Open Access

Original Article

# Comparison of Analgesic Efficacy of Quadratus Lumborum Versus Transversus Abdominis Plane Block in Patients Undergoing Gynecologic Surgeries

**Naveed Ahmed Durani, Salman Ahmad Saleem, Rashid Iqbal*, Moazzam Ali*, Shmyla Hamid**, Tahseen Talib***

Department of Anesthesia, Shifa International Hospital, Islamabad Pakistan, *Department of Anesthesia, Combined Military Hospital, Rawalpindi/National University of Medical Sciences (NUMS) Pakistan, **Department of Anesthesia, Rawalpindi Medical University, Rawalpindi Pakistan

## ABSTRACT

***Objective:*** To determine the analgesic efficacy of quadratus lumborum block versus transversus abdominis plane block in patients undergoing gynecological surgeries.

***Study Design:*** Quasi-experimental study.

***Place and Duration of Study:*** Department of Anesthesia and Pain Medicine, Combined Military Hospital, Rawalpindi, Pakistan, from May – Oct 2021.

***Methodology:*** We included 60 patients undergoing gynecological surgeries under general anesthesia in our study. Patients given bilateral Transversus Abdominis Plane (TAP) block were allocated to Group T (n=30), while those given bilateral Quadratus Lumborum Block (QLB) were allocated Group Q (n=30). Pain score, using Numeric Rating Scale (NPS), was assessed at 1, 6, 18 and 24 hours after the procedure as a primary outcome while total tramadol consumption in milligrams was recorded as a secondary outcome.

***Results:*** In both groups, the mean pain score remained 7 or less over 24 hours. Mean pain score after 1 hour was 2.30±1.09 in Group T while it was 2.40±1.10 in Group Q and after 6 hours, it was recorded as 2.47±0.94 in Group T and 2.43±1.04 in Group Q. After 12 hours pain score was 2.97±1.25 in Group T and 2.83±1.37 in Group Q while at 24 hours, a mean pain score of 3.37±1.45 was noted in Group T and 3.20±1.42 in Group Q. Total mean Tramadol consumption in Group T was found to be 127.5±70.5 mg and 122.5±63.1 mg in Group Q.

***Conclusion:*** Both blocks were equally effective in the management of post-operative pain within the first 24 hours of gynecological surgery.

**Keywords:** Analgesia, Gynecological surgery, Numeric Rating scale, Quadratus lumborum block, Tramadol.

***How to Cite This Article:*** *Durani NA, Saleem SA, Iqbal R, Ali M, Hamid S, Talib T. Comparison of Analgesic Efficacy of Quadratus Lumborum Versus Transversus Abdominis Plane Block in Patients Undergoing Gynecologic Surgeries. Pak Armed Forces Med J 2025; 75(3): 436-439. DOI: https://doi.org/10.51253/pafmj.v75i3.7754*



## INTRODUCTION

Post-operative surgical pain is an important yet overlooked aspect in surgical patients and it is important that a safe, effective technique is employed which not only relieves post-surgery pain but also enhances patient satisfaction due to which multimodal pain management with regional blocks is the preferred mode of analgesia after various gynecological and obstetric procedures.[1] While opioids have often been prescribed for post-operative pain management, their usage is discouraged nowadays due to serious adverse effects such as gut ileus, nausea and vomiting,[2] as a result of which alternate methods to decrease postoperative pain and lessen opioid consumption ae required.[3] Transversus Abdominis Plane (TAP) block is a commonly employed regional fascial plane block used in abdominal surgeries for control of abdominal pain as it blocks the sensory afferents that run between the two inner abdominal wall muscles.[4] In contrast, Quadratus Lumborum Block (QLB) also effectively controlled post-operative pain after abdominal surgery, such as cesarean section,[5] where QLB has proven to provide adequate analgesia along with ease of performing procedure for all age groups,[6] due to which it is considered as an effective technique for satisfactory analgesia after different kinds of surgical procedures.[7] One study compared TAP block with QLB and noted that QLB was superior in terms of analgesic efficacy and post-operative opioid consumption.[8] Subsequently, regional blocks are gaining popularity for post-operative pain management with these two blocks being most commonly used nowadays as TAP block is relatively easy to perform while QLB seems more efficacious.[9] Unfortunately, local data regarding the comparison of these two blocks is lacking due to which this study was planned to compare the effectiveness of both procedures in our population to determine which is

