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Original Research Article

A comparative evaluation of ultrasound guided dual transversus abdominis plane block versus erector spinae plane block for postoperative analgesia in patients undergoing laparoscopic cholecystectomy: A randomised prospective study

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ABSTRACT

Background: Effective pain control after laparoscopic cholecystectomy (LC) is crucial for early patient mobilization, facilitating a speedy recovery and avoiding several complications. Ultrasound (USG) guided bilateral dual transversus abdominis plane block (DTAPB) and erector spinae plane block (ESPB) are effective for providing postoperative pain relief after LC.
Setting and Design: A prospective randomised, study comprising of 100 patients posted for elective LC.
Aim: To compare the effectiveness of USG-guided DTAPB and ESPB for providing postoperative pain relief in patients undergoing LC.
Material and Methods: A total of 100 patients aged 18-70 years, were included in the study and divided into two groups of 50 patients each. Group DTAPB received bilateral DTAPB and group ESPB received bilateral ESPB, using 50 ml of 0.25% ropivacaine with 8 mgs of dexamethasone. Post operative visual analogue score (VAS) score, time to first analgesia request, total number of analgesic doses required in 24 hours (hrs) and complications if any were noted.
Result: VAS score was higher in DTAPB group than ESPB group at 1,2,6,8 and 14 hrs. In DTAPB group patients requested analgesia after an average of 8 ±2.0 hrs, whereas in ESPB group they requested after 12 ± 3.16 hrs. In ESPB group 45 patients needed single analgesic dose and only 5 needed second analgesic doses. However, in DTAPB group 35 patients received single and 15 patients received second analgesic dose. Side effects were comparable in both the groups.
Conclusion: USG-guided bilateral ESPB with 50 ml of 0.25% ropivacaine plus dexamethasone is an effective approach in reducing postoperative pain following LC.

1. Introduction

Laparoscopic cholecystectomy (LC), often considered the preferred method for addressing symptomatic gallbladder conditions like cholecystitis and cholelithiasis and is the most frequently performed minimally invasive surgical procedure. Nevertheless, it can lead to significant postoperative discomfort, which is partly attributed to the segmental innervation of nociceptor pathways along the trans abdominal fascial plane.[1,2] Pain following LC can manifest through various components. This may include discomfort originating from the incisional trocar site (somatic pain), local visceral pain (deep abdominal pain), parietal pain, and referred visceral pain.[3]

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Effective postoperative pain control is crucial for promoting early patient mobilization and facilitating a speedy recovery. Inadequate postoperative pain management can result in various complications, including circulatory, pulmonary, urinary dysfunction, as well as disturbances in psychological and emotional well-being.

Postoperative pain relief can be managed by various therapeutic modalities including systemic opioids and non opioid analgesics, local anaesthetics (LA) infiltration at port sites and various plane blocks like transversus abdominis plane (TAP) block, dual transversus abdominis plane block (DTAPB) and newer emerging erector spinae plane block (ESPB). However, opioids can lead to nausea, vomiting and itching while NSAIDS effects the gastric, hepatic and renal systems. On the contrary peripheral nerve blocks seems to lack systemic side effects.

In 2011, Borglum and colleagues introduced the innovative bilateral DTAPB, employing a comprehensive four-point approach.[4] This technique combines bilateral subcostal and posterior TAP blocks across all four quadrants of abdomen. This method is applicable to both open and laparoscopic surgeries, as it effectively targets analgesia for the entire anterior abdominal wall.[5] The utilization of ultrasound (USG)-guided DTAPB appears to hold promise in diminishing postoperative pain scores and reducing opioid consumption. This reduction is achieved within the initial 24 hours (hrs) after the LC. DTAPB effectively alleviates postoperative pain associated with abdominal surgery by inhibiting sensory nerves in the anterolateral abdominal wall, spanning from levels T6 to L1.[6]

ESPB is an innovative interfacial plane block method initially introduced by Forero M et al.[7] This technique specifically targets the ventral rami, dorsal rami and rami communicantes of the spinal nerves. It has been shown that following the administration of this block, the local anesthetic extends both cranially and caudally, covering multiple dermatomes and provides good pain relief.[7] The ESPB has found applications in postoperative pain management for a range of surgeries of shoulder and hip regions.[8,9] However, there is limited research available demonstrating its effectiveness as an analgesic method following abdominal surgeries.[10,11]

To the best of our knowledge there is hardly any study comparing the effectiveness of bilateral ESPB and DTAPB for post-operative analgesia following LC. So we decided to compare the USG-guided bilateral DTAPB and ESPB, to determine the intensity of pain using visual analogue scale (VAS) score and duration of pain, time to first analgesic request and total analgesic consumption in 24 hours and complication or side effect.

