



Anaesthesiology

EFFICACY OF ULTRA SOUND GUIDED TRANSMUSCULAR QUADRATUS LUMBORUM BLOCK VERSUS TRANSVERSE ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE ANALGESIA IN PARTURIENTS UNDERGOING CAESAREAN SECTIONS.

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ABSTRACT

Background: Quadratus Lumborum Block has gained a lot of popularity in past few years. It is the only truncal block that claims to provide visceral analgesia for lower abdominal surgeries as opposed to the existing ultrasound guided truncal blocks that cater only to the somatic component of pain in lower abdominal surgeries. Further studies and cadaveric dissections have shown that in the quadratus lumborum block, drug spreads to the thoracic paravertebral space. Although the existing TAP block reduces the opioid requirements, it does not address the visceral component of pain. so we decided to compare it to the transmuscular quadratus lumborum block to evaluate its analgesic efficacy for lower segment caesarean sections. **Objective:** To compare the analgesic efficacy in QL block and TAP block comparing VAS scores, time of first rescue analgesic, total number of rescue analgesics. **Methods And Materials:** It is a prospective, randomized double blinded study after obtaining approval from Ethical committee, 60 parturients scheduled for elective/emergency caesarean section under spinal anaesthesia, were enrolled into the study with 30 in each group. They were randomly assigned to receive Group Q - Quadratus Lumborum Block with 0.25% bupivacaine 20 ml or Group T - Transverse abdominis plane block with 0.25% bupivacaine 20 ml. The main objective was to measure the severity of postoperative pain assessment via visual analogue score and time for rescue analgesia and the total number of analgesic dose required over a period of 24 hours. P value ≤ 0.05 was considered as statistically significant. **Results:** statistical analysis shows Quadratus Lumborum Block provides better VAS scores in 1st 24 hrs ($p < 0.05$). Total Number of rescue analgesics are significantly less in Quadratus Lumborum block compared to Transverse Abdominis Plane block. There was no significant difference in demographic data between the two groups. The resting VAS score at 30min, 2nd, 4th, 6th, 12th and 24 hr after operation in group Q is lower than group T ($p < 0.05$). The time for first rescue analgesia is 486 ± 75 mins in group Q compared to group T which is 352 ± 67 mins ($p < 0.05$). The number of patients received rescue analgesic doses is 18 in group Q compared to group T which is 27 ($p < 0.05$). Total dose of opioid consumption (mg) is 120 ± 40.46 in group Q compared to group T which is 150 ± 64.89 ($p < 0.05$). **Conclusion:** Transmuscular Quadratus Lumborum block is better for post operative analgesia in caesarean sections.

KEYWORDS : Quadratus Lumborum Block, regional anaesthesia, Transverse abdominis plane block, pain management.

INTRODUCTION

Caesarean delivery¹ is the most common in patient surgical procedure performed worldwide; improving the perioperative care of parturients has significant global implications. Acute postpartum pain is a leading anaesthetic concern for women is a key determinant of maternal satisfaction may lead to persistent postoperative pain and a predictor of postpartum depression.

Enhanced recovery² after surgery is a multimodal perioperative care pathway that promotes preoperative organ function and reduces the stress response generated by surgical trauma to achieve and improve speedy recovery. Opioids, the popular painkiller, have several side effects such as sedation, dizziness, nausea, vomiting, constipation, physical dependence, tolerance, pruritis, and respiratory depression.

Multimodal analgesia, including long-acting intrathecal or epidural opioid, is standard for postoperative caesarean delivery analgesia. In the absence of long-acting neuraxial opioid, truncal blocks such as transversus abdominis plane (TAP) blocks and quadratus lumborum blocks (QLB), are increasingly being incorporated into obstetric anaesthetic practice to improve analgesic outcomes. However, no visceral analgesia is provided with TAP blocks, and thus the QLB may offer improved analgesic efficacy due to possible injectate spread to the paravertebral space

The sensory nerves of the anterolateral abdominal wall, T6-L1, that travel to innervate the abdomen are blocked during the TAP block

.After lower abdominal surgery, a TAP block can provide effective analgesia. QLB block is classified anatomically into 3 groups: QLB 1 (Lateral approach) provides analgesia from T7 to L1. QLB 2 is conducted by injection medication at the site posterior to the quadratus lumborum muscle from the posterior abdominal wall. QLB 3, also referred to as transmuscular quadratus lumborum block, aimed at the anterior border of quadratus lumborum and posterior to psoas major, so that the anesthetic can spread to the thoracic paravertebral space.

