ORIGINAL ARTICLE

Ultrasound Guided Erector Spinae Plane Block and Quadratus Lumborum Block for Postoperative Analgesia in Patients Undergoing Total Abdominal Hysterectomy: A Comparative Study

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DOI:https://doi.org/10.62848/bjpain.v4i2.6027

Received: 10 July 2024
Accepted: 6 October 2024

Abstract

Background: Quadratus lumborum block is a peripheral block method that has been used successfully for pain relief after total abdominal hysterectomy. Prolonged analgesia has been reported as compared with more conventional transversus abdominis plane (TAP) block. Erector spinae plane (ESP) block is a novel interfascial plane block used in postoperative pain and chronic neuropathic pain relief of the thoracoabdominal region. Recently it has been used as a postoperative regional analgesia technique in different surgeries from the shoulder to hip regions due to its simplicity and efficacy. This study was designed to compare the efficacy of ultrasound guided erector spinae plane block and quadratus lumborum block for postoperative analgesia in patients undergoing total abdominal hysterectomy.

Methods: This randomized prospective double-blinded comparative study was carried out form July 2021 to June 2022 at Dhaka Medical College. A total of 60 patients were enrolled in this study and randomized into two groups (ESPB and QLB-2). 1st group (Group: ESPB): received bilateral ultrasound-guided Erector Spinae Plane (ESPB) block with each block 20ml of 0.25% bupivacaine at the level of T9, 2nd group (Group: QLB-2): received bilateral ultrasound-guided posterior Quadratus Lumbroum block (QLB-2) with the same volume and concentration of bupivacaine. Following parameters were observed, recorded and compared between two groups: postoperative pain intensity using VAS score, the total amount of opioid consumption in the first 24 hours after the operation, the time of first rescue analgesia and possible adverse events such as hypotension, nausea/vomiting, shivering, dizziness, itching etc. during the postoperative period.

Results: There were no significant differences found according to demographic and clinical status between two groups. The failed block rate was high in group B which was 13.3% ($p = 0.011$). At 16th and 24th hour mean heart rate (HR), SBP & MAP were significantly higher in group B ($p < 0.05$) than group A. In Group A mean HR, SBP & MAP were higher at 20th hour than group B and statistically significant differences ($p < 0.05$) observed. After assessing VAS score during postoperative period, it was observed that VAS score was significantly higher in group B, at 16th and 24th hour ($p < 0.05$) than group A. In group A, VAS score was higher than group B at 20th hour and found statistically significant ($p < 0.05$). Time of first rescue analgesia (hrs) for ESP group and QLB group were 20±1.4 hours & 16.7±1.2 hours respectively and the difference was statistically significant ($p < 0.05$). Total opioid (pethidine) requirement in 1st 24 hours (mg) was significantly higher (136.8±9.4 mg) in QLB group than ESP group (79.6±8.6 mg) as $p < 0.05$. Incidence of adverse events like nausea (23.08%), vomiting (15.4%) and itching (19.2%) were higher in group B then group A which were also statistically significant ($p < 0.05$).

Conclusion: After total abdominal hysterectomy under SAB, ESP block provide longer duration of analgesia, low VAS score during postoperative period with less requirement of opioid in 1st 24 hours as well as lower postoperative complications when compared to QL block-2.

Keywords: Erector Spinae Plane Block (ESPB), Posterior Quadratus Lumborum Block (QLB-2), Subarachnoid Block (SAB), Total abdominal hysterectomy (TAH), Visual analogue scale (VAS)

Citation: Helali AM, Mohammad T, Khan AKMN, Showrav SA, Ali MS, Kamal MM. Ultrasound Guided Erector Spinae Plane Block and Quadratus Lumborum Block for Postoperative Analgesia in Patients Undergoing Total Abdominal Hysterectomy: A Comparative Study. Bangladesh J Pain 2024; 4(2): 34-43; doi:10.62848/bjpain.v4i2.6027

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Introduction

Postoperative pain management is a major concern for an anaesthesiologist. Hysterectomy is one of the common surgical procedures leading to severe postoperative pain in women[1] and poor pain control after hysterectomy is associated with increased length of hospital stay and recovery, and it also has an impact on psychological changes, quality of life, and patients' satisfaction[2]. Adequate control of pain can prevent the development of chronic pain after hysterectomy[3].

