Ultrasound-guided quadratus lumborum block versus transversus abdominis plane block in postoperative pain management after laparoscopic sleeve gastrectomy

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Background
Patients undergoing abdominal surgeries may benefit from an ultrasound-guided quadratus lumborum block (QLB) as one of the postoperative pain management techniques.
Objective
This study compares the effects of bilateral ultrasound guided Transversus abdominis plane (TAP) block versus bilateral ultrasound guided QLB on postoperative analgesia in patients having laparoscopic sleeve gastrectomy (LSG) under general anaesthesia (GA).
Patients and methods
45 patients who were scheduled for elective LSG participated in a randomized controlled trial. All patients were given 1–2 μg/kg of intravenous fentanyl as intraoperative narcotic during GA. **QLB Group (15 patients):** received ultrasound-guided QLB using 0.2 mL/kg of 0.25% bupivacaine per side after induction of general anaesthesia. **TAP Group (15 patients):** received ultrasound-guided TAP block using 0.2 mL/kg of 0.25% bupivacaine per side after induction of general anaesthesia**. Control Group (15 patients):** received general anaesthesia and then 1 gm IV paracetamol and 30 mg IV ketorolac within first hour and 8 h postoperative.
Results
QLB group used pethidine as rescue analgesia mush less than other groups with highly statistically significant difference (P value$<$0.001). Also, there was statistically significant difference between groups in number of patients needed rescue analgesia (60% of QLB group, 86.7% of TAP group and 100% of control group).
Also, the QLB group had superior clinical pain scores than the other groups with a statistically significant difference at PACU arrival, 30 min, 2 h, and 4 h postoperative. The TAP group had a lower VAS score than the control group, with a statistically significant difference at PACU arrival and 4 h postoperative. In comparison to the TAP group, the VAS score was lower in the QLB group, with a statistically significant difference at 30 min postoperatively.
MAP was significantly lower in the QLB group than in the control group at PACU entry, 30 min, and 6 h postoperatively. However, MAP was lower in the QLB group than in the TAP group, with a statistically significant difference only at the 12- and 24-hour post-operative time points. HR was less significantly in QLB group than control group at 30, 2, 12, 24 h postoperatively, when comparing the HR between the QLB and TAP groups, the difference became statistically significant only at the 12-hour post-operative time.
Conclusion
In compared to TAP block and IV analgesics, QLB was the most efficient method for delivering analgesia following LSG.

Keywords:
Laparoscopic sleeve gastrectomy, obesity, pain, pethidine, Quadratus lumborum block, transversus abdominis plane

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Guided Quadratus Lumborum Block versus Transversus Abdominis Plane Block in Post-operative Pain Management after Laparoscopic Sleeve Gastrectomy: A Randomized Controlled Trial

Introduction

Obesity has been linked to considerable medical and psychiatric comorbidity, as well as an elevated hazard ratio for all-cause death. The demand for bariatric surgery is growing quickly, and the concepts of laparoscopy and fast-track surgery have made it an

affordable and effective method of treating the severely obese.[1]

During laparoscopic operations, postoperative discomfort is still a significant element that might lower the overall success of recovery.[2]

A rising understanding of the advantages of acute pain control on patient satisfaction, quality of life, and in the avoidance of the emergence of chronic pain syndromes has led to guidelines for pain evaluation and management.[3]

Although, the use of opioids frequently results in unfavourable side effects (respiratory depression, central nervous system depression, sedation, circulatory depression, nausea, vomiting, pruritus, urinary retention, impairment of bowel function, and sleep disruption), which can impede recovery from surgery. Opioids continue to play a significant role in the management of acute postoperative pain.[4]

Transversus abdominis plane block blocks the sensory afferent nerves that flow between the abdominal muscles and reduces pain around surgical incisions.[5]

Quadratus lumborum block was initially introduced by Blanco in 2007. The major benefit of the QLB over the TAP block is the expansion of the local anaesthetic (LA) agent into the thoracic paravertebral area above the transversus abdominis plane. The diffusion of LA to the paravertebral region, which contains mechanoreceptors, nociceptors, and sympathetic fibres, is thought to be the cause of the block's ability to suppress visceral pain which result in more potent and prolonged analgesia with less side effects than other analgesic modalities.[6] We postulate that QLB could have comparable analgesic efficacy and possible longer duration of analgesia in comparison to TAP block and conventional IV analgesics.