This study aims to compare the efficacy of ultrasound guided bilateral QLB versus bilateral ultrasound-guided TAP block for postoperative analgesia in patients undergoing elective /emergency caesarean section under spinal anaesthesia.

MATERIAL AND METHODS:

- An prospective, randomized double blinded study was conducted from MARCH 2022 to FEB 2023. After receiving informed written consent, the present investigation was carried out on 60 parturients who were ASA II, with normal pregnancies with a gestation age of at least 37 weeks, and scheduled for elective/emergency caesarean section under spinal anaesthesia at Narayana Medical College and Hospital in Nellore. After receiving clearance from the institutional ethical committee (Ref no. IEC/NMC/5/05/2021_1.) and Trial registered with clinical trial registry of india with no. CTRI/2022/01/039118.

this study was carried out with the participation of all patients who

provided written informed consent.

Sample size: 60 patients (Two groups of 30 each).

$$n = \frac{2[(a+b)^2\sigma^2]}{(\mu_1 - \mu_2)^2}$$

Fig.1. sample size formula.

Using the above formula, sample size was determined while maintaining two-sided alpha error at 5% and power at 80%. Each group needed at least 23 individuals, but for greater validation, 30 patients were chosen for each group.

Patients were randomly assigned into two groups.

Group Q - Quadratus Lumborum Block with 0.25% bupivacaine 20 ml or
Group T - Transverse abdominis plane block with 0.25% bupivacaine 20 ml.

Inclusion Criteria:

1. Parturients undergoing caesarean sections.
 2. ASA grade II and III.
 3. Age between 18 to 40 yrs.
- Valid informed/explained consent.

Exclusion Criteria:

1. Parturients own refusal for participation.
2. ASA grade IV.
3. Known history of coagulation disorders.
4. Inflammatory / infective skin lesions at the site of giving block.
5. Diseases and deformities of spinal cord.

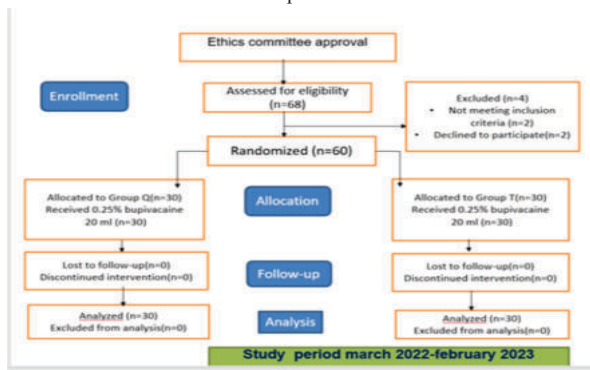
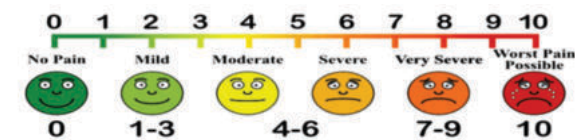


Fig.2. Consort flow chart

Main outcome measures:

- Pain relief by using Visual Analogue Score (VAS),
- Time for first rescue analgesic (inj. Tramadol 2mg/kg I.V),
- Number of rescue analgesics in first 24 hours post operatively,
- Hemodynamic parameters,
- Any adverse events in the post operative period.