Pain from intra-abdominal surgery is a combination of somatic and visceral pain. Visceral pain is transmitted by the autonomic nervous system via sympathetic fibres that form plexuses in close proximity to the viscera themselves. This pain tends to be diffuse, poorly localised, and dull, and may be associated with autonomic symptoms such as nausea, vomiting, and sweating[4]. Nerve blocks of the abdominal wall generally only treat somatic pain, which is more localised; hence they should be used as part of a multimodal approach to analgesia. Newer blocks, however, as described below, may have the potential to contribute to visceral pain through spread to the paravertebral space where the sympathetic chain lies.

Current modalities for pain management include systemic opioids often via a patient controlled analgesia system (PCA), subcutaneous local anaesthetic and epidural analgesia. Evidence for pain control after local anaesthetic infiltration for gynaecologic procedures is inconclusive; however, it does not appear to provide long duration of analgesia[5]. Although Intravenous patient-controlled analgesia is effective in controlling acute pain, opioid-related adverse effects such as nausea, vomiting, and decreased level of consciousness are relatively common[6].

Thoracic epidural analgesia is still considered as the standard procedure for postoperative analgesia in major open abdominal surgery. However, there are side effects such as hypotension and motor blockade, as well as a risk of major complications such as epidural hematoma and abscess, which have led some to question its role[7]. An alternative to epidural analgesia ultrasound-guided abdominal wall nerve blocks such as TAP block, ESP block and QL block is often used after open abdominal surgery. These abdominal wall nerve blocks can be safely used in patients undergoing TAH for postoperative analgesia.

With the increasing evidence concerning postoperative complications related to neuroaxial analgesia and the safety of peripheral regional anaesthesia under ultra-sound guidance, multimodal analgesia with peripheral nerve blocks have become more popular[8]. As effective constituents of multimodal analgesia, quadratus lumborum (QLB) block and transversus abdominis plane (TAP) block are mainly used for postoperative analgesia in abdominal surgery. The QLB, a regional variation of the TAP block, has been suggested to be a more reliable approach for the pain management after abdominal surgery and results in more extensive sensory blocks than TAP block (T10-L3 Vs T10-T12)[9].

Quadratus lumborum block is a block of the posterior abdominal wall, "interfascial plane block" which is performed exclusively under ultrasound guidance was first described by Blanco[10]. Recently, quadratus lumborum block (QLB) has shown promising results in managing postoperative pain following both abdominal and retroperitoneal surgeries. It has been used successfully to provide analgesia in various surgeries such as open hysterectomies, open liver resections, percutaneous nephrolithotomy, caesarean sections, laparoscopic ovarian surgeries, laparotomies, and hip arthroplasties[11]. There are many approaches to QLB: with the local anaesthetic deposited laterally (QLB-1), posteriorly (QLB-2), anteriorly (QLB-3 or transmuscular) or intramascular (QLB-4) in relation to the quadratus lumborum muscle[12]. Recently, many studies demonstrated that the quality and safety of QLB-2 as post-operative analgesia at different surgical procedures is excellent and less complicated than other approaches, hence in our study we chose the posterior approach of QLB.

Erector spinae plane (ESP) block is a para-spinal regional anaesthesia technique that allows local anaesthetic dispersion into the interfascial plane between the transverse process and the erector spinae muscles, attaining a paravertebral spread of three and four vertebral levels cranially and caudally, respec-

tively, covering the ventral as well as dorsal rami inhibiting both visceral and somatic pain[13]. This block used in postoperative pain and chronic neuropathic pain relief of the thoraco-abdominal region. However, its first use was for treatment of chronic pain, but recently it has been used as a postoperative regional analgesia technique in different surgeries from the shoulder to hip regions[14,15]. To the best of our knowledge, till date there is no published study comparing the ultrasound-guided bilateral ESP block with bilateral QL block on postoperative analgesia after TAH. This randomized, prospective study was designed to compare the analgesic efficacy of ESPB versus QLB-2 in postoperative patients undergoing elective total abdominal hysterectomy under spinal anesthesia.