Aim of the work

This research compares the effects of bilateral ultrasound guided QLB and TAP blocks on postoperative analgesia in individuals having LSG under GA.

Patient and methods

Ain Shams University Hospitals undertook this prospective randomised clinical trial between Jan 2021 and July 2022 after receiving clearance from the anaesthesia department's scientific and ethical committee; Research Ethics Committee (REC) with identification No. FMASU MD268a/2020/2021/2022. All patients were provided their written informed permission. The research was planned for elective LSG comprised 45 obese individuals with a body mass index (BMI) between 35 and 45 kg/m2. ASA class II, from both sexes and ranged in age from 25 to 60. Using a closed-envelope approach and a random number table, the patients were placed in one of three groups: either group received combination GA and QLB (QLB group), GA combined with TAP block (TAP group), or GA with 1 gram of IV paracetamol and 30 milligrammes of IV ketorolac 1 and 8 h after surgery (control group). 15 patients make up each group (n=15).

Exclusion Criteria included refusal to provide written informed consent, a history of medication allergies, psychiatric disorder, BMI greater than 45 kg/m^2, complicated surgery, conversion to open sleeve gastrectomy and contraindications to regional anaesthesia (including coagulopathy and local infection).

Preoperative settings

All patients were assessed preoperatively by history taking, full physical examination, laboratory evaluation and other appropriate investigations.

Intraoperative settings

Electrocardiography, non-invasive blood pressure monitoring and pulse oximetry were monitored the patients as soon as they were entered the operating room. baseline measurements of heart rate (HR), arterial oxygen saturation (SpO_2), mean blood pressure (MAP), systolic blood pressure, and diastolic blood pressure are taken were recorded. IV line was inserted. Both groups received IV ceftriaxone (2 g) as antibiotic, IV granisetron (1 mg) as antiemetic, an IV fentanyl (1–2 g/kg) and propofol (2 mg/kg) to produce general anaesthesia. For endotracheal intubation, rocuronium (0.5 mg/kg) was then administered. Using capnography, mechanical ventilation is maintained to keep the end-expiratory CO2 levels between 34 and 36 mmHg. Isoflurane 1-2 vol% in 100% O2 is used to maintain anaesthesia. Every 30 min or as needed, an incremental dosage of rocuronium (0.1 mg/kg) were administered.

The blocks were performed after endotracheal intubation and before the operation begins.

All blocks were conducted by a Sonoscape SSI 6000 ultrasound machine with a high frequency linear probe

coated in sterile sheath and a 100 mm needle (B- Braun Medical Inc., Bethlehem, PA, USA) under strict aseptic conditions.

In TAP group

The layers of the abdominal wall (external oblique, internal oblique, and transversus abdominis muscles) were identified by placing the probe in the anterior axillary line at the level of the umbilicus, between the iliac crest and the lower costal border. The needle was introduced to be between the internal oblique and transversus abdominis muscles using an in-plane method (Fig. 1).

0.2 mL/kg of 0.25% bupivacaine is administered per side after negative aspiration (to rule out IV injection). The dosage was adjusted to ensure not exceeding the toxic thresholds. The same technique was performed on the other side.[6]

In QL group

The patient was lying supine with a slight lateral tilt, the transducer was positioned at the anterior superior iliac spine, and moved cranially until the three muscles of the abdominal wall were plainly visible. The transducer moved cranially until the three abdominal wall muscles were clearly identified. Then the external oblique muscle followed posterolaterally until its posterior border was visualized, leaving underneath the internal oblique muscle, like a roof over the QL muscle (hook sign). To locate the middle layer of the thoracolumbar fascia, which is represented by a strong hyperechoic line, the probe was tilted downward. Anterolateral to posteromedial was the plane of the needle's insertion. The needle's tip was inserted between the QL muscle and the thoracolumbar fascia, then following aspiration, the right needle location was confirmed by injecting 5 ml of normal saline. Ahypoechoic picture and hydrodissection appeared (Fig. 2). 0.2 ml/kg of 0.25% bupivacaine to each side were injected.