2. Materials and Methods

Present study was a prospective, randomized study carried out after the approval from institutional ethical committee (IEC/GMCK/112), in the department of anesthesiology and surgery. The study period was approximately one year. Each participant provided their signed consent before their enrollment in this study.

Patient allocation into two groups was carried out through a random process by generating a random table. This table was prepared by a researcher who was not a part of this study. The operation room anesthesiologist selected the sealed envelope corresponding to each randomized patient from a folder, revealing the assigned block. A sample size of 100 was decided in consultation with statistician using the formula mentioned below. After considering data from the previous studies,[10,12] we revealed that at least 45 patients were needed in each group for the detection of 35% variation in VAS score in first 24 hrs post-operatively with the power of 0.1 and a significance level of 80% (α =0.05, β= 0.84). Considering the 10% of dropout rate in clinical studies, we included 50 patients in each group. In the present study, the sample size for each group was calculated using the following formula:

$$n = \left(\frac{Z_{\alpha/2}+Z_{\beta}}{d/\sigma}\right)^2$$

Where,

1. n is the sample size per group
2. $Z_{\alpha/2}$ is the Z value corresponding to the chosen significance level (for $\alpha = 0.05$, $Z_{\alpha/2}\approx 1.96$
3. $Z_{\beta}$is the Z value corresponding to the chosen power (for 80% power, $Z_{\beta}\approx\approx 0.84$)
4. d is the effect size (difference in means between the two groups)
5. σ is the standard deviation

A total of 100 patients, aged 18 to 70 years, of both sexes, possessing an American Society of Anaesthesiologists (ASA) physical status of I and II, having gall bladder illness planned for elective LC were included in the study. Patients with ASA physical status of III and IV, those with coagulopathy, bleeding disorder, known allergy to study drug, infection at the site of the block, advanced hepatic /renal failure. BMI >35kg/m^2, patients in whom surgery was converted to open cholecystectomy and patients of chronic opioid consumption were excluded from the study.

2.1. Anaesthesia technique

In the operating room, all non invasive ASA standard monitors (pulse oximeter, NIBP, ECG, capnography) were used. Intravenous (iv) line was secured with 20 G cannula for iv fluid administration. The same anesthestic method was carried out on all the subjects. All the subjects were induced with iv injection of propofol 2 mg/kg, fentanyl 2μg/kg and atracurium 0.5 mg/kg, to facilitate endotracheal intubation with adequate size cuffed endotracheal tube. Ventilation was sustained with a tidal volume of 6-8 ml/kg and a respiratory rate of 12-14 breaths per minute. End-tidal

carbon dioxide ($ETCO_2$) was maintained within the range of 30-35 mmHg, with positive end-expiratory pressure (PEEP) set at 3-5 cm H_2O. Anaesthesia was maintained with inj. atracurium, isoflurane along with a gas mixture consisting of oxygen and nitrous oxide. After intubation the participants were assigned to any of the two groups with 50 patients each i.e Group DTAPB –receiving USG - guided bilateral DTAPB with inj. Ropivacaine .25%, 48 ml (120 mgs) plus inj. dexamethasone 2 ml (8 mgs), making total of 50 ml. Group ESPB- receiving USG-guided bilateral ESPB with inj. Ropivacaine .25%, 48 ml (120 mgs) plus inj.dexamethasone 2ml (8 mgs), making total of 50 ml.

In DTAPB group, after intubation patients were placed in the supine position. The anesthesiologist positioned the ultrasound probe (linear multi-frequency 6-13 MHz transducer, SONOSITE M-TURBO, USA) obliquely on the upper abdominal wall, near the subcostal margin close to the xiphisternum at the midline of the abdomen. Landmarks, such as the rectus abdominis muscle and the underlying transverse abdominis muscle, were pinpointed in proximity to the costal margin and xiphoid. Subsequently, the probe was shifted laterally until the aponeurosis of the abdominis muscles became visible, and further lateral movement allowed identification of the transverse abdominis muscle. The anesthesiologist directed the needle toward the transverse abdominis fascia and injected 10ml of 0.25% ropivacaine with dexamethasone on each subcostal side, total of 20 ml.

