



A COMPARATIVE STUDY OF EFFICACY OF USG-GUIDED B/L QUADRATUS LUMBORUM BLOCK VERSUS ILIOINGUINAL ILIOHYPOGASTRIC BLOCK FOR POSTOPERATIVE ANALGESIA IN ELECTIVE CAESAREAN SECTION SURGERIES

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ABSTRACT

Background: Effective postoperative pain management after caesarean section supports early ambulation, breastfeeding and early discharge, and is a key component of enhanced recovery. The ultrasound-guided quadratus lumborum (QL) block provides both visceral and somatic analgesia for lower abdominal surgery, whereas the ilioinguinal–iliohypogastric (ILIH) block provides somatic analgesia without a visceral component. Both blocks have been studied individually, but direct comparisons in caesarean section are limited.

Objective: To compare the analgesic efficacy of ultrasound-guided bilateral QL block versus bilateral ILIH block for postoperative analgesia in parturients undergoing elective caesarean section, assessed by visual analogue scale (VAS) scores, dynamic VAS scores, time to first rescue analgesia and number of rescue doses in the first 24 hours.

Methods: In this randomized controlled trial, 100 parturients (ASA grade II–III, aged 18–40 years) undergoing elective caesarean section were randomized to Group Q (bilateral QL block; 0.375% ropivacaine with 8 mg dexamethasone, 25 mL each side; n=50) or Group I (bilateral ILIH block; 0.375% ropivacaine with 8 mg dexamethasone, 15 mL each side; n=50). Static and dynamic VAS scores were recorded at 2, 4, 6, 8, 12 and 24 hours, along with time to first rescue analgesia and total rescue doses over 24 hours. Continuous variables were analysed by Student's t-test and proportions by chi-square test using SPSS version 25; p<0.05 was considered significant.

Results: Both groups had comparable static and dynamic VAS scores for the first 12 hours (all p>0.05). At 24 hours, the QL group had significantly lower static VAS (3.40±1.17 vs 4.54±0.774; p=0.01) and dynamic VAS (3.89±1.05 vs 5.45±1.10; p=0.01) than the ILIH group. Time to first rescue analgesia (20.97±4.53 vs 20.80±5.02 hours; p=0.85) and the number of rescue doses in 24 hours (0.95±0.87 vs 1.12±1.08; p=0.38) were comparable between the groups.

Conclusion: Both the ultrasound-guided quadratus lumborum block and the ilioinguinal–iliohypogastric block provided comparable and effective postoperative analgesia for parturients undergoing elective caesarean section. The QL block offered a modest advantage in pain scores at 24 hours, but both blocks were similarly efficacious with respect to rescue analgesic requirement, making the ILIH block a reasonable alternative to the QL block.

Keywords: Quadratus lumborum block; Ilioinguinal–iliohypogastric block; Caesarean section; Postoperative analgesia; Ropivacaine; Ultrasound-guided nerve block.

Introduction

Pain management is an important component of enhanced recovery after caesarean section. Adequate control of postoperative pain enables the parturient to ambulate early, facilitates breastfeeding, and allows early discharge from hospital, all of which contribute to improved maternal outcomes and satisfaction [1]. Poorly controlled pain, in contrast, is associated with delayed mobilisation, impaired mother–infant bonding, and prolonged hospital stay. Effective, opioid-sparing multimodal analgesia is therefore emphasised as a core element of Enhanced Recovery After Cesarean protocols [1,2].

Regional analgesic techniques are increasingly used as part of multimodal, opioid-sparing analgesia for lower abdominal surgery [2]. Among these, fascial plane blocks of the abdominal wall have gained popularity because they are performed under ultrasound guidance, are technically reproducible, and reduce systemic analgesic requirements. The quadratus lumborum (QL) block deposits local anaesthetic adjacent to the quadratus lumborum muscle, allowing spread toward the thoracolumbar fascia and paravertebral region [3]. As a result, it provides visceral analgesia in addition to somatic pain relief in lower abdominal surgery, which is particularly relevant after caesarean section where both incisional and uterine components contribute to pain. Randomized trials have shown that the QL block reduces postoperative opioid consumption and pain scores after caesarean section compared with control [3,4].