The dosage adjusted to ensure toxic thresholds does not exceeded; the same technique was performed on the other side.[6]

In control group

Patients received 1 gm IV paracetamol and 30 mg IV ketorolac at the first hour hour and 8 h postoperatively.

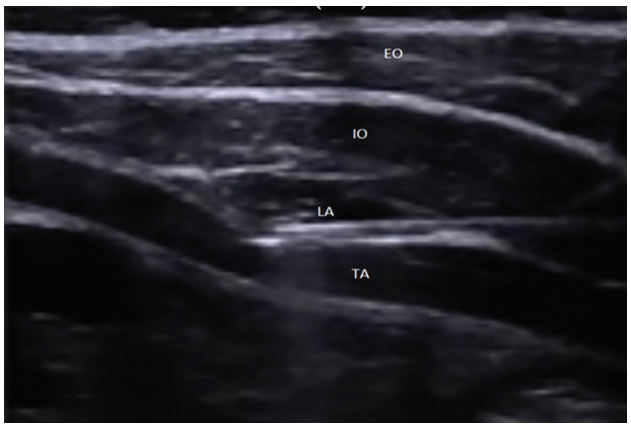
(1) **Intraoperative** fentanyl 1ug/kg was given when the HR or the blood pressure or both increased>20 percentage of the baseline. Isoflurane discontinued on completion of the surgical procedure, and sugammadex 2 mg/kg administered to reverse the effect of rocuronium. After awakening from anesthesia and achieving an appropriate level of consciousness, the patient discharged from the operating room.

All medications were given according to lean body weight except sugammadex were given according to actual body weight.

Postoperative settings

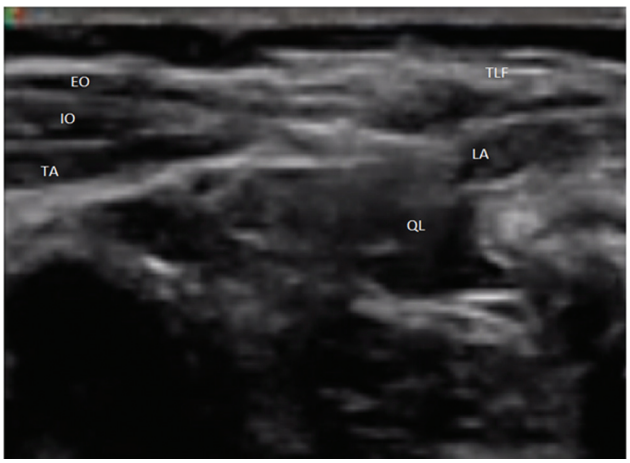
The visual analogue score (VAS) as well as HR (beats/min) and MAP (mmHg) were used to assess pain intensity at rest and on movement upon arrival to

Figure 1



Sonographic image of the abdominal muscles layers with local anesthetic spread in TAP block. EO=External oblique muscle, IO=Internal oblique muscle, TA=Transversus abdominis muscle, LA=Local anesthetic drugs.

Figure 2



Sonographic image of the abdominal muscles layers with local anesthetic spread in QLB. QL=Quadratus lumborum muscle, EO=External oblique muscle, IO=Internal oblique muscle, TA=-Transversus abdominis muscle, LA=Local anesthetic drugs, TLF=Thoracolumbar fascia.

the PACU and after 30 min, 2, 4, 6, 12 and 24 h postoperatively.