**Correspondence: Dr Moazzam Ali,** Department of Anesthesia, Combined Military Hospital, Rawalpindi Pakistan

*Received: 02 Dec 2021; revision received: 09 Jan 2022; accepted: 10 Feb 2022*

better block for patients in terms of post-operative analgesia. Our study objective was to determine the analgesic efficacy of QLB versus TAP block in patients undergoing gynecological surgeries and to measure post-operative opioid requirement as a secondary outcome.

## METHODOLOGY

We conducted this study at the Department of Anesthesia and Pain Medicine, Combined Military Hospital (CMH), Rawalpindi, Pakistan, from May to October 2021. Permission was sought and granted from Ethics Review Board of our institution vide ERB certificate number 219/1/21. The sample size of 60 cases (30 per group) was calculated with 95% confidence level, 90% power of test, and taking mean pain score at 2 hours as 4.1±0.68 with TAP and 2.4±0.67 with QLB.8 We included 60 patients, using random sampling technique, and further divided them into two equal groups of 30 patients each. Informed consent was taken from every patient prior to the study. A predesigned proforma was used to record all patient responses.

**Inclusion Criteria:** Female patients between the ages of 30 to 60 years, with American Society of Anesthesiologist's (ASA) Status I and II, admitted for gynecological surgeries were included.

**Exclusion Criteria:** Patients with known allergies to local anesthetics or their constituents, bleeding disorders, morbid obesity with Body Mass Index (BMI) of more than 35 kg/m², chronic pain, drug addiction or previously diagnosed psychiatric issues were excluded.

In both groups, block was carried out after the completion of surgery when the patient was still under general anesthesia. Intraoperatively, all patients received analgesia of 0.1 mg/kg nalbuphine intravenously and 1000 mg 8 hourly paracetamol postoperatively for 24 hours. Group T received TAP block with the help of a linear high frequency ultrasound probe (MyLab One Esaote, Netherland) placed in the anterior axillary line at the level of umbilicus, in between the iliac crest and the costal margin, and needle was inserted with in plane technique and advanced under ultrasound guidance till the tip of the needle reached between the internal oblique and fascia transversalis after which a total of 25 mL of 0.25% plain bupivacaine was injected on both sides. Group Q received the same drug and dose, but the ultrasound transducer was placed at the level of the anterior superior iliac spine, moving cranially until the three abdominal wall muscles were clearly identified after which the needle was inserted in plane, from anterolateral to posteromedial, between the thoracolumbar fascia and the quadratus lumborum muscle where the drug was injected. All procedures were performed by a consultant physician in Pain Medicine. Numeric Rating Scale was applied for pain scoring, ranging from 0 to 10, with 0 indicating no pain and,[10] meaning worst pain imaginable. Pain score was recorded at 1, 6, 12 and 24 hours after surgery. If at any time after surgery, patient complained of moderate to severe pain (NRS≥4), intravenous Tramadol 25 mg was given with total of 300 mg in 24 hours. Total dose of Tramadol used in each patient over 24 hours was also recorded. Data analysis was done using Statistical Package for the Social Sciences (SPSS) version 26.0. Quantitative data was presented in the form of means and standard deviations while frequency and percentages were calculated for ASA status. Post-stratification independent sample t-test was used to compare means where a *p*-value of ≤0.05 was considered as significant.