Methods

This prospective, randomized, double blinded study was carried out in the Department of Anaesthesia, Pain, Palliative and Intensive Care in collaboration with Gynaecology and Obstetrics department, Dhaka Medical College & Hospital, Dhaka during the period from July, 2021 to June, 2022. Patients undergoing total abdominal hysterectomy operations with ASA I or II at the study period under subarchonoid block (SAB) were included in this study. Patients with infection at injection site, morrbid obesity (BMI > 40kg/m^2), difficult anticipated anatomy on ultrasound, physical or mental diseases interfering with the evaluation of pain scores, kidney failure or liver failure, allergy to local anaesthetics (Bupivacaine/Lidocaine), uncontrolled DM or HTN, block failure and unwilling to participate were excluded. Patients were randomized into group A and group B achieved by computer-generated random number table. Group A- received bilateral ultrasound-guided erector spinae plane (ESPB) block with each block 20 ml of 0.25% bupivacaine at the level of T9. Group B- received bilateral ultrasound-guided posterior quadratus lumbroum block (QLB-2) with each block 20 ml of 0.25% bupivacaine.

Study procedure

During pre-anaesthetic visit 60 participants were selected according to the inclusion and exclusion criteria and were approached to be included in this study. Following informed about the study aim, objectives and procedure, written consent was taken from each participant. History taking, focusing on clinical features, disease duration along with physical examinations were done as per standard protocol. Patients were educated about the 10 cm visual analogue scale (VAS) during the preoperative assessment.

An 18-gauge intravenous cannula pathway was established in the non-dominant hand or arm in the operating theatre. All patients were attached to standard monitoring, including electrocardiogram, pulse, arterial oxygen saturation, respiratory rate, and non-invasive blood pressure (NIBP).

The spinal needle was inserted into the lumbar epidural space at the level of L3-4 intervertebral space after sterilizing and infiltrating the skin with 2-3 ml of 2% lidocaine. After finding the epidural space using loss of resistance, the tip of a spinal needle was passed through to reach the subarachnoid space and all patients were received intrathecal anaesthesia with 4 ml of 0.5% bupivacaine heavy. Patients were immediately placed in the supine position. Spinal anaesthesia was considered successful when a bilateral block to T6, assessed by loss of cold (ice cube) and touch (blunt pin) discrimination, established 5 min after the spinal injection. At the end of surgery all patients were received intravenous (iv.) paracetamol 1 gm. Anti-emetic prophylaxis was also administered including iv ondansetron 4 mg.

For ESPB group

In the prone position, after skin sterilization with 10% povidone iodine, ESP block was performed at the level of T9. Counting down from the spine of the seventh cervical vertebrae, and the spine of the 9th thoracic vertebrae (T9), a linear high-frequency (3-5 MHz) ultrasound transducer (SonoSite M-Turbo; FUJIFILM Sonosite, Inc., Bothell, WA) was placed sagittal 3 cm lateral to T9 spinous process. A hyperechoic shadow of the transverse process (TP) and erector spinae was identified. A 22-gauge short bevel needle was inserted in cranial to caudal direction toward TP in plane to the ultrasound transducer until the needle touched the TP crossing all the muscles. The location of the needle tip was confirmed by visible normal saline solution separating erector spinae muscle off the bony shadow of the TP. When

the appropriate needle tip was confirmed by 1 ml test dose of normal saline, 20 mL of bupivacaine 0.25% was injected. The procedure was repeated following the same steps on the other side of the back. Sonographic confirmation of the local anesthetic spread was seen as an anechoic shadow in the paravertebral spaces from T7 to T12.