METHODOLOGY

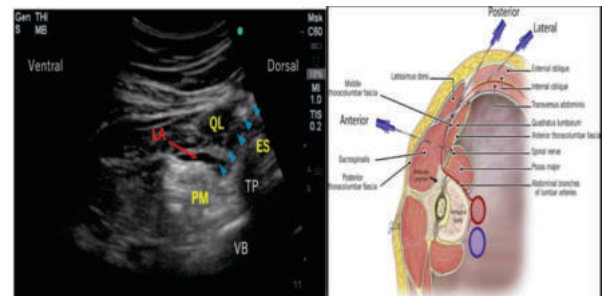
After preoperative evaluation with investigations like Complete blood picture, renal function tests, liver function tests, blood sugars, urine examination, chest x ray, standard 12 lead ECG, all patients posted for for elective/emergency caesarean section. As per perioperative anaesthesia management all patients received 40-mg pantoprazole by mouth in the morning, 2 hours before surgery. In the operating room, an intravenous cannula of 18-gauge was secured in the non-dominant hand or arm.

All the patients received single-shot spinal anesthesia with a 0.5% solution of hyperbaric bupivacaine. The patients received spinal injections from 2.0 to 3.0 mL of local anesthetic to reach a sufficient level of the blockade (T4–T6). Only individuals with an appropriate level of anesthesia could be randomized. At the end of the procedure, the participants were randomly allocated into one of the study arms

(1:1 allocation ratio): TAPB or QLB, for ultrasound-guided regional blockade. The team member who anesthetized the patient opened an opaque envelope that contained the patient's study group allocation. The envelope was sealed, and the patient allocation was prepared according to the randomization procedure by a team member not directly involved in the process of anesthesia or further evaluation of the participants.

At the completion of the surgery, with the patient still in the supine position and fully monitored, the abdomen was cleaned with the surgical solution, thereafter the QL block or TAP block was performed. A linear array (6–13 MHz) transducer Sonosite was used.

For the QL block, the posterior approach was used. A wedge was placed beneath the buttocks to facilitate probe movement, thereafter the transducer was placed at the level of the anterosuperior iliac spine and moved cranially until clear visualisation and identification of the 3 abdominal wall muscles. Then, the transducer probe was moved posteriorly until appreciation of the lumbar interfascial triangle covering the paraspinal muscle between the latissimus dorsi and QL muscles. A 21 gauge spinal needle was inserted in the plane anterolaterally to posteromedially. The needle tip was further progressed until it was inside the thoracolumbar fascia's middle layer. The spread of injectate was observed ultrasonographically. The same procedure was repeated on the other side also.



For the TAP block, the transducer probe was initially placed at anterosuperior iliac spine's level, the probe then moved cranially as in QL block until identification of the 3 abdominal wall muscles thereafter moved posteriorly between the internal oblique and transversus abdominis muscles to the most posterior end of the TAP, where transversus abdominis tails off and turns into the aponeurosis. The target was the most posterior end of the TAP. The same type of needle was introduced in the midaxillary line and progressed posteriorly until it reached the posterior end of the TAP. The same procedure was repeated on the other side as well.



RESULTS:

statistical analysis shows Quadratus Lumborum Block provides better VAS scores in 1st 24 hrs ($p < 0.05$), Total Number of rescue analgesics are significantly less in Quadratus Lumborum block compared to Transverse Abdominis Plane block.

There was no significant difference in demographic data between the two groups. The resting VAS score at 30min, 2nd, 4th, 6th, 12th and 24 hr after operation in group Q is lower than group T ($p < 0.05$). The time for first rescue analgesia is 486 ± 75 mins in group Q compared to group T which is 352 ± 67 mins ($p < 0.05$). The number of patients received rescue analgesic doses is 18 in group Q compared to group T which is 27 ($p < 0.05$). Total dose of opioid consumption (mg) is 120 ± 40.46 in group Q compared to group T which is 150 ± 64.89 ($p < 0.05$).

Hemodynamic Parameters:

There was no significant difference in haemodynamic parameters.

Side Effects:

There were no significant side effects observed in both groups.

DISCUSSION:

There are various modalities to control post-operative pain after a CS. Most commonly used modality includes intravenous, intrathecal and epidural administration of opioids and NSAIDs which are associated with alteration of the normal gastrointestinal, hepatic and renal system. Opioids, the popular painkiller, have several side effects such as sedation, dizziness, nausea, vomiting, constipation, physical dependence, tolerance, pruritis, and respiratory depression.

