Original Article

Comparison of the analgesic efficacy of two different fascial blocks in patients undergoing laparoscopic inguinal hernia surgery: A randomized control trial

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Abstract

Background and Aims: Moderate-to-severe intensity pain is reported on the first day following lower abdominal surgery. No study has compared transversus abdominis plane (TAP) block with retrolaminar block (RLB) in laparoscopic inguinal hernia surgery for postoperative pain relief.

Material and Methods: In this prospective, randomized trial, 42 *male* patients of American Society of Anesthesiologists (ASA) physical status I and II, aged 18–65 *years*, and having a BMI <40 kg/m^2 received TAP or RLB following laparoscopic inguinal hernia surgery. A standard general anesthetic technique was performed. Patients were randomized into two groups: single-shot TAP block (*group* I) (n = 21) or the RLB (*group* II) (n = 21) with bilateral 20 ml of 0.375% ropivacaine. Postoperatively, IV paracetamol 1 *g* was administered as rescue analgesia. Postoperative cumulative Visual Analogue Scale (VAS) score 24 hours after surgery was considered as the primary outcome.

Results: Postoperative cumulative VAS score at rest at 24 *h*, represented as mean ± S.D (95% CI), in the TAP block group was 3.54 ± 3.04 (2.16–4.93) and in the RLB group was 6.09 ± 4.83 (3.89–8.29). *P* value was 0.112 and VAS on movement was 7.95 ± 3.41 (6.39–9.50 [2.5–15.0]) in TAP block group, whereas *P* value was 0.110 and VAS on movement was 10.83 ± 5.51 (8.32–13.34) in the RLB group.

Conclusion: Similar postoperative cumulative pain score on movement at 24 *h* was present in patients receiving TAP block or RLB. However, VAS score at rest and on movement was reduced in patients receiving TAP block at 18 and 24 *h* postoperatively.

Keywords: Analgesia, hernia, inguinal, nerve blocks, pain intensity, ropivacaine, transversus abdominis, ultrasonography, visual analogue pain scale

Introduction

The prevalence of inguinal hernia repair surgery increases with age.[1] Approximately 39.4% of patients develop chronic pain after hernia repair.[2] Patients with chronic pain usually become socially withdrawn and undergo repeated hospital visits, leading to economic burden. Hence, chronic pain may result in a socioeconomic problem and increase the cost of health.[1] Laparoscopic hernioplasty with a totally extraperitoneal repair technically eliminates the hazard of intraoperative injuries.[3] Postoperative pain following inguinal hernia surgery is reported to be moderate to severe in intensity. Enhanced postoperative pain can lead to increased consumption of analgesics, reduced mobility, enhanced stress, hemodynamic instability, delayed recovery and reduced patient-reported satisfaction.[4-6]

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The most commonly used pharmacological agents used in perioperative care are acetaminophen, non-steroidal antiinflamatory drugs (NSAIDs) and opioids.[6] Preperitoneal or periportal infiltration of local anesthetic may cause local site infection and dilution of drug intraperitoneally.[7] Epidural analgesia, in spite of it being a well-established technique, is associated with adverse effects.[6]

Currently, ultrasound-guided regional anesthetic techniques and multimodal analgesia are used for management of postoperative pain. The transversus abdominis plane (TAP) block is the standard of care in abdominal surgeries. However, the efficacy of the retrolaminar block (RLB) in laparoscopic inguinal hernia repair has not yet been proven in a randomized clinical trial. RLB—a modification of the lamina approach to the paravertebral block—blocks the ventral rami, dorsal rami, lateral cutaneous branches, and other small branches of the intercostal nerves. The present study aimed to evaluate postoperative cumulative Visual Analogue Scale (VAS) score on movement during 24 h in patients receiving either ultrasound-guided TAP block or RLB following laparoscopic inguinal hernia surgery under general anesthesia (GA).

Material and Methods

We conducted the present randomized clinical study in the Department of Anaesthesia and Intensive Care in collaboration with the Department of Surgery of a tertiary care hospital. The study commenced and was registered with the Clinical Trials Registry of India. The sample size for the study was calculated based on the cumulative VAS score on movement at 24 h.