For QLB-2 group (posterior QLB)

All patients were in the supine position, tilting 45 degrees to the opposite side in order to place the low-frequency convex probe properly and see the sonography clearly. Following preparation of the block area with 10% povidone iodine, the probe was placed in the mid axillary line cranially to the iliac crest to identify the three muscles of the anterior abdominal wall (transversus abdominis, internal oblique, and external oblique), then scan dorsally keeping the transverse orientation until observing that the transversus abdominis muscle becomes aponeurotic, and this aponeurosis was followed until the QL muscle being clearly visualized with its attachment to the lateral edge of the transverse process of L4 vertebral body and also being visualized the thoracolumbar fascia at the lateral edge of the QL muscle. The atraumatic needle (22-G, 120-mm needle for peripheral nerve blocks, B. Braun Melsungen AG, Germany) was inserted in-plane from anterior to posterior and the tip of the needle was advanced towards the posterior border of the QL muscle, between the QL and the latissimus dorsi (LD) muscles, 1 ml test dose of normal saline was injected to confirm correct needle-tip position, and then this was followed by injection of 20 ml of 0.25% bupivacaine. The same procedure was repeated on the other side also.

Patients were randomly allocated at the end of surgery to either receive QLB- 2 or ESPB. Random allotment was done by using computer generated random number table. An anaesthetist who was not involved in the study opened a sealed opaque envelope containing the study number. These numbers were used in postoperative data collection and analysis. Patients were allocated sequentially to their groups as per numbered opaque envelopes. Spinal block height was assessed at the end of surgery to ensure sufficient anaesthesia at the site of block performance. Patients were blinded to block allocation using the surgical drapes to occlude their view. The researcher, who performed the blocks in this study, did not participate in data collection. Patients and other healthcare providers involving in postoperative care and collecting data were blinded to the group of the patient.

Outcome measure

The primary outcome measures of the study were the values and were assessed by on duty postoperative ward anaesthesiologist and nurse on the general ward (blinded to the study) using the visual analogue scale (VAS, 0-100 mm/0-10 integers) scores at rest, at 2nd, 4th, 6th, 8th, 10th, 12th, 14th, 16th, 18th, 20th, 22nd and 24th hours. Analgesic requirements in the first 24 hours postoperatively after surgery, time to first rescue analgesic (in hours), were recorded at postoperative follow-up visits by one of the colleagues available on duty blinded to the study groups. If any patient required rescue analgesia within two hours after block performance then it was considered as block failure and they were excluded from the study. Total amount of pethidine needed during first 24 hrs postoperative period was in mg.

The secondary outcomes included complications such as nausea and vomiting, pruritus, urinary retention, lower-limb weakness, infection and hematoma were recorded. The vital signs including heart rate, respiratory rate, oxygen saturation and non-invasive blood pressure (NIBP) were also recorded.

Statistical analysis

Data were statistically described in terms of mean ± standard deviation (±SD), or frequencies (number of cases) and percentages when appropriate. Comparison of numerical variables between the study groups were done using Student t- test for independent variables. For comparing categorical data, Chi square test was performed. Inter group analysis was done by ANOVA. P-values less than 0.05 was considered statistically significant. All statistical calculations were done using computer programs SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 25 for Microsoft Windows.

Results

As per protocol the sample size was total 60 patients. As it was a prospective randomized comparative study, patients were halved into two groups by com-

puter generator random number tables; here each group was containing 30 numbers of patients. But during performing this fascial plane block: in group A (ESP Block) two (2) of the patients were diagnosed as failed block. Block failure as diagnosed as per operational definition. Somehow, in group B (QL-2 Block) four (4) of the patients were diagnosed as failed block. So, finally data of 28 in group A and data of 26 patients in group B: overall data of 54 patients were calculated. Data like demographic, clinical status and duration of surgery were collected from the patient's hospital record file. Others data like HR, SBP, DBP and perioperative complications of the patients were collected from the patients data collection form. Outcomes variables like visual analogue score (VAS) within first 24 hours postoperative period, time of 1st analgesic requirement and total opioid consumption within first 24 hours were recorded in preformed data collection form. The demographic and clinical status of the studied groups were shown in table I.

Table I: Distribution of the patients by demographic and clinical status (n=54).