The first time of analgesia requirement was recorded (when VAS is >3 and or when HR and/or MAP is >20 percentage from the baseline) and analgesia was given in the form of 50 mg pethidine IV with maximal dose of 200 mg in 24 h.

If pain persist after reaching the maximum dose of pethidine, 1 gm IV paracetamol up to 4 gm/day and 30 mg IV ketorolac up to 90 mg/day given.

Measurements

Primary outcome

VAS for pain assessment (ranging from 0 to 10, where 0 no pain and 10 maximum pain) at the arrival to the PACU and after 30 min and every hour during the first 12 h and then every 4 h thereafter for 24 h postoperatively.

Secondary outcome

(1) The total dose of pethidine used postoperatively (patient rescue analgesia) for 24 h.
(2) Postoperative hemodynamics.
(3) Number of patients needed rescue analgesia.

Sample size

Using PASS11 program for sample size calculation and according to ***(Yousef et al., 2018)***,[7] the expected mean VAS score 12 h postoperative in study groups: 3.5 +/– 0.62 for QL group and 1.8 +/– 0.46 for TAP group. Sample size of 15 patients in each group can detect difference between two groups with power >90% setting α- error at 0.05.

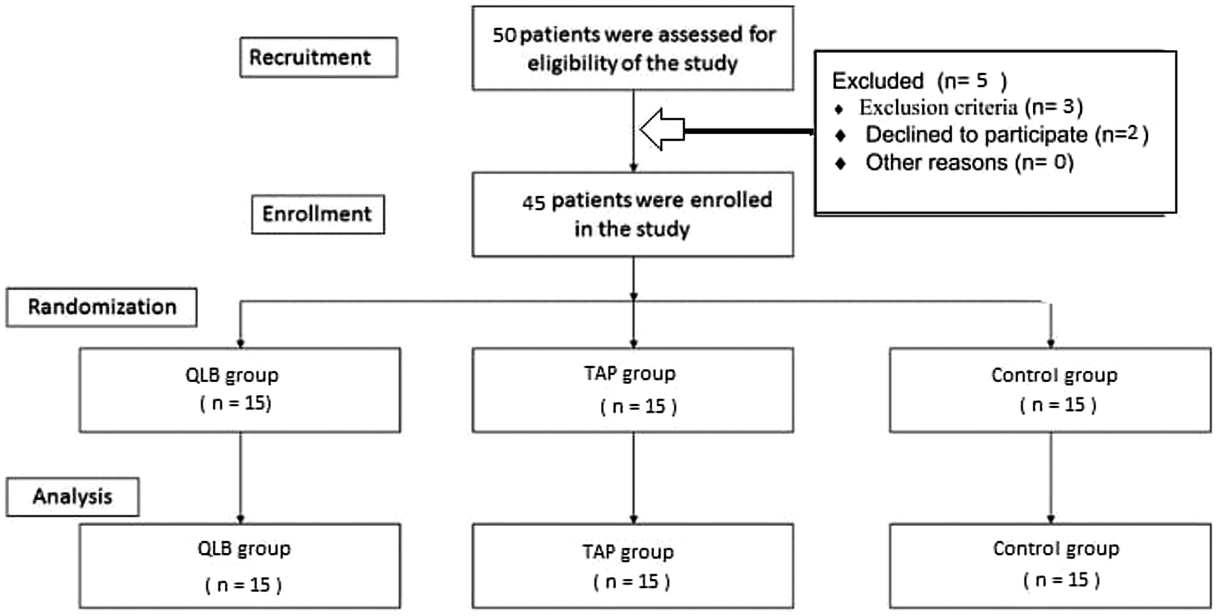
Statistical analysis

Quantitative data were represented as mean standard deviation (SD) or median and interquartile range (IQR) when analysed using the Statistical Package for Social Science (SPSS) version 22.0. Qualitative data were expressed as frequency and percentage.