The pilot cases showed a mean cumulative VAS score difference on movement in-between the two groups as 2.5 (5.5 in patients receiving TAP block versus 8 in patients receiving RLB with a standard deviation (SD) of 2.6 at 24 h. The effect size was 0.961; using the formula $n\ (Z_{\alpha/2} + Z_{\beta})^2 *2*\sigma^2/d^2$, where $Z_{\alpha/2}$ represented critical value for normal distribution, σ represented population variance, d represented difference between two means, with a confidence interval of 95% and power of 80%, the sample size was 19 participants per group. To compensate for dropouts, 10% of cases were added and then the total sample size was 42 patients.

The inclusion criteria were patients who were 18–65 years of age, had an American Society of Anesthesiologists (ASA) physical status I and II, were of both genders, and had planned to undergo laparoscopic inguinal hernia surgery. Exclusion criteria were patients who had a BMI >40 kg/m^2, were suffering from coagulopathy, had an allergy to ropivacaine, acetaminophen, and diclofenac, had substance abuse disorder, were pregnant and lactating, were not able to understand VAS and in whom there was contraindication to GA or laparoscopic surgery. The patients were assessed a day prior to surgery, to evaluate fitness for surgery under GA. The required blood investigations, electrocardiography, and chest X-ray were done. The patients were explained about the VAS assessment for pain. A score of 0 stood for no pain and 10 meant worst imaginable pain. In the present study, the cumulative VAS meant additive VAS of all the time intervals (5, 10, 15 min and 1, 8, 12, 18, 24 h) at 24 h perioperatively. The VAS can be different at different time points and the cumulative VAS will be greater than 10. The preoperative advice for patients included nil per oral for eight hours for solids and two hours for clear liquids. All patients received po alprazolam 0.25 mg and pantoprazole 40 mg a night prior and two hours prior on the day of surgery.

In the operating room, baseline hemodynamics were recorded (Aespire view, Datex-Ohmeda, Madisin, USA) and IV 500 ml normal saline was infused prior to commencement of GA. The anesthesia technique included IV propofol 2–3 mg/kg, morphine 0.1 mg/kg, and vecuronium 0.1 mg/kg. After four minutes of mask ventilation, trachea was intubated. Maintenance of anesthesia included oxygen in nitrous oxide 40:60, inhalational agent sevoflurane 1%–2% and IV boluses of vecuronium 0.01 mg/kg. Hemodynamics were maintained within ± 20% of baseline. In the present study, the surgeon used tacker for mesh placement but in one case in both the groups, that surgeon used sutures where it was surgically difficult. At the end of the surgery, IV paracetamol 1 g, IV diclofenac 75 mg, and IV ondansetron 0.1 mg/kg were administered.

Group allocation, randomization, and patient blinding were ensured. Group allocation concealment was done using an opaque colored envelope that was opened at the end of the surgery before extubation. Computer-generated number tables were made by an anesthesiologst who was not a part of the research team for the study. All patients were randomized to either of the following groups:

Group I (n = 21) in which participants were administered bilateral single-shot TAP with 20 ml of 0.375% ropivacaine.

Group II (n = 21) in which participants were administered bilateral single-shot RLB with 20 ml of 0.375% ropivacaine.

Posterior approach of TAP block was performed under strict aseptic precaution, with the patient in the supine position, and with a 5–10-MHz ultrasound probe (Sonosite, Inc., Bothell, WA, USA), and the drug was placed between the fascial planes of internal oblique muscle and transversus abdominis

muscle posterior to the midaxillary line. After confirming the sonoanatomy, a 22-G needle was inserted in plane; after confirming that the tip of the needle was in the correct fascial plane with 5 ml normal saline, the study drug was injected. After confirmation with hydrolocation, bilateral TAP block was performed with 20 ml of 0.375% ropivacaine and sterile dressing was done.