Characteristics		**Group A (n=28)**	**Group B (n=26)**	*p value*
Age	**40-50 years**	6(21.4%)	5(19.2%)	***0.328***
	51-60 years	13(46.4%)	12(46.2%)	
	61-70years	5(17.9%)	6(23.1%)	
	71 years and above	4(14.3%)	3(11.5%)	
	mean±SD	53.6±7.4	54.2±7.8	
Height(cm)		152.8±4.3	151.3±4.6	***0.371***
Weight(kg)		63.7±5.3	61.9±5.7	***0.347***
BMI		24.7±2.8	23.2±2.5	***0.371***
ASA Class	**I**	19(67.9%)	18(69.2%)	**0.613**
	II	9(32.1%)	8(30.8%)	

Values were expressed as Mean±SD and within parenthesis percentage (%) is over column total

Considering the age of the patients between two groups, most of the patients were between 51-60-year ranges (46.4% Vs 46.2%, p = 0.328). No statistical differences were found in aspect of mean height, weight as well as in BMI between the two groups, as p >0.05. According to ASA class, most of the patients of both group (67.9% vs 69.2%) were belongs to ASA class I.

During the postoperative period, there was no significant difference observed in case of mean heart rate between the groups except after 16 hours. At the 16th and 24th hour mean heart rate were high in group B and in group A mean heart rate was high at the 20th hour, which were statistically significant as p <0.05. The mean heart rate during post-operative period were shown in figure 1.

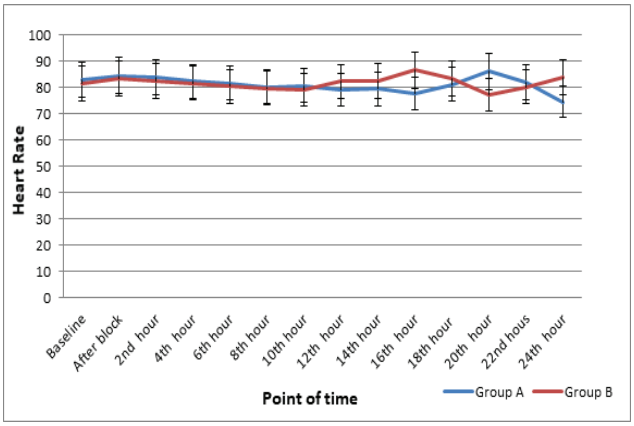

Figure 1: Mean heart rate during perioperative period (Beats/Min)

Figure 2 shows the mean arterial pressure changes in the perioperative period. After giving the USG guided Block, statistically significant differences were observed in case of MAP at 16th, 20th and 24th hour between the two groups. At 16th and 24th hour MAP was low in group A in compared to group B. At 20th hour MAP was high in group A compared to group B. After receiving analgesic MAP reduced in both groups, in group-B from 93.8±6.5 on 16th hour to 91.4±6.4 on 18th hour and in group- A from 92.5±5.6 on 20th hour to 91.7±5.4 on 22nd hour. The p value was less than 0.05 at 16th, 20th and 24th hour. In case of other point of time no statistically significant differences were observed.

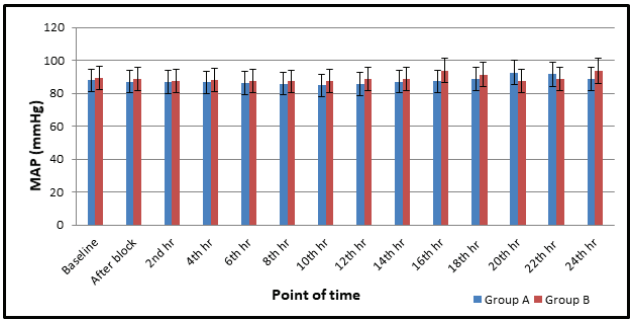

Figure 2: The MAP during perioperative period (mmHg)

After assessing VAS score during postoperative period, it was observed that VAS score was high in group B at 16th and 24th hour. In group-A, VAS score was higher than group B at 20th hour (Figure 3). These were statistically significant as p <0.05.

