e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2023; 13(10); 66-69

Original Research Article

Effect of Analgesia Induced by Erector Spinae Plane Block versus Transversus Abdominis Plane Block Post Elective Lower Segment Caesarean Section: A Comparative Analysis

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Received: 12-07-2023 / Revised 21-00-2023 / Accepted 20-09-2023
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Conflict of interest: Nil

Abstract:

Introduction: This research investigated the anelgesic effectiveness of bi-lateral transversus abdominis plane (TAP) & bi-lateral erector spinae plane (ESP) blocks following elective lower segment cesarean section.

Material & Methods: 120 subjects planned for spinal anaesthesia-induced elective cesarean deliveries were arbitrarily allotted to undergo either an ESP-block or a TAP-block. At the conclusion of surgery, the ESP category received an ESP-block with 20 mL of 0.25% bupivacaine at the level of the ninth thoracic transverse process. After delivery, the TAP category underwent an USG-guided TAP-block with 20 mL of 0.25% bupivacaine. The length of anelgesia that each block was able to provide was the main result. Post-operative pain intensity, total tramadol intake, & subject satisfaction were secondary outcome indicators.

Results: The ESP category had a extended median (interquartile range) block period than the TAP category (12 Hrs [10, 14] versus 8 Hrs [8, 8], $p<0.0001$). The average visual analogue pain count at rest was 0.32 units lesser in the ESP category in the initial 24 Hrs. The TAP category consumed considerably more tramadol on average during the first 24 Hrs than the ESP category (125 mg [100, 150] vs 100 mg [75, 100], $p=0.003$).

Conclusion: The ESP-block offers more outcome pain comfort than the TAP-block, has a extended period of anelgesic effect, extends the duration before the first anelgesic is needed, is associated to lesser tramadol utilization, & can be used in multi-modal anelgesia & opioid-sparing regimens following lower segment cesarean section.

Keywords: Erector Spinae Plane Block, Cesarean, Anelgesia, Tramadol.

Introduction

It might be difficult to provide post-operative pain management after an elective lower segment cesarean section since it must satisfy the mother without endangering the infant. The most popular method used during cesarean deliveries is spinal anaesthesia since it offers quick & efficient sedation & is technically simple to carry out [1]. When local anaesthetic is spread in the neurofascial plane between the internal oblique & transversus abdominis muscle, the anterior rami of the spinal nerves of the abdominal anterior wall are blocked, which relieves the pain of lower segment cesarean section. TAP-block has grown in popularity as an outcome anelgesia method for mothers having cesarean deliveries [2]. Recent studies have mentioned that ESP-block provides both somatic & visceral anelgesia by blocking the dorsal & ventral branches of the thoracic & abdominal spinal nerves, which is a useful part of a multi-modal regimen for pain comfort following various types of surgeries, including lower segment cesarean section [3]. After an elective lower segment cesarean section, we anticipated that bi-lateral ESP-block would offer more outcome & lasting pain comfort than TAP-block & may be employed as a part of a multi-modal opioid-sparing anelgesia strategy. This research compared the anelgesic outcome of bi-lateral TAP-block vs bi-lateral ESP-block following an elective lower segment cesarean section while using spinal anaesthesia [4-6]. The length of anelgesia provided by these two forms of block was the main research outcome.

Material & Methods:

The Hospital's ethical review board gave the go-ahead for this prospective, randomized, single-

center, clinical research. All research participants provided their written, informed permission. Between July & December of 2019, prospective participants had appointments for spinal anaesthesia-based elective cesarean deliveries. The research's design complies with the relevant CONSORT recommendations. The experiment involved 120 subjects who were planned for elective cesarean deliveries using a Pfannenstiel incision & had physical status I as per the American Society of Anaesthesiologists [7]. Local infection, noteworthy liver, kidney, or cardio-vascular illness, a bleeding issue, known allergy to any medicine used in the experiment, & a contra-indication to regional anaesthetic were the exclusion criteria. The research investigator unsealed the separate opaque envelopes containing the computer-generated random numbers right before conducting the block to distribute the ladies equally between the ESP & TAP categories. The identical anaesthesiologist performed all of the blocks [8]. Until the trial's conclusion, the functional data collectors were unaware of the randomization. Pre-anaesthetic assessment was conducted as per standard hospital procedure, 1 mg of granisetron & 50 mg of ranitidine were given intra-venously (IV) as premedications one Hr before to the procedure, & 10 mL/kg of Ringer's lactate preparation was infused for 15 minutes as a preload. A conventional spinal anaesthetic consisting of 10–12 mg of 0.5% hyperbaric bupivacaine was administered to all trial participants. The mother was then swiftly placed in the supine position with a 15° inclination to the left & given an oxygen nasal catheter. Following verification that there was an adequate dose of anaesthetic, a cesarean birth was carried out while BP & heart rate was continuously monitored.

Results:

Out of 224 subjects who were assessed for eligibility, 26 had an emergency lower segment cesarean section, 36 fulfilled an exclusion criterion, 12 withdrew to participate, & 30 did not match the inclusion requirements. In each category, data for 60 subjects were examined. Age, body weight, spinal level, or parity between-category differences were innoteworthy. (Table 1).

