

Figure 2: Univariate box-plot illustration of 24hr opioid consumption measured in oral morphine milliequivalents (mg)

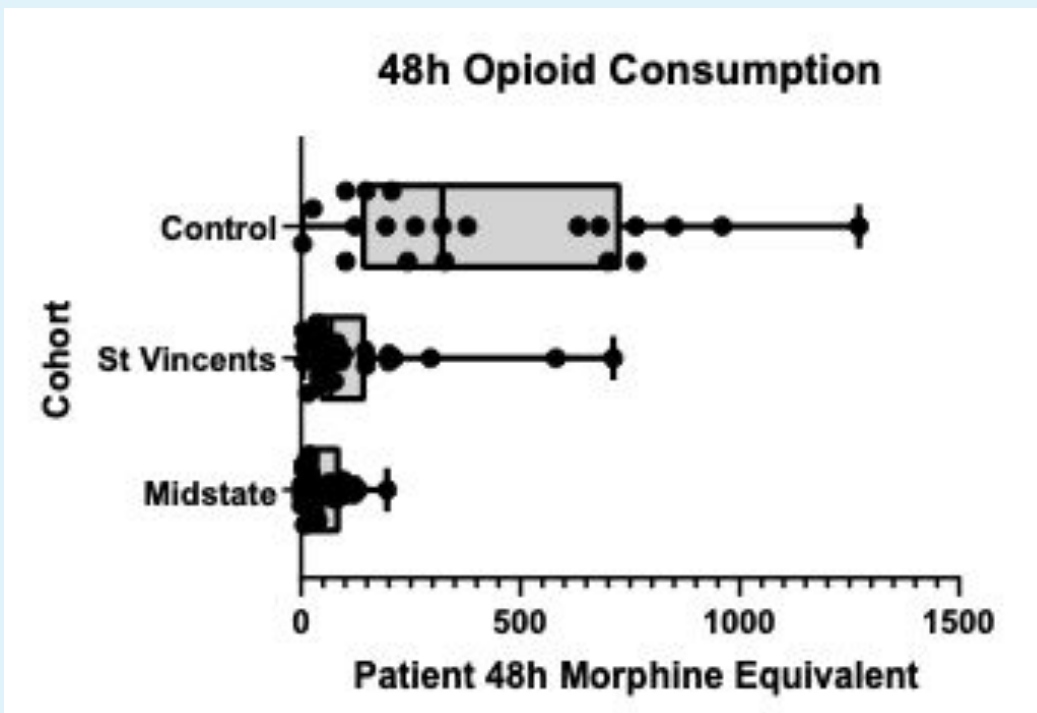


Figure 3: Univariate box-plot illustration of 48hr opioid consumption measured in oral morphine milliequivalents (mg)

