

A Randomized Control Study to Compare Postoperative Analgesic Efficacy between USG Guided Erector Spinae Plane Block versus Transverse Abdominis Plane (Tap) Block in Elective Lower Segment Caesarean Section at a Tertiary Care Centre

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Abstract

Background: Aim of present research was to evaluate analgesic effectiveness of ultrasound guided (USG) bilateral ESP block with that of bilateral anterior TAP block in LSCS surgery. **Subjects and Methods:** Sixty women were planned for elective caesarean deliveries under intrathecal anaesthesia were included in the trial. The women were arbitrarily divided into two groups: an ESP group or a TAP group in sealed opaque envelopes. Postoperative pain was calculated by the visual analogue scale (VAS) pain score at rest at 0, 4, 8, 12, 24 hours. **Results:** Significant dissimilarity in median duration of analgesia among the ESP group and the TAP group. The median total tramadol use in the primary 24 hours was significantly superior in the TAP group than in the ESP group. VAS pain scores at rest for repeated measures were 0.3 units lesser on average in the ESP group than in the TAP group during the primary 24 postoperative hours and 0.5 units lower in the ESP group in the first 8 postoperative hours. **Conclusion:** The ESP block has an extended duration of analgesia, holds up the time to primary necessity for analgesia, and decreases tramadol utilization compared with the TAP block and can be utilized in multimodal analgesia and opioid-free schedules following caesarean section.

Keywords: Analgesia, caesarean section, tramadol, ultrasound.

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Introduction

Lower segment caesarean section is commonly performed under spinal anaesthesia, as it is easy to perform and overcomes the drawbacks of general anaesthesia. For early recovery, and to facilitate breast-feeding, analgesia is a very important aspect for mother after LSCS surgery.

Since long back multimodal analgesia techniques are used for postoperative pain relief like: NSAID, systemic opioids, epidural analgesia, and truncal blocks.^[1]

TAP block (a commonly used truncal block) is being used since 2001 as a post-operative analgesia in caesarean section, by jamming the anterior rami of the spinal nerves of the abdominal anterior wall subsequent allocation of the local anaesthetic agent in the neuro fascial plane among the transversus abdominis and internal oblique muscle.

According to recent studies, the ESP block serves more effective post-operative analgesia after LSCS by jamming equally dorsal and ventral branches of the thoracic and abdominal spinal nerves; thus providing both somatic and visceral analgesia.^[2,3]

The aim of the present research was to evaluate the analgesic effectiveness of ultrasound guided bilateral ESP block with that of bilateral anterior TAP block in LSCS surgery. The primary conclusion measure of the study was: 1) Duration of analgesia which is measured by time requirement of first dose of rescue analgesia, 2) Quality of analgesia measured by VAS score at 0 and 4, 8, 12, and 24 hours postoperatively and other objective was total requirement of analgesic drugs in first 24 hours postoperatively.

Subjects and Methods

It was a prospective, randomized control research, performed with prior consent of the ethical committee of the institute (GMERS Medical College and Hospital, Sola, Ahmedabad). Prospective contributors were planned for elective caesarean delivery under spinal anaesthesia among July 01, 2021, and January 31, 2022, sample size in each group being 30 subjects.

Sixty women aged 18–40 years with American Society of Anaesthesiologists physical status II (ASA II) planned for discretionary caesarean delivery under intrathecal anaesthesia were incorporated in the research. The segregation criteria were: local infection, major cardiovascular disease, a bleeding disorder, and a contraindication to regional anaesthesia.

Study subjects were arbitrarily owed in identical figures to an ESP group or a TAP group utilizing computer-generated random numbers placed in divide opaque envelopes that were opened by the researcher just prior to performing the block.

A thorough history, examination and routine investigations were done on all subjects. Pre-operatively monitoring devices attached, IV line secured, preloaded with fluids and premedicated with Injection Ondansetron 0.15mg/kg. Subjects were given Spinal Anaesthesia in sitting position with 10-12 mg of injection bupivacaine heavy 0.5%. The mother was then shifted straight away to the supine place with a 15° left tilt and fixed with an oxygen mask with oxygen flow at 5 litre/min. following verification of a adequate level of anaesthesia, caesarean delivery was executed with constant supervising of blood pressure and heart rate. Upon delivery, 10 U of oxytocin were injected by IV infusion and surgery performed in usual manner.