RLB was performed at T10 level under strict aseptic precaution, with the patient in the lateral position, and with a 5–10-MHz ultrasound probe (Sonosite, Inc., Bothell, WA, USA) placed in the paramedian sagittal orientation. After confirming the sonoanatomy, a 22-G needle was inserted using the out-of-plane approach and in carina-to-caudal direction. The tip of the needle was placed between the lamina of T10 vertebrae and erector spinae muscles. The correct position of the needle tip was confirmed with 5 ml normal saline as hydrolocation. After confirmation, bilateral RLB was performed with 20 ml of 0.375% ropivacaine and sterile dressing was done.

After completion of surgery, the effect of the muscle relaxant was reversed with IV neostigmine 50 μg/kg and neostigmine 0.1 mg/kg, and the trachea was extubated. If any patient reported a VAS score more than or equal to 4, then IV paracetamol 1 g was administered as rescue analgesic during 24 h postoperatively. The patient and postoperative assessor was blinded to the group allocation. The anesthesiologist performing the block did not participate in postoperative patient assessment of VAS scoring. Hemodynamics, pain at rest and on movement, and time-to-first rescue analgesia were measured at baseline in the PACU at 5, 10, 15 min and at 1, 8, 12, 18, and 24 h after administration of the block. Total paracetamol consumption and patient satisfaction score were evaluated for 24 h following surgery. One month after surgery, patient satisfaction score and verbal numeric rating scale (VNRS) at rest and on movement were recorded in person or on phone.

Statistical analysis was performed using the IBS SPPS Statistics software version 22.0. Data was represented as mean and standard deviation (SD) or number and proportion (%) or median and interquartile range (IQR). Student's t test was used for weight, height, and BMI. For skewed data the Mann–Whitney *U* test was used. For categorical comparisons Chi-squared or Fisher's exact test was used, as appropriate. Wilcoxon's signed-rank test was used for time-related variable score. For repeated measure values analysis of variance (ANOVA) was used for multiple comparisons. This was followed by Dunnet *t*-test. All statistical test were two-sided based and *P* value of <0.05 was considered statistically significant.

Results

The first and last date of patient enrolment was on March 17, 2020, and November 29, 2021. During this period, we screened 46 patients; after excluding 4 patients, 42 were finally enrolled for the study [Figure 1]. The demographics are shown in Table 1. Postoperative cumulative VAS score at rest at 24 h, represented as mean ± S.D (95% CI) in Group I was 3.54 ± 3.04 (2.16–4.93) and in Group II was 6.09 ± 4.83 (3.89–8.29); *P* value was 0.112. VAS on movement was 7.95 ± 3.41 (6.39–9.50) in the TAP group as opposed to 10.83 ± 5.51 (8.32–13.34) in the RLB group; *P* value was 0.110 as shown in [Tables 2 and 3]. Values of cumulative VAS score at rest at 24 h represented as median (IQR [range]) was 3.00 (1.00–5.25 [0.0–10.0]) in the TAP group 4.50 (2.00–11.00 [0.0–2.00]) in the RLB group [Figure 2]. The cumulative VAS score at movement at 24 h represented as median (IQR [range]) was 8.00 (5.50–10.00 [2.50–15.00]) in the TAP group versus 10.50 (6.50–

Table 1: Demographics and secondary outcomes of patients receiving TAP block versus RLB in patients undergoing laparoscopic inguinal hernia surgery

Patients' characteristics	Group I (TAP block) (*n*=21)	Group II (RLB) (*n*=21)	*P*
Age (years)	49.8 (4.22)	41.2 (14.8)	0.06
Weight (kg)	69.1 (8.75)	70.9 (9.24)	0.53
Height (m)	1.74 (0.07)	1.73 (0.05)	0.73
BMI (kg/m^2)	22.8 (3.25)	23.5 (2.47)	0.47
Bilateral hernia	7.00 (33.3)	3.00 (14.2)	0.29
Unilateral hernia (right)	10.0 (47.6)	11.0 (52.4)	
Unilateral hernia (left)	4.00 (19.0)	7.00 (33.3)	
ASA I	13.0 (61.9)	14.0 (66.6)	0.75
ASA II	8.00 (38.1)	7.00 (33.3)	
Rescue analgesia at 18 h after block	0.00±0.00 (0.00–0.00 [0–0])	0.14±0.35 (−0.02–0.30 [0.0–1.0])	0.076
Patient satisfaction score 24 h after block	4.23±0.53 (3.99–4.48 [3.0–5.0])	4.04±0.86 (3.65–4.44 [2.0–5.0])	0.565
Patient satisfaction score at 1 month after block	4.38±0.59 (4.11–4.65 [3–5])	4.19±0.92 (3.77–4.61 [2–5])	0.691