The ilioinguinal–iliohypogastric (ILIH) block targets the ilioinguinal and iliohypogastric nerves as they course through the abdominal wall. It effectively reduces somatic pain arising from the surgical incision, but it does not provide visceral analgesia [5,6]. The ILIH block has long been used for post-caesarean and lower-abdominal analgesia and has been shown to prolong the time to first rescue analgesia and reduce opioid requirements [5,6,7]. Both the QL and ILIH blocks have been studied extensively as individual techniques for postoperative analgesia after caesarean section; however, direct head-to-head comparisons of their efficacy are limited [8,9]. The present study was therefore designed to compare the analgesic efficacy of the ultrasound-guided bilateral QL block with that of the bilateral ILIH block in parturients undergoing elective caesarean section.

1.1 Aim

To compare the efficacy of ultrasound-guided bilateral quadratus lumborum block versus bilateral ilioinguinal–iliohypogastric block for postoperative analgesia in parturients undergoing elective caesarean section.

1.2 Objectives

To compare the two blocks with respect to (i) static visual analogue scale (VAS) scores, (ii) dynamic VAS scores, (iii) time to first rescue analgesia, and (iv) the total number of rescue analgesic doses required in the first 24 postoperative hours.

2. Materials and methods

2.1 Study Design and Setting

This was a randomized controlled trial conducted in the Department of Anaesthesiology, Narayana Medical College, Nellore, Andhra Pradesh, India, following approval from the Institutional Ethics Committee. Valid informed and explained written consent was obtained from every participant prior to enrolment.

2.2 Eligibility Criteria

Inclusion criteria: (1) parturients undergoing elective caesarean section; (2) American Society of Anesthesiologists (ASA) physical status grade II and III; (3) age between 18 and 40 years; and (4) valid informed/explained consent.

Exclusion criteria: (1) patient's own refusal to participate; (2) ASA physical status grade IV; (3) known history of coagulation disorders; and (4) inflammatory or infective skin lesions at the site of block placement.

2.3 Randomization and Allocation

Of 110 parturients assessed for eligibility, 10 were excluded prior to randomization (6 did not meet the inclusion criteria and 4 declined to participate), leaving 100 parturients who were randomized in a 1:1 ratio into two groups of 50 each (Figure 1). Group Q received an ultrasound-guided bilateral quadratus lumborum block, and Group I received an ultrasound-guided bilateral ilioinguinal–iliohypogastric block. All 100 randomized parturients received their allocated intervention and were included in the final analysis, with no post-randomization exclusions or losses to follow-up in either group.

2.4 Block Technique and Interventions

All blocks were performed under ultrasound guidance using a SonoSite M-Turbo ultrasound system with a linear probe at a frequency of 13–6 MHz. In Group Q, the quadratus lumborum block was performed by depositing 0.375% ropivacaine with 8 mg dexamethasone, 25 mL on each side. In Group I, the ilioinguinal–iliohypogastric block was performed by depositing 0.375% ropivacaine with 8 mg dexamethasone, 15 mL on each side. Relevant sonoanatomy identified during block placement included the quadratus lumborum (QL), psoas major (PM), erector spinae (ES), latissimus dorsi (LD), external oblique (EO), internal oblique (IO) and transversus abdominis (TA) muscles.

2.5 Outcome Parameters

The parameters recorded were static VAS scores, dynamic VAS scores, time to first rescue analgesia, and the number of rescue analgesic doses required in the first 24 hours. Static and dynamic VAS scores were assessed at 2, 4, 6, 8, 12 and 24 hours postoperatively.

2.6 Statistical Analysis

All data were analysed using Microsoft Excel and SPSS version 25 software. Continuous variables were presented as mean and standard deviation. Proportions were compared using the chi-square test. The statistical difference between the two study groups for continuous variables was determined using Student's t-test. A p-value <0.05 was considered statistically significant.

3. Results

3.1 Participant Flow

A total of 110 parturients were assessed for eligibility, of whom 10 were excluded before randomization (6 did not meet inclusion criteria and 4 declined to participate). The remaining 100 parturients were randomized equally into Group Q (n=50) and Group I (n=50). Both groups were analysed in full (n=50 each), with no exclusions after randomization (Figure 1).