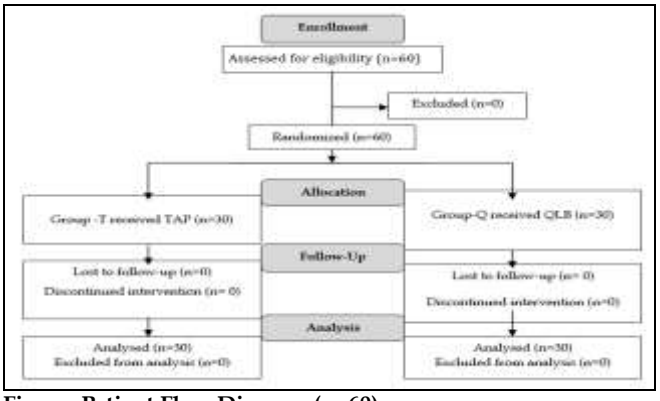


**Figure: Patient Flow Diagram (n=60)**

## RESULTS

We studied two outcomes in our study, which were pain scores and total opioid consumption. Among the total enrolled patients (n=60), the mean age in Group T (n=30) was 56.80±8.71 and 58.72±6.96 in Group Q (n=30). BMI was 32.72±3.21 kg/m² in Group T whereas it was 31.22±4.05 kg/m² in Group Q. A total of 9 patients of ASA I were in Group T while,[11] were in Group Q, however, more ASA II patients were in Group T (21) versus Group Q (19). Demographic data of our enrolled samples along with their ASA grades are presented in Table-I.

NRS pain scoring did not show significant difference between both groups over the period of 24

hours. At 1 hour after procedure, mean NRS in Group T was 2.30±1.09 and 2.40±1.10 in Group Q while after 6 hours, it was 2.47±0.94 in Group T versus 2.43±1.04 in Group Q. At 12 hours, it increased to 2.97±1.25 in Group T whereas it was 2.83±1.37 in Group Q but by 24 hours, pain score remained stable between both groups (Group T 3.37±1.45 versus Group Q: 3.20±1.42), as shown in Table-II.

**Table-I: Patient Characteristics, (n=60)**

| Parameter (Mean±SD) | Group TAP (n=30) | Group QLB (n=30) |
|---|---|---|
| Age (years) | 50.77±5.52 | 50.60±6.06 |
| BMI (kg/m²) | 30.75±2.42 | 30.85±2.23 |
| ASA | n (%) | n (%) |
| I | 9 (30) | 11(37) |
| II | 21(70) | 19(63) |

** ASA: American Society of Anesthesiologist, BMI: Body Mass Index*

**Table-II: Comparison of Pain Score Between Both Groups Over 24-hours, (n=60)**

| Numeric Rating Scale (Mean±SD) | Group TAP (n=30) | Group QLB (n=30) | *p*-value (≤0.05) |
|---|---|---|---|
| at 1 hour | 2.30±1.09 | 2.40±1.10 | 0.73 |
| at 6 hours | 2.47±0.94 | 2.43±1.04 | 0.89 |
| at 12 hours | 2.97±1.25 | 2.83±1.37 | 0.69 |
| at 24 hours | 3.37±1.45 | 3.20±1.42 | 0.65 |

Tramadol was administered to patients to keep their pain scores less than 4, at any time after the surgery which led to total mean tramadol consumption for Group T to be 127.5±70.5 mg whereas it was 122.5±63.1 mg in patients of Group Q, as illustrated by Table-III.

**Table-III: Total Tramadol Consumption Between Both Groups Over 24 Hours, (n=60)**

| | Group TAP (n=30) | Group QLB (n=30) |
|---|---|---|
| Tramadol (mg) | 127.5±70.5 | 122.5±63.1 |