The following tests were used:

(1) One-way analysis of variance (ANOVA) was used to compare the means of different subgroups of a variable, and when the ANOVA test is positive, the post-hoc test is used to compare subgroups pairwise.
(2) To compare proportions between qualitative factors, the Chi-square (X2) test of significance is used.
(3) The Kruskal-Wallis test is used to compare a number of subgroups in non-parametric data.
(4) The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the *P* value was considered significant as the following:
(5) Probability (*P* value)
    (a) *P* value <0.05 was considered significant.
    (b) *P* value <0.001 was considered as highly significant.

Figure 3



Consort flow chart of the studied patients. TAP=Transversus abdominis plane, QLB=Quadratus lumborum block.

(c) *P*-value >0.05 was considered non-significant.

Forty fife (45) patients were enrolled in the study. 15 patients in QLB group, 15 patients in the TAP block group and 15 patients in control group.

Results

A total of 45 patients were assessed for eligibility, randomized into 3 groups 15 patients each allocated to receive QLB with GA, TAP block with GA or GA with conventional analgesics, then they followed up for 24 h and results were analyzed (Fig. 3).

Patients' characteristics

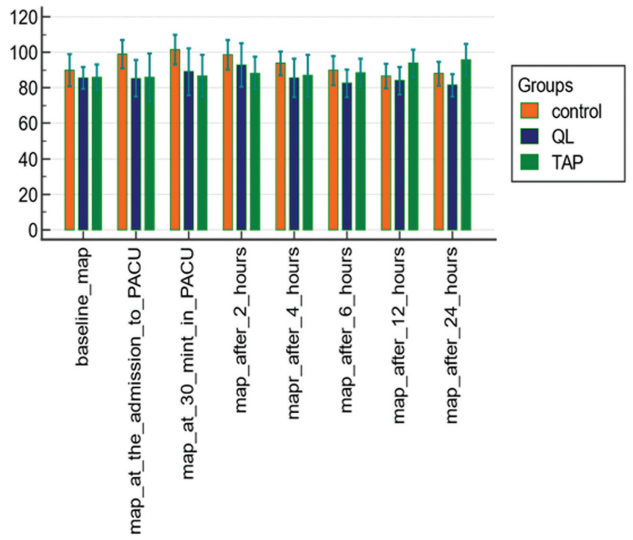
Groups were comparable in demographic data (in terms of age, sex and BMI) and there was no statistically significant difference between groups (*P* value>0.05) (Table 1).

Hemodynamics

Groups were comparable in post operative hemodynamics in terms of MAP and HR at intervals of (PACU, 30 min after PACU, 2, 4, 6, 12 and 24 h post operative).

MAP was significantly lower in the QLB group than in the control group at PACU entry, 30 min, and 6 h postoperatively. However, MAP was lower in the QLB group than in the TAP group, with a statistically significant difference only at the 12- and 24-hour post-operative time points (Table 2) (Figs. 4 and 5). HR was less significantly in QLB group than control group at 30, 2, 12, 24 h postoperatively (Table 3), when comparing the HR between the QLB and TAP groups, the difference became statistically significant only at the 12-hour post-operative time (Figs. 6 and 7).

Figure 4



Bar chart graph comparison between groups as regards MAP.

Table 1 Comparison between groups as regard Patients' characteristics

Demographic data	QL group (*n*=15)	TAP group (*n*=15)	control group (*n*=15)	F/Z/x2	*P* value
Age (y)	39.47±10.1	40.9±7.8	39.87±7	0.12[F]	0.89
BMI (kg/m^2)	40.47±2.9	40.67±2.81	40.7±2.8	0.035 [F]	0.97
Sex					
male	8 (53.3%)	7 (46.7%)	8 (53.3%)	0.18 [X2]	0.9
Female	7 (46.7%)	8 (53.3%)	7 (46.7%)		