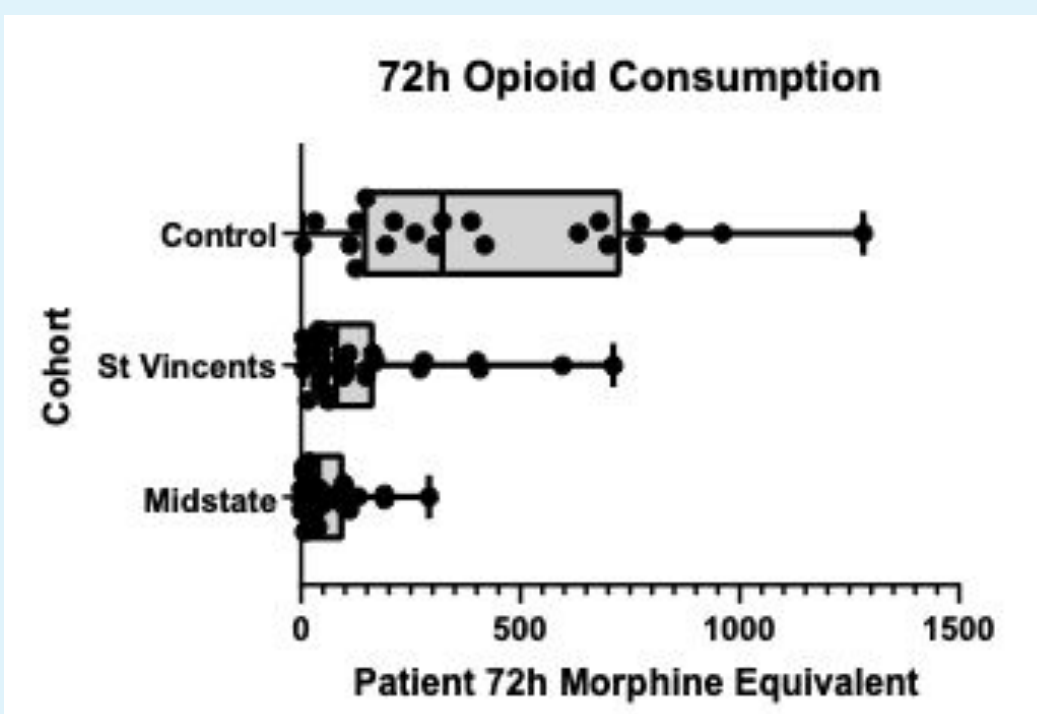


Figure 4: Univariate box-plot illustration of 72hr opioid consumption measured in oral morphine milliequivalents (mg)

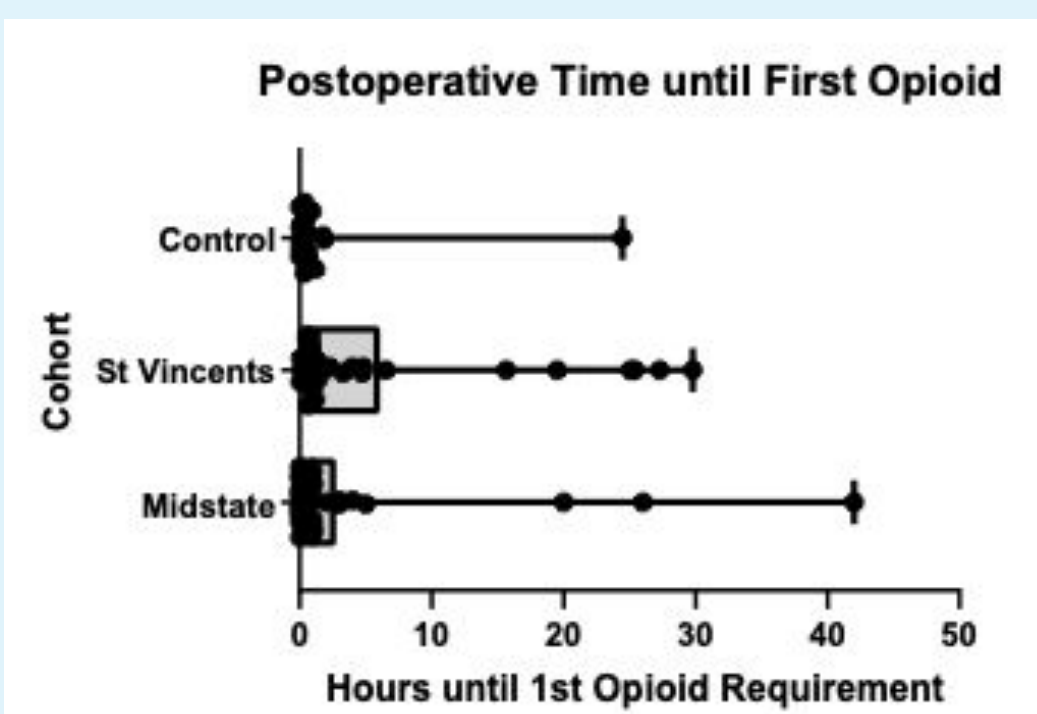


Figure 1: Univariate box-plot illustration of time to first opioid measured in hours.