To perform the posterior TAP block, the anaesthesiologist carefully adjusted the position of the ultrasound probe, placing it in a posterolateral position along the iliac crest and the costal border at the mid-axillary line of the abdominal wall. Using aseptic techniques, an 80 mm 21G spinal needle was inserted in-plane at an angle of 30-40 degrees, moving from the medial to lateral direction. The precise needle tip location was verified through hydrodissection with 2-3 ml of isotonic saline before the anesthesiologist administered a 15 ml of 0.25% ropivacaine with dexamethasone within the fascial plane on both sides, total of 30 ml.

In ESPB group after intubation, patients were placed in a lateral decubitus position. The anesthesiologist positioned the ultrasound probe longitudinally at the level of the T7 spinous process. Thereafter, the anaesthesiologist moved the probe to 3cm laterally from the midline. Ultrasonic landmarks were identified, including the T7 transverse process and the erector spinae muscle overlaying it. To reach the T7 transverse process, a 21G (80mm) block needle was inserted at 30-40 degrees angle from cranial to caudal within same plane. After hydrodissection with 2-3 ml of isotonic saline solution, we confirm the needle's correct position, and the anaesthesiologist administered 25 ml injection of 0.25% ropivacaine with dexamethasone bilaterally on each side.

3mg kg^{-1} is the maximum recommended dose of ropivacaine.[13] Total dose of ropivacaine used in this study is 120 mgs, which is quite less than the maximum recommended dose for the average weight of our study participants.

Fifteen minutes following the administration of the block, the surgical procedure commenced. Injection neostigmine 0.05mg/kg and glycopyrrolate 0.01mg/kg were administered to reverse the patient.

After the patient had completely regained consciousness with stable vital signs, they were transferred to a postoperative care facility where they received appropriate postoperative care and continuous hemodynamic monitoring. Our main aim was to measure VAS score during 24 h postoperative. The secondary outcomes were hemodynamics, first analgesic requests, total analgesic doses in 24 h postoperative, and complications if any.

Postoperative pain levels were assessed in both the groups using VAS, which was explained in details to every patient preoperatively. This scale indicates the intensity of the pain suffered by each patient, and is described in a whole number. VAS gives a pain score in a numerical value ranging from 0 (no pain) to 10 (severe pain). In cases where the VAS score exceeded 4, patients were administered inj. Tramadol (2mg/kg) as rescue analgesia. These scores were recorded irrespective of the knowledge of the group assignments to the anesthesiologist at postoperative time points of 1, 2, 4, 6, 8, 10, 12, 18, and 24 hours.

2.2. *Statistical measures*

This study conducted the statistical analysis of the data obtained by following tests as indicated in above sections using the Statistical Package for the Social Sciences (SPSS) software, version 21.0. Thereafter, two tests were employed for comparing the categorical variables and quantitative variables. In particular, we utilized chi-square test for the former comparison and Fisher's t-test for later comparison. Statistical significance was established at a p-value less than 0.05.

3. Results

A total of 100 patients were enrolled in the present study and were randomly allocated into two groups of 50 patients each. Group DTAPB who received USG- guided bilateral DTAPB and group ESPB who received USG- guided bilateral ESPB.

Both the study groups were comparable in terms of age, gender distribution, weight, height, ASA classification, and procedure duration and were statistically insignificant ($p > 0.05$) (Table 1).

There was significant difference ($p<0.05$) in the HR between the groups at 6, 8,12, 14 and 16 hrs but it was comparable at 2,4,10 and 24 hrs ($p >0.05$) (Table 2). In

Table 1: Demographic characteristics of patients in two groups

Parameter	DTAPB (n=50)	ESPB (n=50)	p-value
Age (years), Mean ± SD	44.02 ± 5.83	45.86 ± 4.81	0.088
Sex (Number, %)			
Male	31 (62.0)	28 (56.0)	0.392
Female	19 (38.0)	22 (44.0)	
Weight (kgs), Mean ± SD	66.88 ± 7.87	68.38 ± 7.33	0.326
Height (m), Mean ± SD	1.71 ± 0.09	1.73 ± 0.10	0.404
ASA (Number, %)			
ASA I	32 (64.0)	29 (58.0)	0.641
ASA II	18 (36.0)	21 (42.0)	
Duration of surgery (minutes)	70.3±9.42	68.4±10.71	0.349

