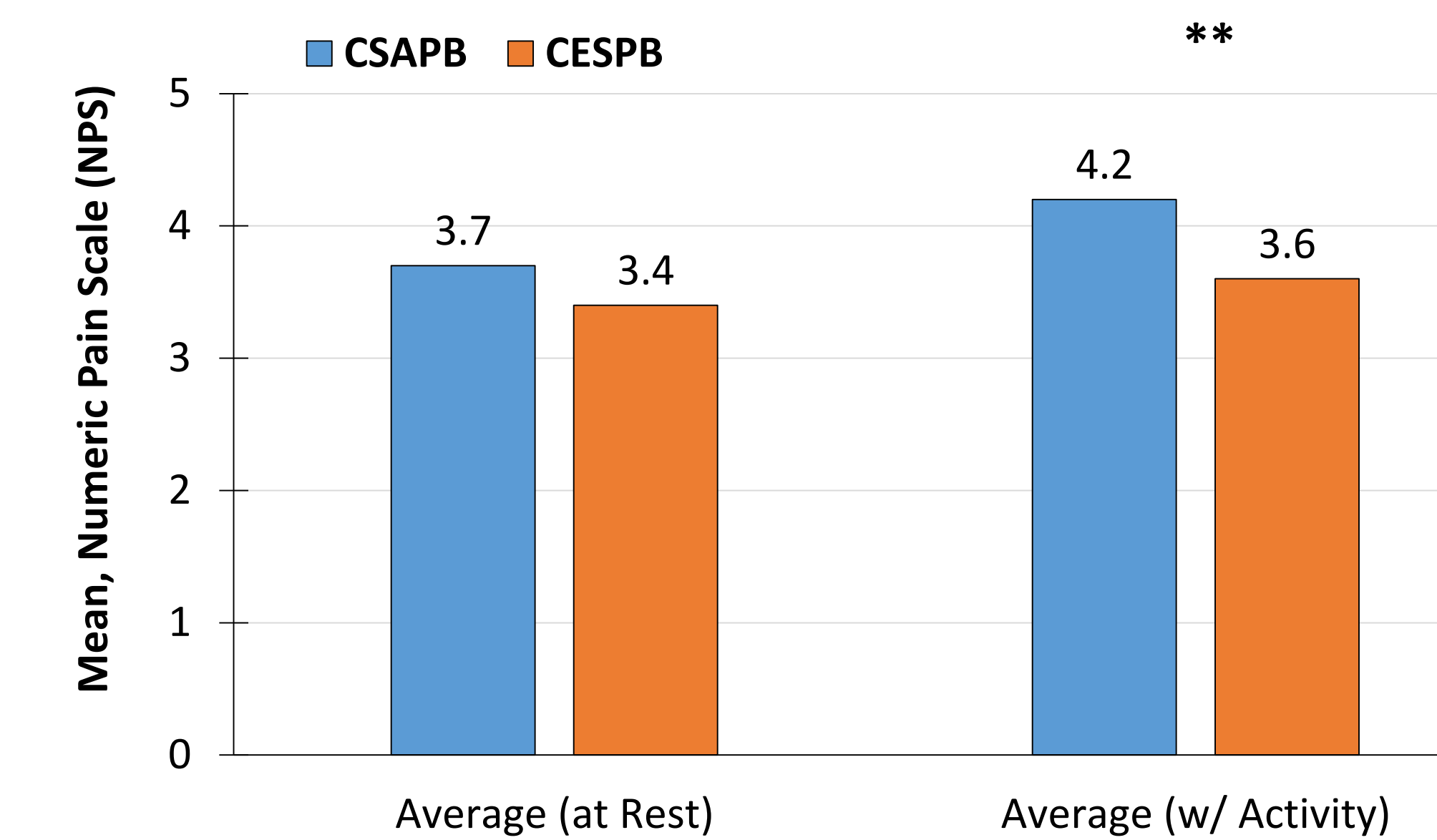
Mann-Whitney U Test or T-test used for numerical data, Pearson Chi-Square statistics used for binary categorical information, and Fisher's Exact Test used for binary variables and small sample sets

Abbreviations: CSAPB= continuous serratus anterior plane block; CESPB= continuous erector spinae plane block; IQR= interquartile range; BMI= body mass index; ASA= American Society of Anesthesiologists, CCI= Charlson Comorbidity Index

**Figure 2.** Opioid consumption in CSAPB vs CESPB (co-primary outcome)



**Figure 3.** Self-Reported Pain Scores Following VATS w/ CSAPB vs CESPB; Median of average pain scores at rest and with activity in the first 72 postop. hours in CSAPB vs CESPB patients, p<0.01\*\* (co-primary outcome)



**Table 2.** Secondary Outcomes in CSAPB vs CESPB

Outcome	CSAPB	CESPB	p-value
PACU Length of Stay, Hours, median (IQR)	3.0 (2.2-4.6)	3.4 (2.3-4.7)	0.328
Procedure end to Discharge, Hours, median (IQR)	3.0 (2.1-4.0)	3.1 (2.1-5.0)	0.058
Time to first postop. opioid Minutes, median (IQR)	36.0 (8.0-117.0)	25.5 (11.0-55.0)	0.346
Antiemetics, n (%)	35 (27.8)	41 (25.2)	0.615
Block-related complications Within 60 days after surgery, n (%)	1 (0.8)	4 (2.5)	0.391

## Results

- A total of 289 patients were included in this study (126 CSAPB and 163 CESPB) after considering all inclusion and exclusion criteria (Figure 1).
- There were no significant differences in patient demographics and health characteristics between CSAPB and CESPB patients (Table 1).
- Opioid consumption was not significantly different between groups during VATS [17 (13-26) vs 18 (15-26), p=0.551], after VATS [74 (20-140) vs 58 (23-149), p=0.914], and in total [90 (36-180) vs 87 (45-182), p=0.539]; median, (IQR), p-value (Figure 2).
- Average pain scores at rest were similar in both groups, whereas the average activity pain scores were lower in the CESPB group than the CSAPB group [4.2 (1.9) vs 3.6 (1.8), p=0.009\*\*]; mean, (SD), p-value (Figure 3).
- There were no statistically differences in any secondary outcomes compared. PACU length of stay, procedure end to discharge time, and time to first postoperative opioid were all comparable. Antiemetics use and incidence of block-related complications were similar between the CSAPB and CESPB groups (Table 2).

## Conclusions and Future Considerations

- This observational cohort study indicates that CESPB and CSAPB are both safe and effective regional blocks to manage postoperative pain in VATS patients.
- Prophylactic postoperative use of CESPB, when compared to CSAPB, led to better management of pain following VATS.
- Few studies have compared the efficacy of these regional blocks following thoracic surgery when continuous infusion with a catheter is used rather than a single-shot. Comparison of single-shot SAPB vs ESPB suggests superiority of ESPB over SAPB<sup>1-4</sup>; our study findings are consistent with the literature when comparing these regional blocks with continuous infusion.
- Together, these results reflect our institution's current standard of care for the preferred use of CESPB over CSAPB in the setting of video-assisted thoracic surgery.

## References

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