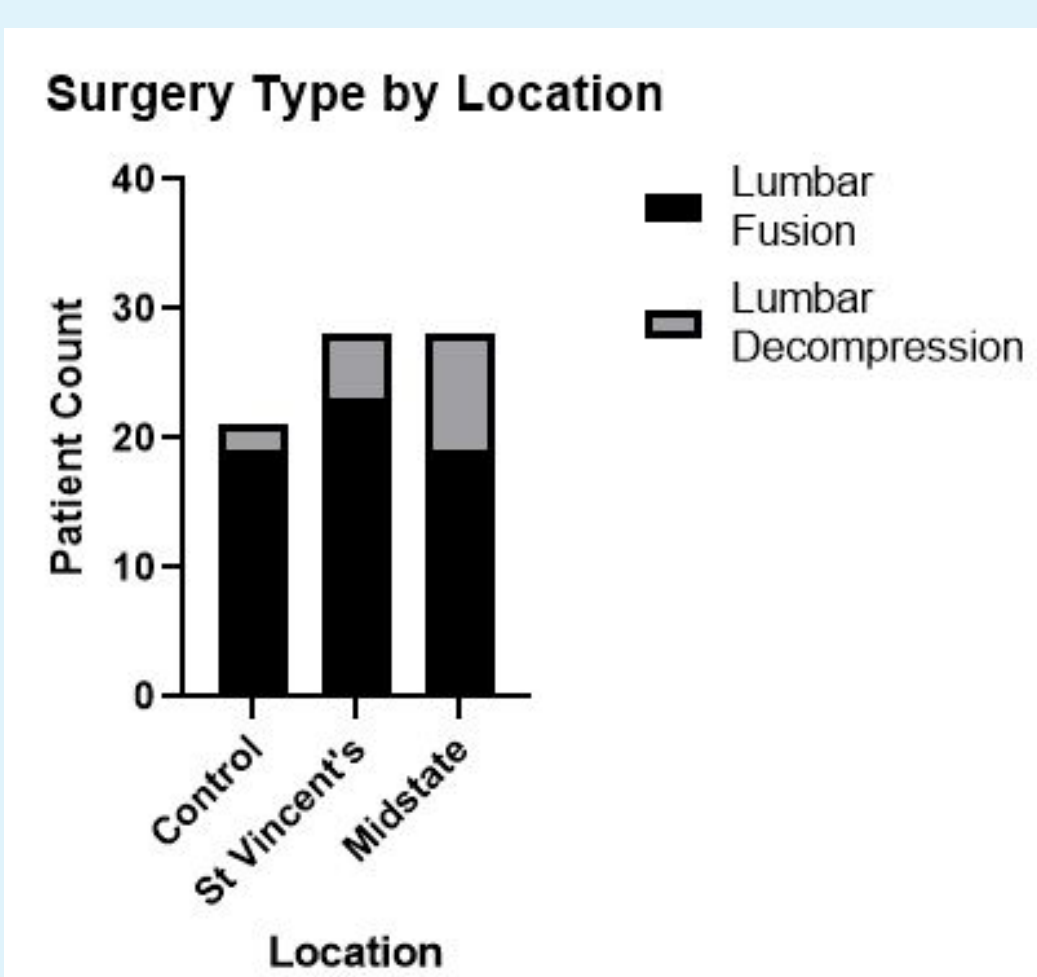


Figure 5: Distribution of surgery type by location

# Efficacy and Safety of Erector Spinae Blocks for Lumbar Spine Surgery: A cohort retrospective multi-institutional study



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## Introduction

Lumbar spine fusions are painful surgeries with opioids as the mainstay of perioperative analgesia. Given the ongoing opioid epidemic and the risk of opioid-related adverse drug events, it is critical to identify and implement opioid-sparing clinical pathways. We report the results of a retrospective case series during which patients undergoing lumbar spine surgery in two large community hospitals (St. Vincent's Medical Center [SVMC], Midstate Medical Center [MMC]) received a multimodal anesthetic regimen including ultrasound-guided erector spinae plane (ESP) blocks was used to provide robust opioid-sparing postoperative analgesia. Our main question was how (1) whether this multimodal regimen would impact postoperative pain and opioid requirements in patients undergoing lumbar spine surgery, and (2) if this protocol caused similar improvements in pain and opioid requirements at both hospitals that received the multimodal analgesia protocol. In addition to pain and opioid consumption we also looked at the length of hospital stay, time to first opioid, and as well as the safety profile of erector spinae blocks for lumbar spine surgery.