Values are represented as mean (SD) or n (%). TAP: Transversus abdominis plane block, RLB: Retrolaminar block. P<0.05 was considered statistically significant

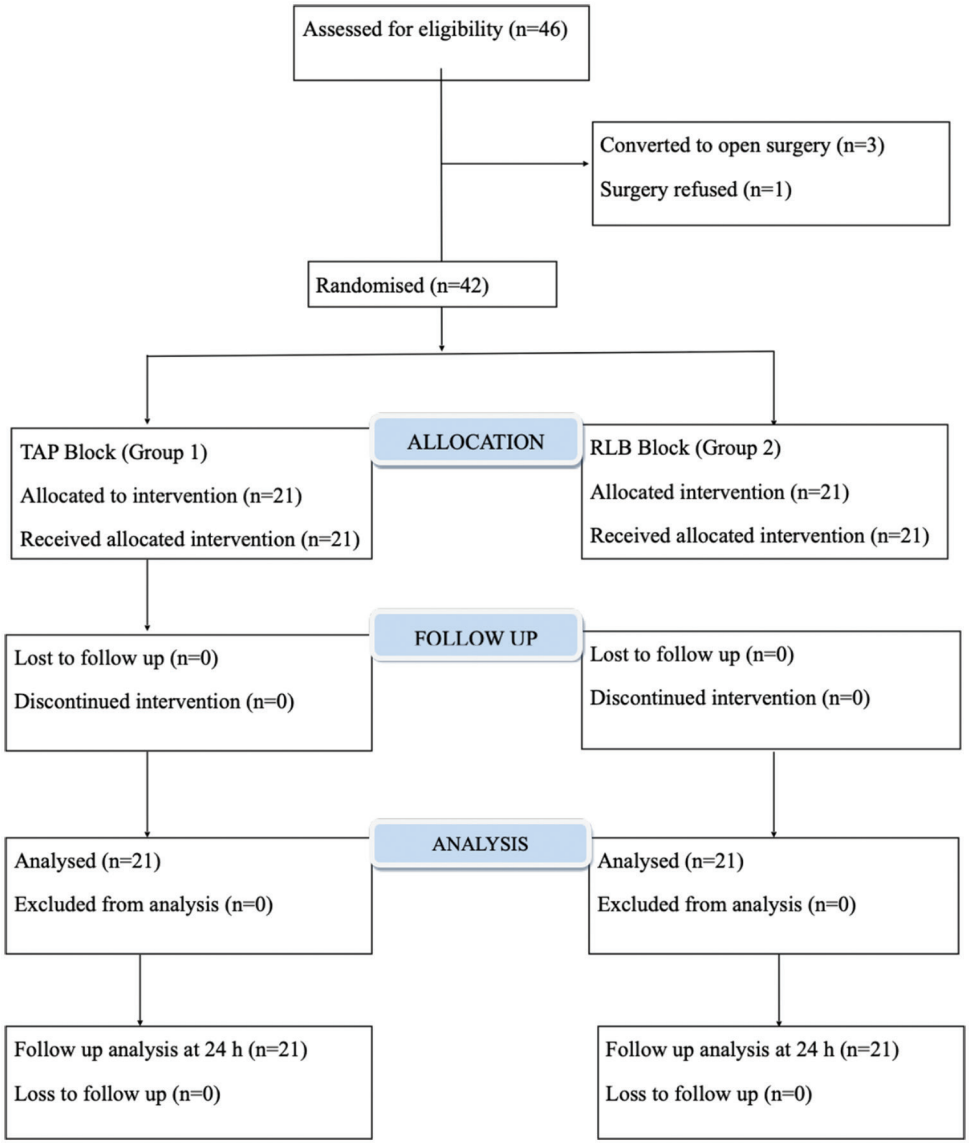

Figure 1: CONSORT chart

Table 2: Postoperative comparison of VAS scores at rest in patients of Group I versus Group II in patients undergoing laparoscopic inguinal hernia surgery

