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ERECTOR SPINAE PLANE BLOCK VERSUS QUADRATUS LUMBORUM BLOCK FOR OPEN ABDOMINAL SURGERIES: A RETROSPECTIVE STUDY

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Introduction

Post-operative pain management for abdominal surgeries continues to be a challenge. Inadequately treated abdominal pain can lead to detrimental physiological effects and may also have psychological, economic, and social adverse effects (1). Effective pain relief is a powerful technique to modify surgical stress responses, thereby leading to an improved outcome. The utilization of regional anesthetic techniques including truncal fascial plane blocks has been shown to reduce postoperative pain and opioid requirements, which in turn decreases complications.(2) While there is widespread use of quadratus lumborum blocks (QLB) for abdominal surgery, erector spinae plane block (ESPB) has recently become popular in its usage; however, there is a lack of published studies comparing the two techniques for open abdominal surgeries. The objective of this study is to compare the analgesic effects of ESPB and QLB in adult open abdominal surgical cases by analyzing retrospective data from a single institution.

Materials and Methods

After the study was approved by the University Hospital Cleveland Medical Center IRB, Patients aged 18 to 65 years with ASA scores of I-III scheduled for elective open abdominal surgery from 2021-2022 were included in the study. Patients on chronic opioid medications at home were excluded. The patients were divided into two groups, QLB and ESPB. All the blocks and catheter placement were done preoperatively with ultrasound guidance. Both groups received 0.5% bupivacaine 30ml before catheter placement. The primary aim of this study was to compare the analgesic efficacy of ESPB and QLB in open abdominal surgeries based on the analgesic requirements in the first 72 h postoperatively. The secondary outcome is block-related complications. All statistical analyses were performed using IBM SPSS for Windows version 20.0 software (IBM Corp., Armonk, NY, USA). Continuous variables are reported using either mean and standard deviation or median and 25th and 75th percentiles. Categorical variables are reported using frequencies and percentages. Continuous variables are compared using independent t-test or Wilcoxon Mann-Whitney test. An additional relationship between intra-op overall opioid use (morphine equivalents) and type of anesthesia is explored using linear regression analysis after including Sex, ASA class, and Surgery time as covariates. These covariates were selected as they were found to be significantly different between the two anesthesia types. All statistical analyses were performed using R program for statistical computing. P-value of less than 0.05 was considered significant.

Results/Case Report

Our study included 288 patients, ESP (100) vs QL (188). There were no significant differences between the groups in terms of age and BMI. There were significant differences between the groups in terms of Sex and ASA. The surgical time is longer in QL group compared to ESP group ($P<0.01$). Intraoperatively, the patient in QL group also received more pain meds than the patients in ESP group ($P<0.01$) (Table 1). After adjusting for sex, ASA class and Surgery time, there was a significant difference in intra-op morphine consumption between Anesthetic techniques with higher consumption in QL compared to ESP (Table 2). There was no difference in 72-hour post-op opioid consumption in patients who received the ESP block compared to the QL block ($P>0.05$). No complications, such as hypotension, arrhythmia or allergic reaction, were observed during the intra- or postoperative periods in any patient. No block-related complications or side effects were observed postoperatively

Discussion

Quadratus Lumborum Block (QLB) and Erector Spinae Plane Block (ESPB) are two regional anesthesia techniques used for abdominal surgery. They provide effective analgesia for a variety of abdominal procedures and have gained popularity due to their relatively straightforward approach and potential benefits in reducing opioid consumption and improving postoperative pain management. The previous comparison of ESP and QL blocks done in pediatrics undergoing lower abdominal procedures showed similar postoperative analgesia(3). However, there were few studies that have compared the efficiency of these two blocks in adult open abdominal surgery.

Our study shows that ESPB and QLB provided similar and adequate postoperative analgesia in open abdominal surgery. It's essential to note that while both QLBs and ESPBs can provide significant pain relief, they may not completely eliminate the need for additional pain management strategies. Multimodal pain management approaches, including a combination of regional blocks, systemic analgesics, and non-pharmacological interventions, are often used to ensure optimal pain control and patient comfort during and after open abdominal surgery. As always, the decision regarding the most appropriate pain management plan should be made collaboratively between the surgical team, anesthesia providers, and the patient.