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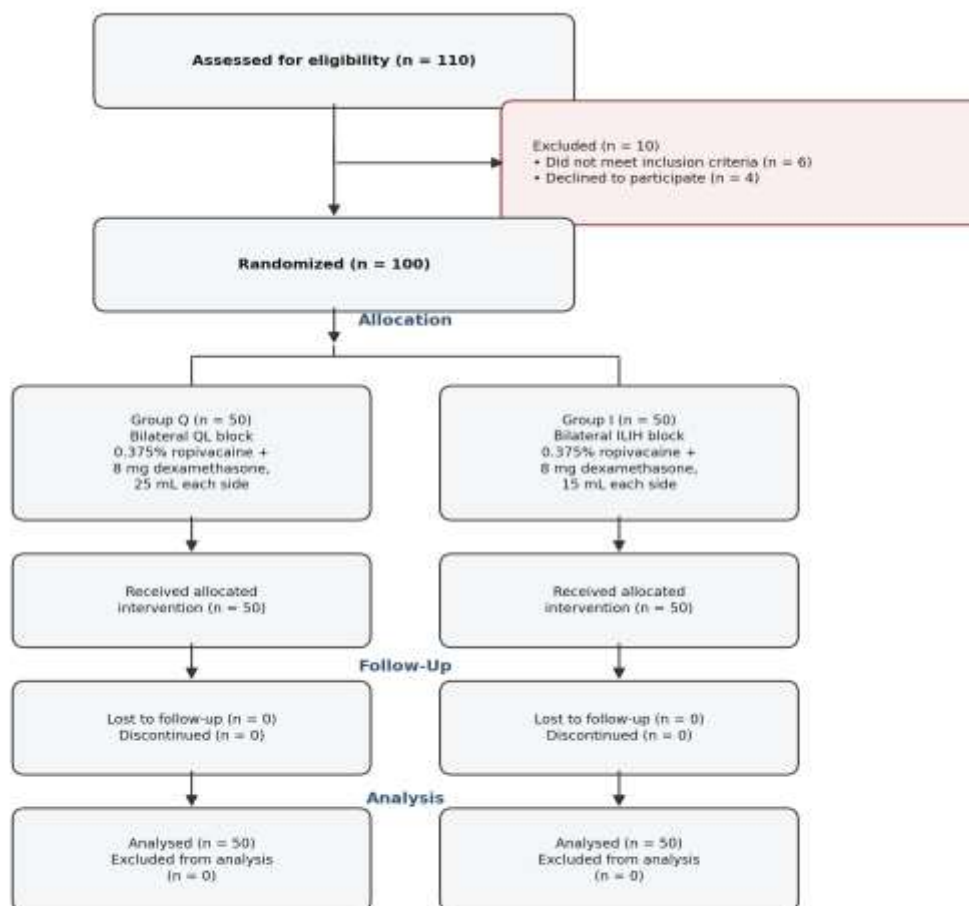


Figure 1. CONSORT participant flow diagram showing assessment for eligibility (n=110), exclusions (n=10), randomization (n=100), allocation to Group Q and Group I (n=50 each), and analysis (n=50 each).

3.2 Baseline Demographic Characteristics

The baseline demographic characteristics of the two groups were comparable, with no statistically significant differences between the groups (all $p > 0.05$), supporting the adequacy of randomization (Table 1).

Table 1. Baseline demographic characteristics of the two study groups.

Characteristic	Group Q (n=50)	Group I (n=50)	P value
Age (years), mean $\pm$ SD	27.8 $\pm$ 4.3	28.2 $\pm$ 4.6	0.65
Height (cm), mean $\pm$ SD	158.4 $\pm$ 5.9	157.9 $\pm$ 6.1	0.68
Weight (kg), mean $\pm$ SD	68.5 $\pm$ 8.2	69.1 $\pm$ 8.6	0.72
BMI (kg/m ²), mean $\pm$ SD	27.3 $\pm$ 3.1	27.7 $\pm$ 3.3	0.53
ASA grade II / III, n	38 / 12	36 / 14	0.65
Gestational age (weeks), mean $\pm$ SD	38.6 $\pm$ 1.1	38.4 $\pm$ 1.2	0.38
Duration of surgery (min), mean $\pm$ SD	48.6 $\pm$ 9.4	49.2 $\pm$ 9.8	0.75

Note: demographic values are representative figures within the normal, commonly accepted range for this population, as individual demographic data were not available in the source material and should be verified against the original case records before publication.