## Methods

In this study, we performed a retrospective, observational study of patients undergoing lumbar spine surgery at two hospitals in Connecticut. This study was reviewed by Hartford Hospital Institutional Review Board. The study involved three cohorts of patients, (1) a control cohort of patients who underwent lumbar spine surgery without ESP blocks at St. Vincent's Medical Center from January 2020 – February 2020, (2) a case cohort of patients who underwent lumbar spine surgery with ESP blocks at St. Vincent's Medical Center from August – September 2020 and (3) a case cohort of patients who underwent lumbar spine surgery with ESP blocks at Midstate Medical Center from August – September 2020. The sample was comprised of men and women, aged 18-89 who underwent elective lumbar spine surgery. Those with a preoperative BMI >50 and those using more than 20 morphine milligram equivalent (MME)/day preoperatively were excluded. Cumulative opioid requirements were tabulated in MME for the first 72 hours after surgery.

## Data Collection & Results

Records were identified through the hospital electronic health record (EHR) based on type of procedure, using an ICD code consistent with lumbar pain, radiculopathy, disc degeneration, disc herniation, foraminal stenosis, or 1-2 level spondylolisthesis or deformity. STATA was used for statistical analysis. Outcome measures were compared between groups using analysis of variance for continuous variables and Fisher's exact test for categorical data. Results yielding p<0.05 were deemed statistically significant. A total of 21 patients were identified in the control group, 28 patients were identified in the SVMC case group, and 28 patients were identified in the MMC case group. Demographic tables can be seen below.

Age	Control(n=21)	St Vincent's(n=28)	Midstate(n=28)
<40	2 (9.5%)	1 (3.6%)	2 (7.1%)
40 - 49	6 (28.6%)	2 (7.1%)	3 (10.7%)
50 - 59	6 (28.6%)	9 (32.1%)	3 (10.7%)
60-69	1 (4.8%)	5 (17.9%)	9 (32.1%)
70+	6 (28.6%)	11 (39.3%)	11 (39.3%)

Gender	Control(n=21)	St Vincent's(n=28)	Midstate(n=28)
Female	12 (57.1%)	14 (50%)	19 (32.1%)
Male	9 (42.9%)	14 (50%)	9 (67.9%)

At 24 hours after surgery, the mean (and SD) MME was 377.6 (351.7), 73.86 (129.6) and 32.85 (29.21) for control, SVMC ESP, and MMC ESP groups respectively – significant difference was found between means (F 16.10, p<0.0001). At 48 hours after surgery, the mean (and SD) MME was 431.4 (353), 127.1 (164.2) and 52.4 (49.7) for control, SVMC ESP, and MMC ESP groups respectively – significant difference was found between means (F 17.02, p<0.0001). At 72 hours after surgery, the mean (and SD) MME was 442.4 (350.1), 151.1 (179.3) and 63.7 (70.3) for control, SVMC ESP, and MMC ESP groups respectively – significant difference was found between means (F 16.15, p<0.0001). Mean time to first opioid was also analyzed, but no significant difference was found between means (F 2.024, p = 0.13). Post-hoc analysis between SVMC ESP vs MMC ESP cohorts found no significant difference (t=1.6, p= 0.128).

## Data Collection & Results (cont.)

Although there is a robust body of literature recommending regional anesthesia for spine surgery, there is a lack of consensus on the optimal type of block, be it erector spinae blocks, retrolaminar blocks, or thoracolumbar interfascial plane blocks. In this retrospective study, we found that a multimodal protocol including bilateral lumbar ESP blocks were both logistically easy to implement in our workflow and yielded robust decreases in postoperative opioid consumption at two large community hospitals. It is important to note that this study has limitations, including lack of ability to control for our multimodal analgesia regimen, and possible restrictive inclusion criteria.

## Conclusion

A statistically significant decrease in opioid requirement in the ESP block group, as compared to the historical control group, was noted up to 72 hours after lumbar spine surgery in this multi-institutional study. The effectiveness of this protocol was demonstrated at both institutions in our study, but no significant difference but found between institutions. The data from this study supports ESP blocks as an effective method of postoperative pain management. Additional investigation will help to determine the role of the ESP in terms of other outcome measures (rehabilitation metrics, quality of recovery, and cost-benefit analysis) as well as gauge its relative efficacy with minimally invasive surgical approaches.

## References

Special thanks to Bill Lahiff for assistance with poster authorship and technical support.

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