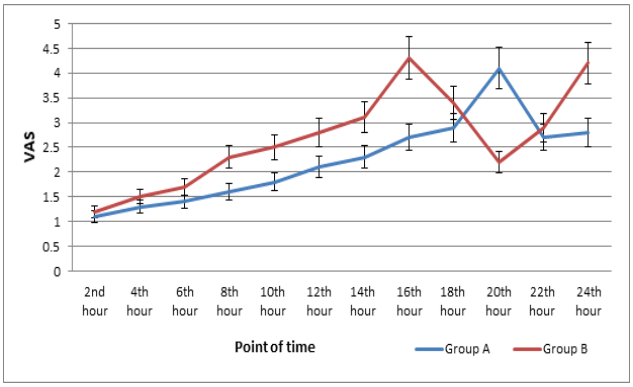

Figure 3: VAS score during postoperative period.

Table II shows the block regression time and total opioid requirement. Time of first rescue analgesia (hrs) for ESP group was 20±1.4 hours and for QL group was 16.7±1.2 hours. Total opioid requirement in 1st 24 hours (mg) that was pethidine, was high (136.8±9.4 mg) in QL group than ESP group (79.6±8.6 mg).

Table II: Block regression time and total opioid requirement between two groups (n=54).

Events	Group A (n=28)	Group B (n=26)	p value
Time of first rescue analgesia (hrs)	20.3±1.4	16.7±1.2	***0.023***
Total opioid Requirement in 1st 24 hours (mg)	79.6±8.6	136.8±9.4	***0.018***

Values were expressed as Mean±SD

Statistically significant difference was found in time of first rescue analgesia (hrs) and total opioid requirement in 1st 24 hours (mg) as p<0.05.

Complication like nausea (23.08%) vomiting (15.4%) and itching (19.2%) were higher in group B than group A and statistically significant differences were found. In other complications like shivering, hypotension and urinary retention no significant differences were observed between groups. Table III demonstrates the frequency of post-operative complications.

Table III: Post-operative complication of the patients between two groups (n=54)

Complications	Group A (n=28)	Group B (n=26)	p value
Nausea	3(10.7%)	6(23.08%)	***0.015***
Vomiting	2(7.1%)	4(15.4%)	***0.027***
Itching	2(7.1%)	5(19.2%)	***0.036***
Shivering	3(10.7%)	2(7.6%)	0.257
Hypotension	4(14.3%)	3(11.5%)	0.348
Urinary retention	5(17.8%)	4(15.4%)	0.437

Values were expressed in percentage (%).

Discussion

Relief from pain is part of the fundamental human right to health. Pain relief after TAH varies from a single suppository to high tech invasive analgesia techniques for 48 h. In patients with abdominal surgery, multimodal analgesic technique reduces morbidity, costs, and hospital stay. Abdominal wall incision is the major origin of pain experienced by patients after abdominal surgery[16]. Although systematically administered opiates and central neuraxial techniques remain the mainstay of analgesic modality after abdominal surgery, they cause considerable adverse effects.

Nowadays, the use of ultrasound in assisting the trunk blocks in anaesthesia is increasing. The trunk blocks have been used more frequently to produce analgesia and anaesthesia for surgeries involving the thorax, abdomen, and lower extremities. Compared to the traditional techniques, ultrasound-guided trunk blocks procedures enable anaesthesiologists to reliably inject local anaesthetic at a target location with a decreased risk of needle trauma to the nerve and surrounding structures[17].

The present study compared the ultrasound-guided ESP block and QL block after TAH under spinal anaesthesia with regard to their duration of analgesia, quality of analgesia, hemodynamic parameters, total dose of analgesic consumption and complications.

According to demographic and clinical status, after considering the age of the patients between two groups, most of the patients were between 51-60 yrs range (46.4% vs 46.2%). There were no significant difference in case of mean age (53.6±7.4 vs 54.2±7.8)

between two groups, as p=0.328. According to ASA class, most of the patients of both groups (67.9% vs 69.2%) were belongs to ASA class I and there was no significant difference p=0.632.