Time interval	Group I (TAP block) (*n*=21)	Group II (RLB) (*n*=21)	*P*
Baseline before block	0.00 (0.00) (0.00–0.00 [0–0])	0.00 (0.00) [0.00–0.00 (0–0)]	1.000
5 min after block	0.00 (0.00) (0.00–0.00 [0–0])	0.00 (0.00) (0.00–0.00 [0–0])	1.000
10 min after block	0.00 (0.00) (0.00–0.00 [0–0])	0.00 (0.00) (0.00–0.00 [0–0])	1.000
15 min after block	0.00 (0.00) (0.00–0.00 [0–0])	0.00 (0.00) (0.00–0.00 [0–0])	1.000
1 h after block	0.73 (0.91) (0.32–1.15 [0.0–2.0])	1.26 (1.88) (0.40–2.12 [0.0–8.0])	0.421
8 h after block	0.88 (1.10) (0.37–1.38 [0.0–3.5])	1.33 (1.45) (0.31–0.67 [0.0–4.0])	0.333
12 h after block	1.00 (1.00) (0.54–1.45 [0.0–3.0])	1.33 (1.30) (0.73–1.92 [0.0–4.0])	0.480
18 h after block	0.57 (1.02) (0.10–1.03 [0.0–4.0])	1.35 (1.25) (0.78–1.92 [0.0–4.0])	0.011*
24 h after block	0.38 (0.58) (0.11–0.64 [0.0–2.0])	0.85 (0.85) (0.46–1.24 [0.0–3.0])	0.047*
Cumulative at 24 h	3.54 (3.04) [2.16–4.93 (0.0–10.0)]	6.09 (4.83) [3.89–8.29 (0.0–14.0)]	0.112
1 month after block	0.19 (0.67) [−0.11–0.50 (0.0–3.0)]	0.33 (0.91) [−0.08–0.74 (0.0–4.0)]	0.396

*Values are represented as mean (SD) (95% CI [range]). TAP: Transversus abdominis plane block, RLB: Retrolaminar block. *P<0.05 was considered as statistically significant. Mann–Whitney U test was used for calculation of VAS scores*

Table 3: Postoperative comparison of VAS at movement in patients of Group I versus Group II in patients undergoing laparoscopic inguinal hernia surgery

Time interval	Group I (TAP block) (*n*=21)	Group II (RLB) (*n*=21)	*P*
Baseline before block	0.00 (0.00) (0.00–0.00 [0–0])	0.00 (0.00) (0.00–0.00 [0–0])	1.000
5 min after block	0.00 (0.00) (0.00–0.00 [0–0])	0.00 (0.00) (0.00–0.00 [0–0])	1.000
10 min after block	0.00 (0.00) (0.00–0.00 [0–0])	0.00 (0.00) (0.00–0.00 [0–0])	1.000
15 min after block	0.04 (0.21) (−0.05–0.14 [0.0–1.0])	0.00 (0.00) (0.00–0.00 [0–0])	0.317
1 h after block	1.38 (1.24) (0.81–1.94 [0.0–3.0])	2.11 (2.19) (1.11–3.10 [0.0–9.0])	0.385
8 h after block	1.81 (1.24) (1.24–2.37 [0.0–4.0])	2.28 (1.60) (1.55–3.01 [0.0–5.0])	0.432
12 h after block	1.92 (1.16) (1.39–2.45 [0.0–4.0])	2.07 (1.46) (1.40–2.74 [0.0–5.0])	0.877
18 h after block	1.45 (0.87) (1.05–1.85 [0.0–3.0])	2.42 (1.37) (1.80–3.05 [0.0–5.0])	0.010*
24 h after block	1.33 (0.69) (1.01–1.65 [0.5–3.0])	1.92 (1.09) (1.42–2.42 [0.0–4.0])	0.046*
Cumulative at 24 h	7.95 (3.41) (6.39–9.50 [2.50–15.0])	10.83 (5.51) (8.32–13.34 [3.0–20.0])	0.110
1 month after block	0.35 (0.96) (0.08–0.79 [0.00–4.0])	0.59 (1.20) (0.04–1.14 [0.0–5.0])	0.305