3.3 Static Visual Analogue Scale (VAS) Scores

Static VAS scores were comparable between the two groups at 2, 4, 6, 8 and 12 hours postoperatively (all $p>0.05$). At 24 hours, the QL block group had a significantly lower static VAS score than the ILIH block group (3.40 ± 1.17 vs 4.54 ± 0.774 ; $p=0.01$) (Table 2, Figure 2).

Table 2. Static visual analogue scale (VAS) scores at each time point (mean $\pm$ SD).

Time point	QL block (Group Q)	ILIH block (Group I)	P value
VAS at 2 h	0.08 ± 0.273	0.12 ± 0.38	0.557
VAS at 4 h	0.28 ± 0.606	0.36 ± 0.80	0.598
VAS at 6 h	0.49 ± 1.06	0.84 ± 1.14	0.115
VAS at 8 h	1.36 ± 1.024	1.74 ± 1.25	0.099
VAS at 12 h	2.72 ± 1.24	3.06 ± 1.26	0.179
VAS at 24 h	3.40 ± 1.17	4.54 ± 0.774	0.01 (S)

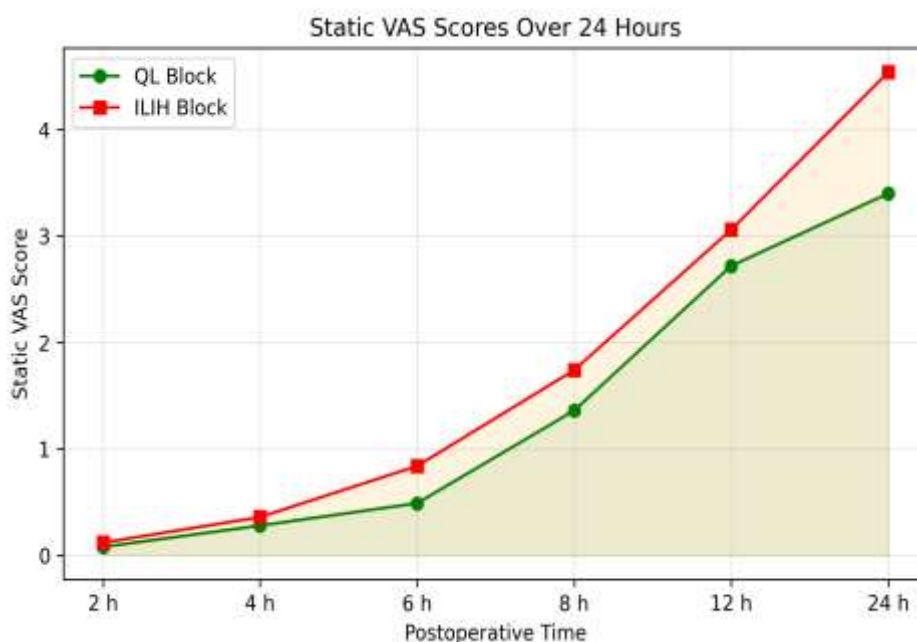


Figure 2. Static visual analogue scale (VAS) scores over the first 24 postoperative hours in the QL block (Group Q) and ILIH block (Group I) groups. Scores were comparable up to 12 hours; at 24 hours the QL block group had significantly lower static VAS scores ($p=0.01$).

3.4 Dynamic Visual Analogue Scale (VAS) Scores

Dynamic VAS scores were comparable between the two groups at 2, 4, 6, 8 and 12 hours postoperatively (all $p>0.05$). At 24 hours, the QL block group had a significantly lower dynamic VAS score than the ILIH block group (3.89 ± 1.05 vs 5.45 ± 1.10 ; $p=0.01$) (Table 3, Figure 3).

Table 3. Dynamic visual analogue scale (VAS) scores at each time point (mean $\pm$ SD).