Data expressed as mean ±SD

Table 2: Comparison of heart rate in two groups

Heart rate (beat/min.)	DTAPB(n=50)	ESPB (n=50)	p-value
1 hr	94.18 ± 8.48	91.24 ± 8.86	0.093
2 hr	91.62 ± 8.36	91.58 ± 7.10	0.979
4 hr	95.94 ± 9.31	94.52 ± 7.07	0.393
6 hr	83.04 ± 4.06	81.48 ± 3.74	0.048
8 hr	83.34 ± 3.65	81.00 ± 4.34	0.004
10 hr	85.34 ± 3.98	84.84 ± 6.69	0.651
12 hr	80.20 ±4.22	81.76 ± 3.18	0.039
14 hr	94.18 ± 8.48	90.86 ± 7.62	0.042
16 hr	92.76±5.83	95.94±9.31	0.043
24 hr	91.62 ± 8.36	90.58 ± 6.08	0.478

Data expressed as mean ±SD

DTAPB group HR was significantly higher at 6,8 and 14 hrs ($p<0.05$) because of the significant difference in the pain (VAS) scores between the two groups. Whereas in ESPB group it was significantly higher at 12 and 16 hrs ($p<0.05$), which correspond to the higher pain (VAS) score at these point of time in these patients (Table 4). Whereas during rest of the time intervals HR was comparable between the groups because of the comparable pain scores between the groups (Table 2).

Table 3 shows the comparison of MAP in first 24 hrs postoperatively between the study groups, revealing statistical significant differences ($p <0.05$) at 8, 12, 14 and 16 hrs postoperatively. In ESPB group MAP was significantly higher at 12 and 16 hrs ($p<0.05$) because of the high pain (VAS) score, whereas in DTAPB group MAP was high at 6 hrs and was significantly high at 8 and 14 hrs ($p<0.05$) which correspond to the high pain (VAS) score in these patients at these point of time (Table 4). But at other time intervals MAP was comparable between the groups because of the comparable pain (VAS) score (Table 3).

Table 3: Comparison of mean arterial pressure (MAP) in two groups

Time	DTAPB (n=50)	ESPB (n=50)	p-value
1 hr	92.92 ± 4.10	92.48 ± 3.14	0.578
2 hr	100.36 ± 5.90	99.28 ± 5.30	0.338
4 hr	93.30 ± 6.31	92.04 ± 6.32	0.321
6 hr	100.36 ± 5.90	98.18 ± 5.31	0.055
8 hr	98.32 ± 4.90	95.06 ± 4.65	0.001
10 hr	98.70 ± 5.46	96.64 ± 6.75	0.096
12 hr	93.70 ± 6.42	98.46 ± 4.61	0.0001
14 hr	94.44 ± 4.76	98.32 ± 4.90	0.0001
16 hr	90.28 ± 3.72	94.45 ± 3.22	0.048
24 hr	91.45 ± 3.22	91.06 ± 3.65	0.734

Data expressed as mean ±SD

Table 4: Comparison of VAS score in two groups

Time	DTAPB (n=50)	ESPB (n=50)	p-value
1 hr	1.36 ± 0.75	0.74 ± 0.60	<0.0001
2 hr	1.64 ± 0.48	1.22 ± 0.42	<0.0001
4 hr	2.32 ± 1.06	2.14 ± 0.35	0.258
6 hr	1.76 ± 0.48	1.44 ± 0.50	0.001
8 hr	2.80 ± 1.09	2.28 ± 0.70	0.049
10 hr	2.10 ± 0.61	2.26 ± 1.05	0.354
12 hr	2.62 ± 0.95	3.16 ± 1.22	0.015
14 hr	1.38 ± 0.60	1.12 ± 0.66	0.042
16 hr	1.60 ± 0.49	1.64 ± 0.83	0.769
24 hr	2.14 ± 0.64	2.16 ± 1.25	0.919

Data expressed as mean ±SD

Difference in the VAS score was significant between both the study groups at initial 1 and 2 hrs but it was never above 4 in both the study groups ($p<0.05$) (Table 4). Otherwise, VAS was significantly higher in DTAPB group at 6, 8 and 14 hrs whereas it was significantly higher in ESPB group at 12 hrs ($p<0.05$) and was comparatively higher than DTAPB group at 10, 16 and 24 hrs, which was statistically insignificant (Table 4).