*Values are represented as mean (SD) (95% CI [range]). TAP: Transversus abdominis plane block, RLB: Retrolaminar block. *P<0.05 was considered statistically significant. Mann–Whitney U test was used for calculation of VAS scores*

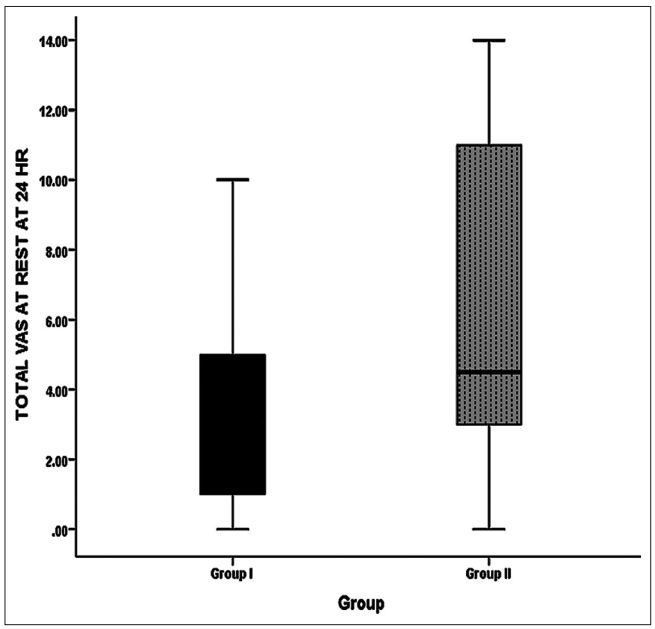

Figure 2: Postoperative comparison of total VAS at rest at 24 h in Group I patients (■ TAP Block) versus Group II patients (■ RLB) undergoing laparoscopic inguinal hernia surgery. Values are represented as box and whisker plot. The horizontal line is median, main box as inter quartile range and the longitudinal lines are range

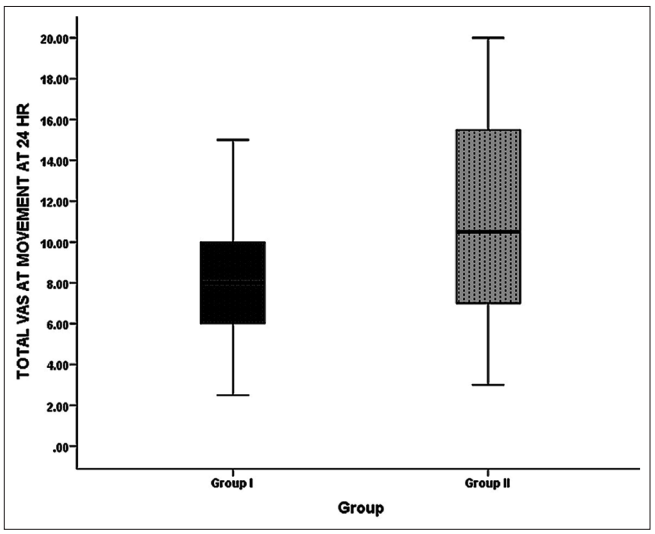

Figure 3: Postoperative comparison of total VAS at movement at 24 h in Group I patients (■ TAP block) versus Group II patients (■ RLB) undergoing laparoscopic inguinal hernia surgery. Values are represented as box and whisker plot. The horizontal line is median, main box is the inter quartile range, and the longitudinal lines are range