Similar observations were found by other authors [15,18]. There was statistically significant difference observed in case of number of failed block between two groups (p = 0.011). The number of failed block rate was high in group B (13.3%) than group A (6.7%). Block failure was defined as if the patients complain moderate to severe pain or VAS >/= 4 or needed intravenous opioid analgesic within 2 hours of block.

At the 16th and 24th hour mean heart rate were high in group B and in group A mean heart rate was high at the 20th hour, which were statistically significant as p <0.05. This might be due to patients' pain sensation at that hour. After giving rescue analgesic, patients' heart rate reduced in both groups. At the 16th and 24th hour mean SBP and MAP were low in group A compared to group B which were statistically significant as p < 0.05 at that point of time. At the 20th hour mean SBP and MAP were high in group A compared to group B. This might be caused by patient had pain at that point of time. After receiving analgesic SBP and MAP were reduced in both groups.

It was observed that VAS score were high in group B at 16th and 24th hour. In group A VAS score was higher than group B at 20th hour. These were statistically significant as p < 0.05. That means patient were feeling pain at these points of time and required rescue analgesia. After giving opioids all patients were reliving from pain and VAS score reduced and became <4. So, it was observed that group A that was provided by ESP block had more duration of analgesia during postoperative period.

Time of first rescue analgesia (hrs) for ESP group was 20±1.4 hours and for QL group was 16.7±1.2 hours. Total opioid requirement in 1st 24 hours (mg), that was pethidine, was high (136.8±9.4 mg) in QL group than ESP group (79.6±8.6 mg). Statistically significant difference was found in time of first rescue analgesia (hrs) and total opioid requirement in 1st 24 hours (mg) as p < 0.05. So, ESP block provided longer duration of analgesia and reduced opioid requirements in 1st 24 hours during postoperative period.

Complication like nausea (23.08%), vomiting (15.4%) and itching (19.2%) were higher in group B then group A. This might be due to high opioid requirement in QL block group. The p value was determined by chi-squared test and was considered significant as p<0.05. In other complications like shivering, hypotension and urinary retention had no significant difference between groups.

Another study done by Amin et al. (2022) observed ultrasound-guided quadratus lumborum block versus transversus abdominis plane (TAP) block for post-operative analgesia in patients undergoing total abdominal hysterectomy[19] and found that time for the first request for pethidine was significantly longer in the QLB group (398.3 ± 23.7 min) than in the TAP group (80.3 ± 20.7 min), (p < 0.0001 and its total consumption was significantly lesser (p = 0.007) in the QLB group (68.33 ± 66.28) than in TAP group (120.0 ± 76.11). The VAS at rest and movement was significantly reduced in QLB group at all times. Hemodynamic parameters and post-operative side effects between the two groups remained insignificant. Naz et al. (2021) in their study also found significant difference in the duration of analgesia among the groups[20]. It was significantly longer in QL group (mean ¼ 8.05 hours; 95% CI, 7.28, 8.81) compared to TAP group (mean ¼ 5.59 hours; 95% CI, 4.63, 6.45) and Control group, who did not receive any intervention (mean ¼ 1.19 hours; 95% CI, 1.04, 1.34). The verbal rating score and the cumulative analgesic consumption were the least in QL group. They recommended to include QL block as a part of multimodal analgesia in TAH as it is superior to TAP block in analgesic effect. Sultana et al. (2023)[21] and Nazem et al. (2023)[22] also reported that QL block produced longer duration of analgesia and reduced opioid consumption among the patients than TAP block.

Present study is in line with these findings as QL group provides longer duration of analgesia and VAS score was less, upto 16.7±1.2th hours.

Similarly when ultrasound-guided erector spinae plane block and transversus abdominis plane block applied for postoperative analgesia after total abdominal hysterectomy, it was observed that the time requirement of first morphine was highly statistically significantly prolonged in the ESP group (14.81 ±

3.52 hours) compared with the TAP group (10.58 ± 2.35 hours). The total amount of morphine consumption in 24 hours postoperatively was statistically significantly decreased in the ESP group; p=0.01. Incidence of postoperative nausea and vomiting was higher but statistically insignificant in the TAP group than the ESP group. There were statistically significant numbers of unsatisfied patients (4) in the TAP group compared with the ESP group (no patient)[23].