## DISCUSSION

This study was performed to compare the analgesic efficacy of both blocks for control of post-operative pain, and both blocks proved to be effective in pain management with not much difference noted between the two groups in terms of Tramadol usage as well. While several methods of regional techniques are employed for pain management, commonly used ones are erector spinae plane block, TAP block, QLB and paravertebral blocks.[10-12] Our results were similar to a recently published systematic review and network meta-analysis of 31 trials which noted similar results for resting and active pain scores at 4-6 hours, 8-12 hours and 24 hours.[14] Another study, which enrolled 74 patients and recorded pain scores after regular intervals, found no significant differences in NRS between the two groups at rest or during movement.[15] Similar studies compared the effects these blocks in patients undergoing lower abdominal surgery, with no difference noted between both groups in terms of pain for the first 24 hours.[16,17] However, one study enrolled pediatric patients undergoing abdominal surgery and noted that TAP block had significantly high pain score when compared to QLB.[18] Furthermore, one study compared the efficacy of QLB and TAP blocks in patients while also comparing the blood levels of local anesthetics as a secondary outcome when both these techniques were used. Results showed that QLB had better analgesic efficacy with lower blood levels of local anesthetic as compared to TAP block.[19]Another study researched the effects of trans muscular QLB in pediatric patients undergoing pyelopasty and reported satisfactory post-operative pain control,[20] similar to a few other studies which also showed that QLB was superior to TAP in terms of pain management in surgical patients.[21,22]

## LIMITATIONS OF STUDY

The motor component of the QLB and dermatomal level of both blocks was not considered in our study. We also followed patients only for 24 hours which may have introduced a confounder in our results as pain can persist for longer among patients undergoing gynecological procedures. Additionally, ASA III or more were not included in our study. As this was a single center project, sample size was limited.

## CONCLUSION

Both QLB and TAP are equally effective in terms of analgesic efficacy for the first 24 hours in post-operative patients of gynecological surgery.

**Conflict of Interest: None.**

**Funding Source:** None.

**Authors' Contribution:**

Following authors have made substantial contributions to the manuscript as under:

NAD & SAS: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

RI & MA: Conception, data analysis, drafting the manuscript, approval of the final version to be published.

SH & TT: Data acquisition, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity

of any part of the work are appropriately investigated and resolved.