Table 1: The participant Characteristics

Trait	ESP (N=60)		TAP (N=60)		P-value
	Average	SD	Average	SD	
Age (years)	27.12	6	28.91	5.51	0.223
Body weight (kg)	91.91	8.3	89.51	11.61	0.364
Spinal level before block Median (IQR)	8.51	(8–10)	8	(6–10)	0.117
Trait	N	%	N	%	P-value
Parity					
Primi-para	4	13.32%	2	6.74%	0.672
Multi-para	26	86.74%	28	93.36%	

The ESP category & the TAP category had noteworthily different median (IQR) anelgesia periods as mentioned in Table 2.

Table 2: Comparison of the Period of the Block of the Two Categories

	ESP (N=60)			TAP (N=60)			P-value
	Median	IQR		Median	IQR		
Period of the block (Hrs)	12	10	14	8	8	8	<0.0001*
Total tramadol utilization (mg)	100	75	100	125	100	150	0.003*

Note: *Statistically noteworthy.

Table 3 shows that At 8 & 12 Hrs, the ESP category's VAS pain count was considerably lesser than the TAP category's (p0.0001). The VAS count did not differ statistically noteworthyly across categories at other periods (p>0.05), nevertheless.

Table 3: Subject Contentment

Subjects Contentment	ESP (N=60)		TAP (N=60)		P-value
Poor	6	10.0%	12	20.0%	0.060
Good	20	33.4%	32	53.4%	
Excellent	34	56.8%	16	26.8%	

No unfavourable outcomes or complications were observed in either category.

Discussion

In this research, we discovered that when subjects undergoing lower segment cesarean section received an ESP-block as opposed to a TAP-block, the period of anelgesia & the duration to first request anelgesia was extended. within the first 8 & 12 post-operative

Hrs, VAS pain counts in our ESP category were lesser than in our TAP category, both at rest & after coughing, & were greater in the TAP category within the first 24 post-operative Hrs. As per Tulgar et al., three subjects having various types of abdominal surgery experienced an ESP-block's anelgesic outcomes for 17, 16, & 13 Hrs, respectively. Furthermore, Hamed et colleagues discovered that in subjects having abdominal hysterectomy, an ESP-block's anelgesic outcomes persisted for 12 Hrs. When compared to a sham block, TAP-block was found to be an outcome part of a multi-modal anelgesic strategy for managing post-cesarean pain & to offer greater anelgesia, minimize the need for opioids, & lesser the incidence of opioid-induced unfavourable outcomes. In other investigations, the anelgesic outcome of a TAP-block was compared to that of neuroaxial morphine, & it was found that intrathecal morphine provided superior anelgesia, albeit at the expense of side outcomes [9-11]. When intrathecal morphine is contraindicated or has negative side outcomes, a TAP-block may be an option, as per meta-analyses by Mishriky et al. & Champaneria et al. Within the first 12 Hrs following transverse incision surgery, TAP-block can outcome relieve pain. As per a meta-analysis by Abdallah et al.10, a posterior TAP-block following lesser abdomen transverse incision surgery provided anelgesia for an extended period of duration than a lateral TAP-block. They hypothesized that the retrograde propagation of the local anaesthetic to the paravertebral region was the reason why the posterior TAP-block had a superior outcome [12]. The lack of a noteworthy difference in subject contentment between the TAP & ESP categories in this research may be due to the fact that, despite being a principal part, pain management is not the sole factor influencing contentment in lower segment cesarean section subjects. There are no known harmful outcomes of bi-lateral ESP-block. However, motor weakness in the lesser extremities was documented following bi-lateral ESP-block in a subject having a lower segment cesarean section, & pneumothorax was the first ESP-block consequence to be reported. It's believed that TAP-block issues are uncommon. There have been a few difficulties associated with TAP-block, though, such as intra-liver injection in a subject with hepato-megaly, intra-peritoneal mis-placement of the TAP catheter without harm to the abdominal organs, & allergic reeffect following ropivacaine administration [13,14]. Due to the TAP's close proximity to the femoral nerve, a potential consequence is short-term femoral nerve palsy. Both types of blocks had no negative consequences in our investigation, however when performing a TAP-block, the aforementioned problems should be taken into consideration. Due to the residual block from spinal anaesthetic, which lasts into the early post-operative period, it was difficult to document the success rate & distribution of either form of block in this investigation. Furthermore, it was difficult for us to compare the current data with those from other papers due to the scarcity of information on the efficacy of the ESP-block for post-operative anelgesia following lower segment cesarean section [15]. We advise that future researches compare the anelgesic effectiveness of an ESP-block with that of a posterior TAP-block after lower segment cesarean section & that these trials be carried out in subjects under general anaesthesia for better assessment of both distribution & success rate. This is because a TAP-block administered via a posterior method arguably has a better anelgesic outcome than one administered via a lateral method.

Conclusions

When compared to the TAP-block, the ESP-block has a extended period of anelgesia, extends the duration until the initial need for anelgesia, & reduces tramadol use. It can be employed in multi-modal anelgesia & opioid-sparing regimens following lower segment cesarean section.

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