Table 5: First analgesic dose request and mean first analgesic dose request in two groups

Time	DTAPB (n=50)	ESPB (n=50)	p-value
6 hr	10 (20%)	0 (0%)	<0.0001
8 hr	15 (30%)	5 (10%)	
10 hr	25 (50%)	10 (20%)	
12 hr	0 (0%)	15 (30%)	
14 hr	0 (0%)	15 (30%)	
16 hr	0 (0%)	5 (10%)	
Mean first analgesics dose time (hr)	8.0 ± 2.0	12.0 ± 3.16	<0.0001

Data expressed as percentage and mean ± SD

Table 5 depicts the comparison of first analgesic request in both the study groups which revealed that in DTAPB group it was requested by 10 patients at 6 hr,15 patients

at 8 hrs and 25 patients at 10 hrs but in ESPB group 5 patients requested it at 8 hrs, 10 patients at 10 hrs, 15 patients at 12 hrs, 15 patients at 14 hrs and 5 patients at 16 hrs which was statistically significant (p< 0.05). As far as mean first analgesic dose requirement time in first 24 hrs postoperatively was concerned it was 8 ± 2.0 hrs in the DTAPB group and was 12 .0±3.16 hrs in ESPB group and the difference between the groups was highly significant (p <0.05) (Table 5)

Table 6: Total analgesic doses requirement in first 24 hours in two groups

Analgesics doses	DTAPB (n=50)	ESPB (n=50)	p-value
1 dose	35 (70%)	45 (90%	0.001
2 doses	15 (30%)	5 (10%)	

Data expressed as percentage

Table 6 compares the requirement of total number of analgesic doses in both the groups in first 24 hrs postoperatively and found that 35 patients in DTAPB group received single dose and 15 patients received two doses. However, in ESPB, 45 patients received single dose and only 5 patients needed second dose, which was found to be statistically significant (p< 0.05).

Table 7: Postoperative side effects in two groups

Side effects	DTAPB (n=50)	ESPB (n=50)	p-value
Nausea	6 (12%)	2 (4%)	0.267
Vomiting	3 (6%)	1(2%)	0.617
Shoulder tip pain	4 (8%)	1(2%)	0.362

Data expressed as percentage

The incidences of side effects are marginally less in ESPB group as compared to DTAPB group but it was statistically insignificant (p >0.05) (Table 7).

4. Discussion

Bilateral USG-guided DTAP block is a well-renowned technique for providing postoperative pain relief and is known for blocking the nerve branches from T6 to L1. This is simultaneously performed in all four quadrants to provide postoperative analgesia. In contrast, ESP block, when administered at lower levels, can also offer abdominal analgesia as it extends across the lumbar region. Initially developed to address neuropathic thoracic pain.[7] ESPB has been documented for use in various surgical procedures such as abdominoplasty, lower segment cesarean section, laparoscopic and open abdominal surgeries.[14–17] In abdominal procedures, ESPB can be performed at the T7-T8 levels, while it can be conducted at T4-T5 levels for breast and thoracic surgeries.[18] In our study, we assessed and compared the effectiveness of USG-guided bilateral DTAPB and ESPB for providing postoperative pain relief in patients undergoing LC.

In terms of first analgesic request, patients in the DTAPB group requested analgesia after an average of 8 ± 2.0 hrs, whereas those in the ESPB group had a significantly longer duration before requesting analgesia, with an average of 12 ± 3.16 hrs. Notably, the ESPB group exhibited the longest interval before requesting analgesic intervention. In the ESPB group, 45 patients needed single dose only 5 patients needed second dose as well. However, in DTAPB group, 35 patients received single dose and15 patients received second dose as well.

Parallel to our research, Altiparmak B et al studied the impact of preoperative USG-guided ESPB versus USG-guided Oblique Subcostal TAP (OSTAP) block with 40 ml of 0.375% bupivacaine on postoperative tramadol consumption and pain scores among LC patients.[12] Their findings demonstrated that following LC, USG-guided ESPB significantly reduced the postoperative need for analgesia and lowered pain ratings when compared to oblique subcostal TAPB.