Yousef (2018) observed that the mean amount of morphine required postoperatively was significantly higher in TAP group than in QL group, p=0.001 (14.46 ± 3.4 mg vs. 10.06 ± 3.8 mg, respectively)[24]. VAS for pain was significantly higher in TAP group than in QL group at all the measured time postoperatively. Duration of postoperative analgesia was shorter in TAP group than in QL group (8.33 ± 4 h vs. 15.1 ± 2.12 h, p= 0.001). The number of patient requested analgesia was significantly higher in TAP group than in QL group (23 patients in TAP group vs. 8 patients in QL group, p= 0.017). Regarding side effects, both groups were comparable and no serious complications were detected (one patient in each group suffered from vomiting and was treated with IV granesetrone 4 mg).

Our study is consistent with these findings as QL group provides longer duration of analgesia 16.7±1.2 hours and for ESPB group the duration was 20±1.4 hours.

When compared to analgesic efficacy of erector spinae plane block and posterior quadratus lumborum block in laparoscopic liver resection, Kang et al. (2021) observed that the cumulative 24 hours opioid consumption was similar between the ESP and QL groups (41.4 ± 22.6 mg vs 44.2 ± 20.0 mg, mean difference (QL-ESP), 2.8 mg, 95% confidence interval, 6.4 to 12 mg, p > 0.99)[25]. There were no significant differences in resting pain scores at 24, 48 and 72 hours postoperatively or recovery outcomes. The peak plasma ropivacaine concentration 30 min after injection was significantly higher in the ESP group (1.5 ± 0.3 μg/mL) than in the QL group (1.3 ± 0.5 μg/mL, p = 0.035); however, both were lower than the arterial threshold value of systemic toxicity (4.3 μg/mL).

Aksu et al. (2019) showed that the ESP block provides similar postoperative analgesia to the QL block in pediatric patients undergoing lower abdominal surgery[18]. No significant difference was determined between the groups' FLACC (Face, Legs, Activity, Cry and Consolability) scores at 0, 1, 3 or 6 h postoperatively (p > 0.05). No significant difference was also determined in times to first analgesia between the groups (p > 0.05).

Another study by Aygun et al. (2019) demonstrated that ultrasound guided erector Spinae plane block and quadrates lumborum block when compared for postoperative analgesia in laparoscopic cholecystectomy, there was no difference in opioid requirement and NRS (Numeric Rating score) scores[26]. Average morphine consumption in the first 24 hours was 3.40 ± 1.42 mg for ESPB and 3.47 ± 1.57 mg for QLB-II group (p = 0.083). Morphine consumption at 1st, 6th, 12th and 18th hours were also similar (p > 0.05). When resting and moving/coughing NRS scores were compared, NRS scores were lower in the ESPB group at 1st hour (p<0.001). However NRS scores were similar for 6th, 12th, 18th and 24th hours (p > 0.01).

Limitation

In this study onset of sensory block could not be assessed as the block were performed at the end of the surgery. At that time effects of SAB was still present. We did not measure the LA concentration in serum after using 40 ml of 0.25% bupivacaine and also we did not use imaging studies with contrast enhancement to follow the pattern of spread of this volume of LA in both approaches.

Conclusion

In this study it was observed that ESP block provide longer duration of analgesia, low VAS score during postoperative period with less requirement of opioid in 1st 24 hours as well as lower postoperative complications. So our results showed that ESP was more effective in providing analgesia after total abdominal hysterectomy in comparison to QL block.

Declaration

Ethics approval

Ethics approval: The study was approved by Ethical Review Board of DMCH (Memo No. ERC-DMC/ECC/2022/04).

Author Contributions:

Conception and development of the idea: AMH
Writing: AMH, TM
Data analysis: AMH, MMK
Data collection: MSA, SAS, AKMNK
Review and Editing: AMH, MMK

Funding: None

Conflict of interest: None

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