15.75 [3.00–20.00]) in the RLB group [Figure 3]. However, postoperative VAS score at rest were lower in patients receiving TAP block represented as mean ± S.D [95% C.I (range)] at 18 h {0.57 ± 1.02 [0.10-1.03 (0.0 -4.0)] vs 1.35 ± 1.25 [0.78-1.92 (0.0 -4.0)]} in RLB group; *P* value = 0.011. The postoperative VAS score on rest at 24 h was {0.38 ± 0.58[0.11 -0.64 (0.0 -2.0)] in TAP block vs 0.85 ± 0.85[0.46-1.24 (0.0 -3.0)]} in RLB group, *P* value = 0.047. Postoperative VAS score on movement was lower in patients receiving TAP block in comparison to RLB, represented as mean ± S.D [95% C.I (range) at 18 h {1.45 ± 0.87 [1.05-1.85 (0.0-3.0)] vs 2.42 ± 1.37 [1.80-3.05 (0.0-5.0)]} in RLB group, *P* value = 0.010. The postoperative VAS score on movement at 24 h in TAP group was {1.33 ± 0.69 [1.01-1.65 (0.5-3.0)] vs 1.92 ± 1.09 [1.42-2.42 (0.0-4.0)]} in RLB group, *P* value = 0.046 as shown in Tables 2-3. One patient in Group I and two patients in Group II required rescue analgesic, as shown in Table 1. Perioperative hemodynamics remained stable in patients of both the groups during the entire period. Patient satisfaction score was reported to be comparable at 24 h and at 1 month, postoperatively, as shown in Table 1. No serious adverse effects were reported in any patient.

Discussion

The present clinical trial demonstrated similar postoperative cumulative pain score on movement at 24 h in patients receiving TAP block or RLB. VAS at rest and on movement at 18

and 24 h were lower in patients receiving ultrasound-guided TAP versus RLB in patients following laparoscopic inguinal surgery under GA. The applications of transversus abdominis plane (TAP) block ranged from enhancing postoperative pain relief during abdominal surgeries including bowel resections, appendectomies, laparoscopic cholecystectomies and inguinal hernia surgeries.[8-10] RLB is a recent block and has been used in breast surgery, multiple rib fractures, and lumbar surgery.[11-13] There have been randomized control trials[8-10] in which TAP block was used as postoperative pain relief in laparoscopic surgeries. But, there have been only a few case reports[11,12] and one randomized control trial[14] in published literature regarding the use of RLB in postoperative analgesia. The novelty of the our study is that the use of ultrasound-guided RLB versus TAP block in laparoscopic inguinal hernia repair has not been evaluated as a randomized control trial.

The inguinal region is supplied by branches of anterior rami of L1, which includes the genitofemoral nerve, ilioinguinal nerve, and iliohypogastric nerve. The posterior TAP block, blocks T9–T12 segmental thoracolumbar nerves, causing the blockade of anterior and lateral cutaneous branches which provides analgesia to the anterior abdominal wall in the periumbilical region, the infra-umbilical region, and the lateral abdominal wall.[15] The spread of solution during posterior TAP block is around the posterior aspect of the quadratus lumborum muscle to the paravertebral space of T5 to L1 level. It is recommended to target L1 branches specifically. TAP block blocks somatic pain and produces an analgesic affect.[16-18] This probably causes superior analgesia as compared to RLB.

On the contrary RLB, which is a modification of the lamina approach to paravertebral block, blocks the ventral rami, dorsal rami, lateral cutaneous branches, and other small branches of the intercostal nerves.[19] The proposed drug spreads between laminae and deep paraspinal muscles. The level of local anesthesia corresponds with the spreads below the superior costotransverse ligament that bathe the dorsal rami of the spinal nerves at that vertebral level. The RLB blocks sensation to the paraspinal muscles, facet joints, and soft tissue. Local anesthetic penetrates through the medial aperture of the superior costotransverse ligament, from where the dorsal ramus of the spinal nerve exits posteriorly to supply paraspinal muscles and anteriorly from loose tissues lateral to facet joints.[20] We probably found similar results for the cumulative VAS at 24 h in laparoscopic inguinal surgery, which involves somatic components and not much of the visceral components. Our study was an equivalence trial in which the sample size was calculated using cumulative VAS score at 24 h and we found similar postoperative cumulative VAS scores in both the TAP and RLB groups. However, it was observed that at 18 and 24 h, the TAP group had lower VAS score compared to the RLB group. The present study was not powered to assess the VAS score at these intervals. Thus, in future, more studies are required to assess the VAS score at different time points. Also, the spread of drug in RLB is not clearly defined in literature at lumbar vertebral levels. We postulate that RLB may not have anesthetized the anterior rami of L1, making RLB less effective.