Towards the conclusion of delivery, subject owed to the ESP group undergo bilateral ESP block. The subject was turned into the lateral position to gain the block. A curvilinear ultrasound probe was positioned longitudinally 3 cm lateral to the spinous course to envisage the trapezius and erector spinae muscles. A 22-G short-bevel needle was advanced in the cranial course utilizing the in-plane process until it made get in touch with the transverse procedure The needle tip was established to be accurately located by injection of 1 mL of saline Following aspiration to keep out vascular puncture, 20 mL of 0.25% bupivacaine was injected.

For TAP Block in supine position, a linear probe was located transversely on the anterolateral abdominal wall in the midaxillary line among the costal margin and iliac crest to recognize the 3 layers of muscles, A 22-G short-bevel needle was commence utilizing the in-plane practice to attain the TAP among the internal oblique and transversus abdominis muscles. Following aspiration to prohibit vascular puncture, 20 mL of 0.25% bupivacaine were injected. Towards the conclusion of delivery, the subjects were relocated to the postoperative anaesthesia care unit where the duration of block and total tramadol utilization were evidenced in the first 24 hours following surgery. Postoperative pain was measured by the VAS pain score at rest at 0, 4, 8, 12, 24 hours.

The recorded data was compiled and entered in a

spreadsheet computer program and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

The subject's demographics were comparable with no significant dissimilarity in both groups; in terms of age, body weight, spinal level, or parity. A significant dissimilarity in median duration of analgesia among the ESP group and the TAP group was observed. The median total tramadol utilization in the primary 24 hours was significantly elevated in the TAP group than in the ESP group.

Table 1: Comparison of Both parameters

	MEDIAN ESP	MEDIAN TAP	P value
Duration of the block (hours)	13	7	<0.0001
Total tramadol consumption (mg)	100	135	<0.003

Comparison of the Duration of the Block of the Two Group Vas score at rest

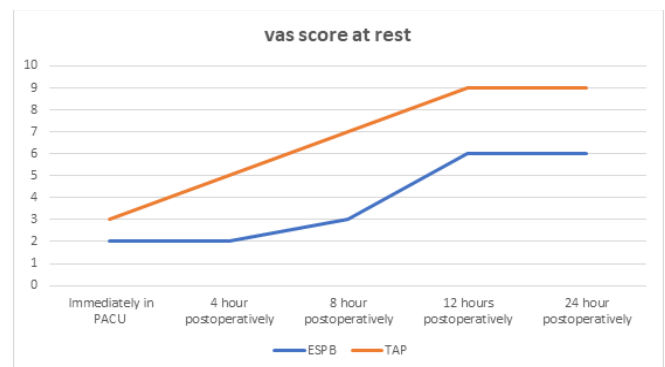


Table 2: Comparison of VAS scores

	ESP(N=30)	TAP(N=30)	p-value
	Median	Median	
VAS at PACU	2	3	0.699
VAS at 4hour	2	5	0.506
VAS at 8hour	3	7	<0.0001*
VAS at 12hour	6	9	<0.0001*
VAS at 24hour	6	9	0.723

*statistically significant

VAS pain scores at rest for recurring measures were 0.3 units inferior on average in the ESP group than in the TAP group ($p \leq 0.05$) throughout the primary 24 postoperative hours and 0.5 units lower in the ESP group ($p \leq 0.05$) in the primary 8 postoperative hours. No adverse effects were observed in each group.

Discussion

Insufficiently guarded post operative pain has unwanted physiological and psychological penalty, caesarean section (CS) linked pain has the maximum objectionable clinical outcomes.

The post caesarean section pain relief inhibit nociceptive impulses, provides subjective comfort, early mobilization (thus prevents the risk of thrombo-embolic disease, which is increased during pregnancy), breastfeeding and care of the new born. The analgesic regime must not affect the capability of mother to look out of the neonate and must have negligible drug transfer through breast milk. Multimodal analgesic include: NSAIDs, opioids, epidural analgesia and truncal blocks.