Another popular technique of pain relief includes epidural analgesia but increased chances of the dural and vascular puncture in presence of gravid uterus along with difficult space identification and non-feasibility in emergency scenario limit its application. Therefore, none of these techniques used in the past can be considered ideal either due to systemic side effects or due to lack of technical feasibility associated with them. Hence, in order to search for a near ideal option of post-caesarean pain relief in terms of simplicity, safety, efficacy, and feasibility, regional anaesthesia techniques come into consideration. One such regional anaesthesia technique is TAP block which has been used successfully in CSs as a component of the multimodal analgesic approach. It blocks the thoracolumbar nerves T10 to L1 and provides adequate somatic analgesia with little or no visceral blockade.

Another regional technique is QL block which claims to provide extensive analgesia of T7 to L1 dermatomes due to the spread of local anaesthetic into the paravertebral space or in the thoracolumbar plane that contains mechanoreceptors and multiple sympathetic fibres, thus contributing to extensive somatic and visceral analgesia.

Blanco et al.³ in their study observed that QL block was better than TAP block in post-caesarean pain relief with longer effective analgesia exceeding 24 hours and less supplementary opioid consumption.

Naglaa Khalil Yousef et al.³ conducted a study in comparing ultrasound-guided bilateral TAP block versus bilateral QL block in patients undergoing total abdominal hysterectomy and observed that duration of postoperative analgesia was higher in QL group than in TAP group with significantly reduced opioid requirement in QL group. QL Block is the only truncal block that claims to provide visceral analgesia for lower abdominal surgeries as opposed to the existing ultrasound guided truncal blocks that cater only to the somatic component of pain in lower abdominal surgeries.

Further studies and cadaveric dissections have shown that in the quadratus lumborum block, drug spreads to the thoracic paravertebral space.

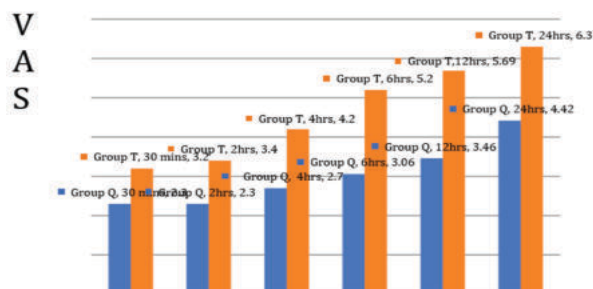
In QL block drug is placed between QL muscle and psoas major.

In TAP block drug is placed between Internal oblique muscle and transverse abdominis muscle.

CONCLUSION:

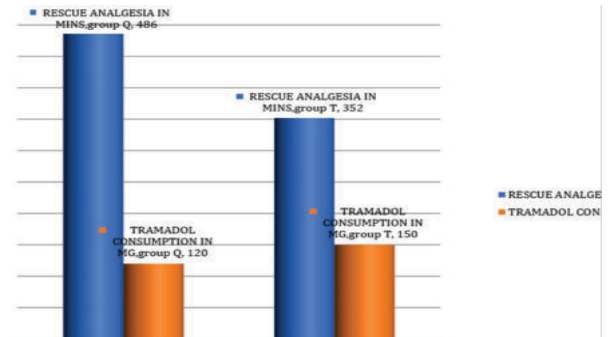
Transmuscular Quadratus Lumborum block is better for post operative analgesia in caesarean sections.

VAS	GROUP Q	GROUP T	P VALUE
30min	2.3±0.24	3.2±0.67	0.001
2hr	2.3±0.68	3.4±0.44	0.001
4hr	2.7±0.56	4.2±0.75	0.001
6hr	3.06±0.43	5.25±0.85	0.001
12hr	3.46±0.46	5.69±0.44	0.001
24hr	4.42±0.24	6.3±0.67	0.001



Mean time of first request of analgesia & Total dose of opioid consumption in 24hr post op:

	Group Q	Group T	P value
Mean time of first rescue analgesia(mins)	486 ± 75	352 ± 67	0.001
No. of patients required analgesia in 24 hr of post op	18	27	0.001
Total dose of opioid consumption(mg)	120±40.46	150 ± 64.89	0.001



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