The limitations of our study are primarily those related to its retrospective nature. There was no standardized protocol for intraoperative and postoperative pain control. It was difficult to collect the pain scores at certain time intervals. However, this study could be used as a pilot study for a future randomized controlled study

References

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Disclosures

No

Tables / Images

Table: Comparison of Patient Characteristics between ESP and QL

	Level	Overall n = 286	ESP n = 100	QL n = 186	p-value
Age	Mean ± SD	62.87 ± 14.09	64.38 ± 13.79	62.06 ± 14.22	0.185 ^a
Sex, n (%)	Female	156 (54.55%)	44 (44%)	112 (60.22%)	0.009 ^c
	Male	130 (45.45%)	56 (56%)	74 (34.78%)	
ASA	Mean ± SD	2.89 ± 0.41	2.99 ± 0.39	2.83 ± 0.41	0.002 ^a
BMI	Mean ± SD	29.36 ± 9.01	29.10 ± 7.81	29.5 ± 9.61	0.727 ^a
PONV, n (%)	Yes (%)	108 (37.76%)	45 (45%)	63 (33.87%)	0.136 ^c
Intraop Meds					
Fentanyl, mg	Mean ± SD	12.56 ± 8.19	8.24 ± 2.78	14.88 ± 9.14	<0.001 ^a
	Median (25 th , 75 th percentile)	10 (10, 10)	10 (5, 10)	10 (10, 20)	<0.001 ^b
Hydromorphone, mg	Mean ± SD	18.47 ± 14.52	8.46 ± 8.45	23.85 ± 14.25	<0.001 ^a
	Median (25 th , 75 th percentile)	20 (8, 20)	8 (0, 12)	20 (20, 31.5)	<0.001 ^b
Toradol, mg	Mean ± SD	1.85 ± 6.96	2.1 ± 7.39	1.72 ± 6.74	0.661 ^a
	Median (25 th , 75 th percentile)	0 (0, 0)	0 (0, 0)	0 (0, 0)	0.629 ^b
Overall Intraop Morphine Equivalents (Calculated), mg	Mean ± SD	31.03 ± 17.70	16.7 ± 7.75	38.73 ± 16.73	<0.001 ^a
	Median (25 th , 75 th percentile)	30 (20, 38)	18 (10, 22)	30 (30, 50)	<0.001 ^b
Surgery time, minutes	Mean ± SD	277.91 ± 128.54	147.67 ± 39.15	347.94 ± 102.64	<0.001 ^a
	Median (25 th , 75 th percentile)	263.50 (182, 366)	146.5 (112, 183.5)	325 (268, 406)	<0.001 ^b
Postop Meds					
Hydromorphone, mg	Mean ± SD	105.07 ± 184.42	137.19 ± 174.84	87.8 ± 187.56	0.031 ^a
	Median (25 th , 75 th percentile)	32 (8, 96)	58 (16, 177)	24 (8, 58)	<0.001 ^b

Oxycodone, mg	Mean ± SD	33.21 ± 48.33	15.86 ± 30.51	42.54 ± 53.39	<0.001 ^a
	Median (25 th , 75 th percentile)	7.5 (0, 45)	0 (0, 15)	22.5 (0, 73.12)	<0.001 ^b
Toradol, mg	Mean ± SD	32.92 ± 50.19	24.9 ± 49.51	37.23 ± 50.16	0.047 ^a
	Median (25 th , 75 th percentile)	0 (0, 60)	0 (0, 30)	0 (0, 0)	0.015 ^b
Tramadol, mg	Mean ± SD	3.52 ± 8.96	1.07 ± 2.78	4.84 ± 10.7	<0.001 ^a
	Median (25 th , 75 th percentile)	0 (0, 0)	0 (0, 0)	0 (0, 5)	0.014 ^b
Overall Postop Morphine Equivalents (Calculated), mg	Mean ± SD	141.80 ± 182.42	154.12 ± 173.14	135.18 ± 187.34	0.403 ^a
	Median (25 th , 75 th percentile)	77.25 (32, 172.25)	93 (33.5, 208.8)	68 (32, 159)	0.242 ^b

^at-test; ^bWilcoxon test; ^cPearson's chi-squared test

Table 2. Linear regression analysis on intraop morphine consumption (mg) with sex, ASA, anesthetic technique (ESP or QL), and surgery time as predictors.

	β	df	Standard error	p-value
Sex (Male)	1.113		0.763	0.446
ASA	2.055		0.960	0.338
Anesthetic technique (QL)	6.045	281	2.235	0.026
Surgery time	0.082		8.146	<0.001

Female and ESP are reference categories.