## REFERENCES


1. Elsharkawy H, El-Boghdadly K, Barrington M. Quadratus lumborum block: anatomical concepts, mechanisms, and techniques. Anesthesiology 2019; 130(2): 322-335. https://doi.org/10.1097/ALN.0000000000002554
2. Hussain N, Brull R, Weaver T. Postoperative analgesic effectiveness of quadratus lumborum block for cesarean delivery under spinal anesthesia: a systematic review and meta-analysis. Anesthesiology 2021; 134(1): 72-87. https://doi.org/10.1097/ALN.0000000000003557
3. Pirrera B, Alagna V, Lucchi A. Transversus abdominis plane (TAP) block versus thoracic epidural analgesia (TEA) in laparoscopic colon surgery in the ERAS program. Surg Endosc 2018; 32(1): 376-382. https://doi.org/10.1007/s00464-017-5685-8
4. Karnik PP, Dave NM, Shah HB. Comparison of ultrasound-guided transversus abdominis plane (TAP) block versus local infiltration during paediatric laparoscopic surgeries. Indian J Anaesth 2019; 63(5): 356-363. https://doi.org/10.4103/ija.IJA_51_19
5. Blanco R, Ansari T, Girgis E, et al. Quadratus lumborum block for postoperative pain after caesarean section: a randomised controlled trial. Eur J Anaesthesiol 2015; 32(11): 812-818. https://doi.org/10.1097/EJA.0000000000000329
6. Diwan S, Blanco R, Kulkarni M. The supine coronal midaxillary approach to anterior quadratus lumborum block: case report. Rev Bras Anestesiol 2020; 70(5): 443-447. https://doi.org/10.1016/j.bjane.2020.07.006
7. Blanco R, Ansari T, Riad W. Quadratus lumborum block versus transversus abdominis plane block for postoperative pain after cesarean delivery: a randomized controlled trial. Reg Anesth Pain Med 2016; 41(6): 757-762. https://doi.org/10.1097/AAP.0000000000000445
8. Yousef NK. Quadratus lumborum block versus transversus abdominis plane block in patients undergoing total abdominal hysterectomy: a randomized prospective controlled trial. Anesth Essays Res 2018; 12(3): 742-747. https://doi.org/10.4103/aer.AER_118_18
9. Støving K, Rothe C, Rosenstock CV. Cutaneous sensory block area, muscle-relaxing effect, and block duration of the transversus abdominis plane block: a randomized, blinded, and placebo-controlled study in healthy volunteers. Reg Anesth Pain Med 2015; 40(4): 355-362. https://doi.org/10.1097/AAP.0000000000000254
10. Weheba HE, Abdelsalam T, Ghareeb S. Posterior quadratus lumborum block versus subcostal transversus abdominis plane block in laparoscopic cholecystectomy. Int J Anesth 2019; 6:093.
11. Okur O, Karaduman D, Tekgul ZT. Posterior quadratus lumborum versus transversus abdominis plane block for inguinal hernia repair: a prospective randomized controlled study. Braz J Anesthesiol 2021; 71(4): 400-406. https://doi.org/10.1016/j.bjane.2021.02.010
12. Chen J, Chen C, Sun G. Quadratus lumborum block versus transversus abdominis plane block for postoperative analgesia in abdominal surgery: a systematic review and meta-analysis. BMC Anesthesiol 2020; 20(1): 53. https://doi.org/10.1186/s12871-020-00968-1
13. El-Boghdadly K, Desai N, Halpern S. Quadratus lumborum block vs. transversus abdominis plane block for caesarean delivery: a systematic review and network meta-analysis. Anaesthesia 2021; 76(3): 393-403. https://doi.org/10.1111/anae.15320
14. Deng W, Long X, Li M. Quadratus lumborum block versus transversus abdominis plane block for postoperative pain management after laparoscopic colorectal surgery: a randomized controlled trial. Medicine 2019; 98(52): e18448. https://doi.org/10.1097/MD.0000000000018448
15. Aoyama Y, Sakura S, Abe S. Analgesic effects and distribution of cutaneous sensory blockade of quadratus lumborum block type 2 and posterior transversus abdominis plane block: an observational comparative study. Korean J Anesthesiol 2020; 73(4): 326-333. https://doi.org/10.4097/kja.19436
16. Baytar C, Yılmaz C, Karasu D. Comparison of ultrasound-guided subcostal transversus abdominis plane block and quadratus lumborum block in laparoscopic cholecystectomy: a prospective, randomized, controlled clinical study. Pain Res Manag 2019; 2815301. https://doi.org/10.1155/2019/2815301
17. Öksüz G, Bilal B, Gürkan Y. Quadratus lumborum block versus transversus abdominis plane block in children undergoing low abdominal surgery: a randomized controlled trial. Reg Anesth Pain Med 2017; 42(5): 674-679. https://doi.org/10.1097/AAP.0000000000000653
18. Murouchi T, Iwasaki S, Yamakage M. Quadratus lumborum block: analgesic effects and chronological ropivacaine concentrations after laparoscopic surgery. Reg Anesth Pain Med 2016; 41(2): 146-150. https://doi.org/10.1097/AAP.0000000000000349
19. Baidya DK, Maitra S, Arora MK. Quadratus lumborum block: an effective method of perioperative analgesia in children undergoing pyeloplasty. J Clin Anesth 2015; 27(8): 694-696. https://doi.org/10.1016/j.jclinane.2015.05.003
20. Jin Z, Liu J, Li R. Single injection quadratus lumborum block for postoperative analgesia in adult surgical population: a systematic review and meta-analysis. J Clin Anesth 2020; 62: 109715. https://doi.org/10.1016/j.jclinane.2020.109715
21. Tan HS, Taylor C, Weikel D. Quadratus lumborum block for postoperative analgesia after cesarean delivery: a systematic review with meta-analysis and trial-sequential analysis. J Clin Anesth 2020; 67: 110003. https://doi.org/10.1016/j.jclinane.2020.110003
22. Elsafty OM, Awad HM, Ahmed MS. Ultrasound guided quadratus lumborum block versus transversus abdominis plane block in post-operative pain management after cesarean section. QJM 2021;114(Suppl 1): hca086-006.