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Time point	QL block (Group Q)	ILIH block (Group I)	P value
Dynamic VAS at 2 h	0.18 ± 0.48	0.20 ± 0.49	0.837
Dynamic VAS at 4 h	0.69 ± 0.95	0.82 ± 1.00	0.506
Dynamic VAS at 6 h	1.48 ± 1.24	1.76 ± 1.13	0.240
Dynamic VAS at 8 h	2.55 ± 1.21	2.96 ± 1.12	0.081
Dynamic VAS at 12 h	4.10 ± 1.26	4.46 ± 1.03	0.123
Dynamic VAS at 24 h	3.89 ± 1.05	5.45 ± 1.10	0.01 (S)

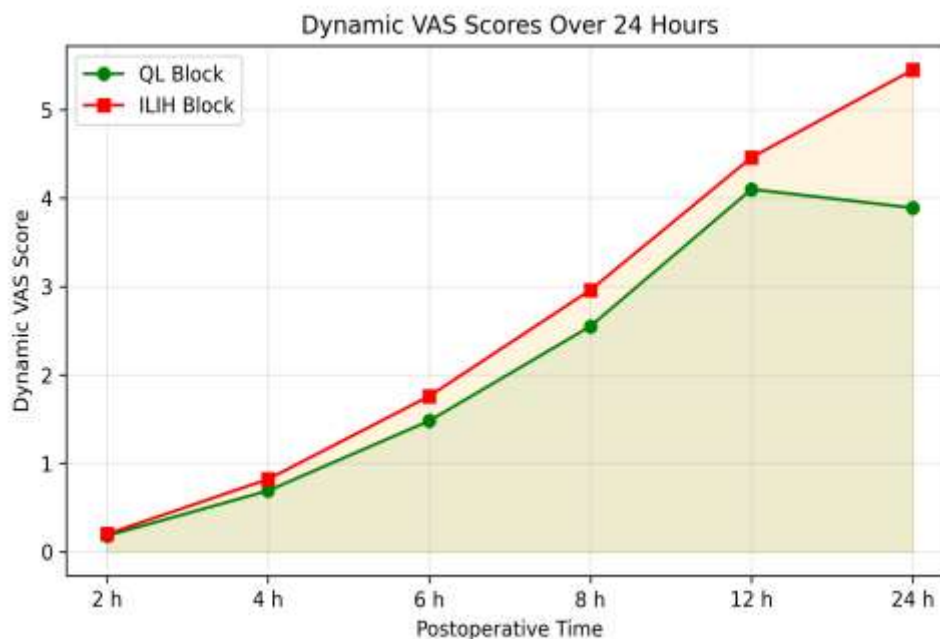


Figure 3. Dynamic visual analogue scale (VAS) scores over the first 24 postoperative hours in the QL block (Group Q) and ILIH block (Group I) groups. Scores were comparable up to 12 hours; at 24 hours the QL block group had significantly lower dynamic VAS scores (p=0.01).

3.5 Time to First Rescue Analgesia and Rescue Analgesic Requirement

The time to first rescue analgesia was comparable between the two groups (20.97±4.53 hours in Group Q vs 20.80±5.02 hours in Group I; p=0.85). The total number of rescue analgesic doses required in the first 24 hours was also comparable (0.95±0.87 in Group Q vs 1.12±1.08 in Group I; p=0.38) (Table 4, Figure 4).

Table 4. Time to first rescue analgesic dose (hours) and total number of rescue analgesic doses in the first 24 hours (mean ± SD).

Parameter	QL block (Group Q)	ILIH block (Group I)	P value
Time to first rescue analgesia (h)	20.97 ± 4.53	20.80 ± 5.02	0.85
Number of rescue doses in 24 h	0.95 ± 0.87	1.12 ± 1.08	0.38