The spread of local anesthesia in interfascial spaces is volume-dependent. A higher injectate volume of approximately 30 ml in other studies resulted in the spread of the drug from the retrolaminar to the Paravertebral space and to the anterior aspect of the vertebral body[21,22] Use of mixture of 19 ml bupivacaine 0.5% and 1ml of methylene blue 1% in cadavers in RLB at T4 showed spread posteriorly below the paraspinal muscle, with a lateral spread of 2.5 cm, cephalad spread of 3.5 cm and a caudal spread of 10.7 cm away from the retrolaminar space.[21] On the contrary, in low volume group in other studies, a 10 ml of the solution resulted in placement between lamina of the vertebrae and paraspinal muscles. The solution did not percolate into paravertebral space. No spread of injectate was observed in epidural space or contralateral PV space.[22] Liu *et al*.[23] conducted a randomized control study in adult patients undergoing retroperitoneal laparoscopic nephrectomy and performed ultrasound-guided RLB for postoperative pain relief. The authors at each laminar level used 10 ml of 0.4% ropivacaine ranging from the T8 to T10 level. The authors concluded that the VAS score of patients with RLB 24 h after surgery was lower than that in patients given local infiltration analgesia.

Ultrasound-guided TAP block has been demonstrated to be effective in patients undergoing TEP. Kim *et al*.[18] used lateral/midaxillary approach with 15 ml of 0.375% ropivacaine bilaterally after induction of anesthesia. The authors reported a significant difference in pain at 20 min, 4 h, and 8 h, postoperatively. The authors did not compare cumulative Numerical Rating Scale at rest and movement after 24 h. The authors at 24 h postoperatively reported NRS value at rest as 1.30 ± 1.00 and on coughing as 3.30 ± 1.50 in patients receiving TAP block. However, in the our study, the VAS score at rest after 24 h in the TAP group was 0.38 ± 0.58 and the same score at movement was 1.33 ± 0.69. We observed lower VAS score in our study when compared to that in the study by Kim *et al*.[18] This is because, in the present study, 20 ml of Local A nesthesia was used bilaterally which could have resulted in spread of the drug to the paraspinal region using the posterior TAP approach. Sivapurapu *et al*.,[24] in patients undergoing laparoscopic (TEP) unilateral inguinal hernia surgery, performed ultrasound-guided TAP block

using lateral/midaxillary approach with 0.3–2 ml/kg of 0.25% levobupivacaine on each side after GA. The authors found that at 24 h with ultrasound-guided TAP block, the NRS (median [IQR]) was significantly lower at rest 2 (2), which was similar to the present study 0.00 (0.00–1.00).[24]

There were several limitations in the present study: First, only ASA I and II patients were enrolled in the study. The efficacy of these blocks needs to be studied in higher ASA grades. Secondly, use of an additive might have prolonged the duration of the analgesia. Thirdly, pain intensity at rest and on movement varies from individual to individual. However, preoperatively, patient's baseline pain, depression, and previous sensitization can be evaluated in future studies.

Conclusion

The present study found similar postoperative cumulative pain scores on movement after 24 h in patients receiving TAP block or RLB. However, VAS score at rest and on movement was reduced at 18 and 24 h, postoperatively, in patients receiving TAP block when compared to those receiving RLB following laparoscopic inguinal hernia surgery.

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Conflicts of interest

There are no conflicts of interest.

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