Opioids being most commonly used as oral, intravenous and epidermal patch, have excellent pain relief but have certain side effects like respiratory depression, reduced gut motility. Epidural analgesia utilizing opioids/local anaesthetic (LA) agents gives effective post-CS analgesia. In recent era, opioid free analgesia is preferred, and so various truncal blocks such as TAP Block, ESP Block etc. shows excellent post op analgesia.

A study utilizing the TAP block with 0.5% ropivacaine in post-caesarean section reported a reduction in total morphine utilize over a phase of 4 h as compared to the control group [1,2] A significant lessening in the VAS score was too observed in the case group when compared to the control group. These findings were analogous with findings of current research in which there is significant postoperative analgesia in the TAP group (8 hours).

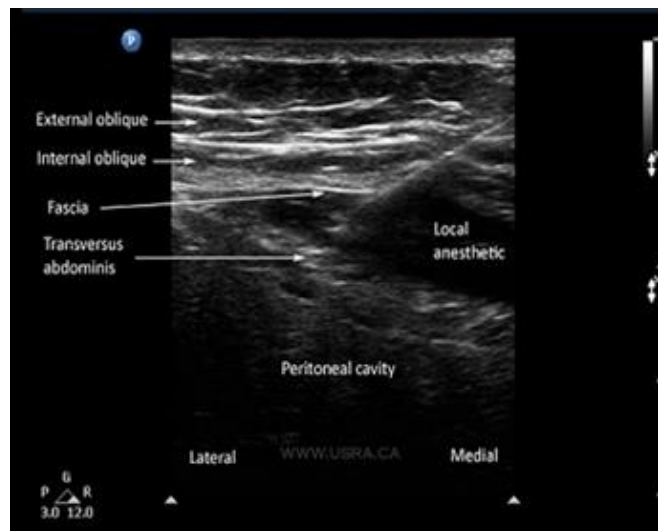


Figure 1: ultrasound image of the approach to transversus abdominis muscle.

The first description of the successful utilization of the ESP block was in 2016,^[1] The local anaesthetic drug in the ESP block spreads three and four vertebral levels cranially and caudally, attaining a paravertebral spread and facilitating extensive somatic and visceral analgesia.^[2] Previous reward of ESP block compose it a rather simple, secure, and dependable substitute to any other modality of pain assistance as it consist of the ultrasonic aim which is represented by the transverse procedure that can be easily viewed, the point of injection being a musculofascial plane which is far-away from the pleura, neuroaxis, and large vascular structures,^[3] and injection of 20–30 mL in adults results into anaesthesia of numerous dermatomes facilitating the approach to be at points somewhat distant as of the surgical zone.^[4,5,6,7]

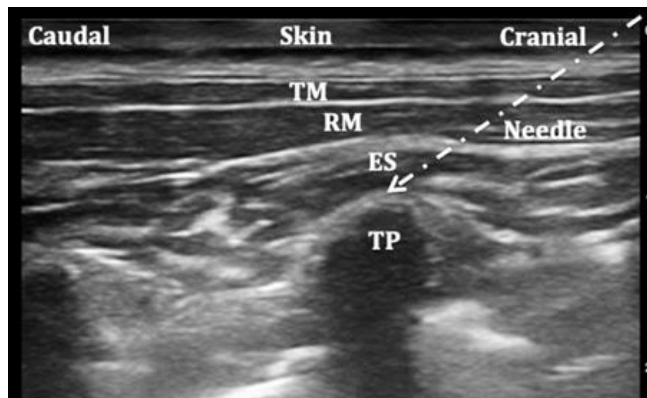


Figure 2: ultrasound image of the approach to erector spinae muscle.

In the present research, it was observed that the duration of analgesia and time to primary request for analgesia was extended in women undergo caesarean delivery while received an ESP block than when they received a TAP block. VAS pain scores at rest were inferior in our ESP group than in our TAP group during the first 8 and 12 postoperative hours and were superior in the TAP group during the first 24 postoperative hours.

Conclusion

The ESP block has a extended duration of analgesia, holds-up the time to primary prerequisite for analgesia, and decreases tramadol utilization when compared with the TAP block and could be utilized in multimodal analgesia and opioid free regimens following caesarean section.

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