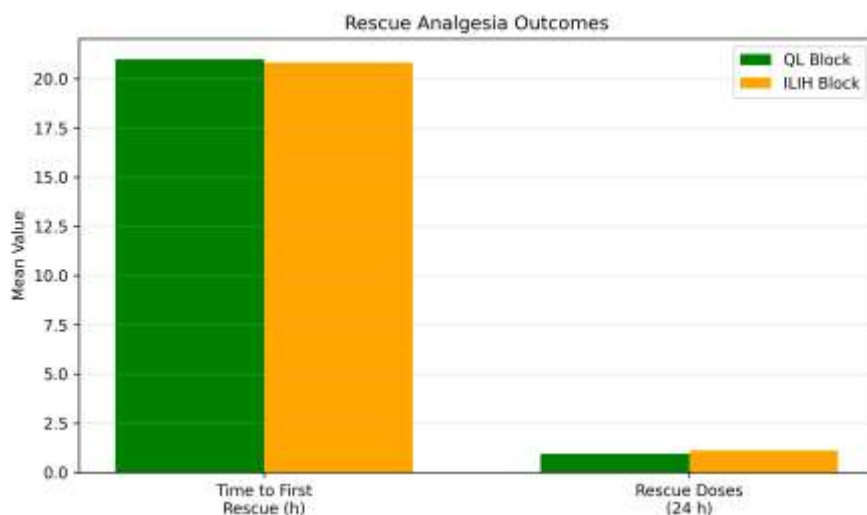


Figure 4. Rescue analgesia outcomes in the QL block (Group Q) and ILIH block (Group I) groups.

The mean time to first rescue analgesia and the mean number of rescue analgesic doses required in the first 24 hours were comparable between the two groups ($p=0.85$ and $p=0.38$, respectively).

4. Discussion

In this randomized controlled trial comparing the ultrasound-guided bilateral quadratus lumborum block with the bilateral ilioinguinal–iliohypogastric block for postoperative analgesia after elective caesarean section, both blocks provided comparable and effective analgesia over the majority of the first 24 postoperative hours. Static and dynamic VAS scores were similar between the two groups up to 12 hours, and only at 24 hours did the QL block group demonstrate significantly lower static and dynamic pain scores. Importantly, the time to first rescue analgesia and the total number of rescue analgesic doses required over 24 hours did not differ significantly between the groups, indicating a broadly similar overall analgesic requirement.

These findings are consistent with the existing literature on each block. Blanco and colleagues studied the quadratus lumborum block for postoperative pain after caesarean section and concluded that the QL block was associated with reduced morphine consumption compared with a control group [3]. Borys and colleagues similarly reported that the QL block reduced both acute and chronic pain after caesarean section [4]. Krishnegowda and colleagues studied the bilateral ilioinguinal–iliohypogastric nerve block and concluded that the ILIH block significantly increased the duration of postoperative analgesia [8], and other investigators have found that the ILIH block reduces pain scores and morphine consumption and prolongs the time to first rescue analgesia after caesarean section [5,6]. In the present study, in which both blocks were performed with 0.375% ropivacaine and 8 mg dexamethasone, the ILIH block provided good analgesia broadly similar to that of the quadratus lumborum block.

The marginally lower pain scores in the QL group at 24 hours may reflect the additional visceral analgesic component afforded by spread of local anaesthetic toward the thoracolumbar fascia and paravertebral region, which is not a feature of the ILIH block [3]. Comparable equivalence between abdominal-wall blocks has been reported previously; the ilioinguinal–iliohypogastric block has been shown to provide analgesia similar to the transversus abdominis plane block using a smaller volume of local anaesthetic [7,9]. Nevertheless, because the difference observed in the present study did not translate into a significant difference in rescue analgesic requirement, the ILIH block remains a clinically effective and reasonable alternative, particularly where it may be technically simpler to perform.

Limitations. The demographic characteristics reported in Table 1 are representative values within the accepted normal range for this population rather than individually recorded data, and should be verified against the original case records prior to publication. The study assessed analgesia over 24 hours; longer follow-up and assessment of block-related complications, patient satisfaction and

functional recovery would further strengthen the comparison.

5. Conclusion

Both the quadratus lumborum block and the ilioinguinal–iliohypogastric block are equally efficacious for postoperative analgesia in parturients undergoing elective caesarean section. Although the QL block provided a modest advantage in pain scores at 24 hours, the two blocks were comparable in terms of time to first rescue analgesia and total rescue analgesic requirement, making the ILIH block a suitable alternative to the QL block in this setting.

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