Recently, Tulgar S et al. assessed the efficacy of the ESP block as part of a multimodal analgesia approach using 40 ml of 0.375% bupivacaine in bilateral ESPB at T9 level. Although they used higher concentration of bupivacaine, still the post operative pain score is comparable to our study, may be because of the dexamethasone 8 mg used as adjuvant to .25% ropivacaine in our study.[19]

Similar to our findings, Kamel AAF et al. compared the USG-guided bilateral ESPB versus bilateral TAPB on postoperative pain scores and opioid consumption in patients scheduled for open abdominal hysterectomy. They gave block before extubation using 20 ml of 0.375% Bupivacaine along with 5 micrograms of adrenaline (1:200,000) on each side at the T9 level. Their study revealed the time for first analgesia requirement was 14.81 ± 3.52 hrs, in ESPB group, whereas it was 10.58 ± 2.35 hrs in DTAPB group which is in contrast to our study which showed time for first analgesic requirement was 12.0±3.16 hrs in ESPB group and 8.0±2.0 hrs in DTAPB group which could be because of higher concentration of bupivacaine along with adrenaline used in their study and moreover we have given block preoperatively after intubating the patient.[20]

Our study is in line with the study conducted by Qi-Hong S et al. who concluded that ESPB group who received block with .25% ropivacaine 20 ml both sides exhibited lower VAS and reduced opioid consumption during the initial 24 hrs postoperatively as compared to subcostal TAP in patients undergoing laparoscopic colorectal surgery.[21] However the incidence of nausea and vomiting is lower in our study because of the adjuvant dexamethasone 8 mgs used in our study.

Canitez A et al., compared the bilateral ESPB using 20 ml of LA mixture of bupivacaine 0.5% (7.5 ml) plus lignocaine 2% (2.5 ml) plus 10 ml normal saline on each side with multimodal analgesia technique and found that bilateral ESPB lead to lower Numeric Rating Scale (NRS) scores with a lower cumulative opioid consumption in the first 24 hrs, which is comparable to present study.[10]

Hassan AAM et al., compared USG-guided bilateral TAPB with bilateral ESPB for postoperative analgesia in patients undergoing emergency laparotomies using 0.25% of bupivacaine 20 ml on each side. They concluded that bilateral ESPB reduces pain score, fentanyl use and prolongs the postoperative analgesia as compared to USG-guided bilateral TAPB. The results of the present study are also in line with the above study.[22]

Engineer SR et al., studied the efficacy of USG-guided bilateral ESPB and oblique subcostal TAP block using 20 ml mixture of 0.375% bupivacaine (10 ml) plus 1.5% lignocaine with adrenaline (10 ml), for postoperative analgesia after LC and found that ESPB is superior to TAPB as far as postoperative pain, consumption of analgesics are concerned.[23] Time to first rescue analgesia after ESPB was 10.7±7.4 hrs and it was 3.8±4.6 hrs for OSTAPB. In contrast, our study showed longer duration of postoperative analgesia in both the groups as we have used larger volume of 0.25% ropivacaine along with adjuvant dexamethasone 8 mgs.

Occurrence of postoperative nausea and vomiting (PONV) in our study was lower in the ESPB group i.e 4% and 2% respectively than the DTAPB group which was 12% and 6% which was quite less than the study conducted by Qi- Hong S et al who reported 9.7% and 3.2% in ESPB group and 35.5% and 22.4% respectively in the TAPB group.[21] Lower incidence of PONV in our study is because of the dexamethasone added as adjuvant to ropivacaine. Our study is in agreement to the various meta analysis which concluded that the ESPB reduce the incidence of PONV after LC, possibly by reducing the opioid consumption in post operative period and also because of dexamethasone used as adjuvant.[24,25]

USG-guided bilateral DTAPB used in the present study is not much evaluated block for postoperative analgesia after LC. From the past researches we found that bilateral DTAPB offers longer postoperative analgesia and lesser opioids consumption postoperatively when compared to classic mid-axillary USG guided TAP block and OSTAP block.[12,20–23]

5. Limitation of the Study

Sensory evaluation of both the blocks in term of success rate and extent of block was not performed as both the blocks were given after giving general anaesthesia to the patients. The test used to quantify pain was subjective as it varies from patient to patient and depend on pain threshold, emotional and psychological well-being. Further studies are needed to evaluate the optimal concentration and dosage of drug used.

6. Conclusion

USG-guided bilateral ESPB with 0.25% ropivacaine with dexamethasone is effective in reducing postoperative pain after LC, as it provides long duration and better quality of analgesia as verified by lower pain scores, delayed need for the first rescue analgesia, and a reduced requirement for additional analgesic doses, resulting in decreased analgesic usage with minimum side effects.

7. Source of Funding

None.

8. Conflict of Interest

None.

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