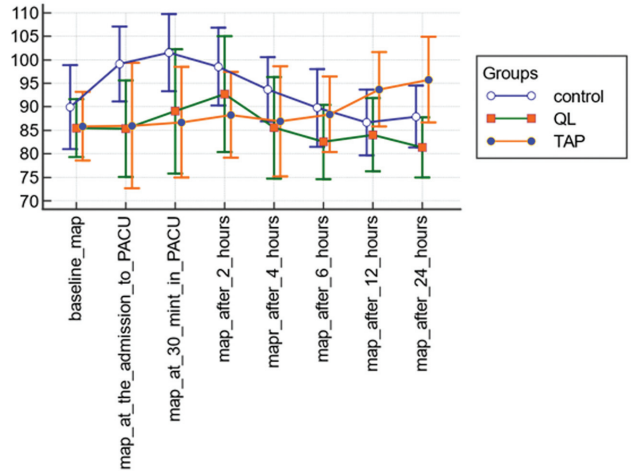
Data expressed as mean ± SD, proportion, F=one way a nova, X= Chi-square, QL= quadrates lumborum group, TAP= transverses abdominus plane block group, *P* value <0.05 was considered significant, *P*-value <0.001 was considered as highly significant, *P* value >0.05 was considered non-significant.

Table 2 Comparison between groups as regard mean arterial blood pressure

	QL group (*n*=15)			TAP group (*n*=15)			Control group (*n*=15)				
	Range	Median	IQR	Range	Median	IQR	Range	Median	IQR	Z	*P* value
vas zero	0–3	1	1–1	0–2	1	1–2	1–3	2	1.25–2	10.3 [¶ €]	0.006
vas 30 min	0–2	1	1–2	0–3	2	2–2.75	1–3	2	1.25–2	7.3 [¶ ¥]	0.026
vas 2 h	1–3	1	1–2.75	1–5	2	1.25–3	1–5	3	2–4	7.9 [¶]	0.019
vas 4 h	0–4	2	2–2	1–6	2	1–2.75	1–4	3	2–4	7.35 [¶ €]	**0.025**
vas 6 h	1–5	2	1–2.75	1–5	3	2–3.75	1–5	3	2–4	5.9	0.052
vas 12 h	1–3	2	2–2.75	1–4	3	2–3	1–4	3	2–3	3.2	0.199
vas 24 h	1–3	2	2–2.75	0–4	2	2–3	1–5	3	2–4	5.2	0.075

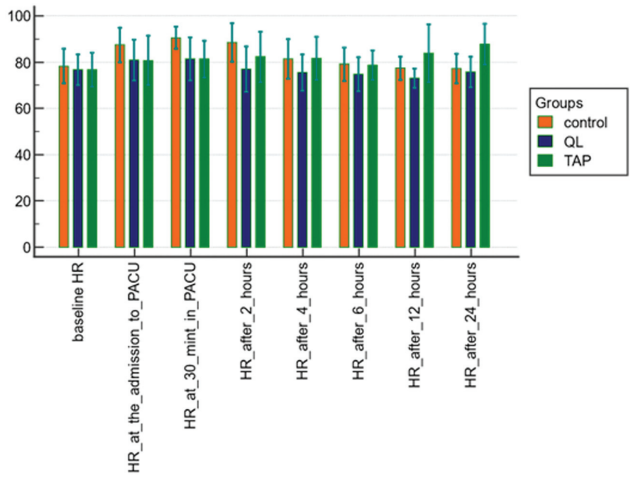
Data expressed as mean ± SD, F=one way a nova, QL= quadrates lumborum group, TAP= transverses abdominus plane block group, *P*-value <0.05 was considered significant, *P*-value <0.001 was considered as highly significant, *P*-value >0.05 was considered non-significant. ¶=post hoc test (Tukey) test significance between control group and QL group. ¥=post hoc test (Tukey) test significance between QL group and TAP group. €= post hoc test (Tukey) test significance between control group and TAP group.

Figure 5



Comparison graph between groups as regard MAP.

Figure 6



Bar chart graph comparison between groups as regards HR.

Table 3 Comparison between groups as regard heart rate

HR	QL group (*n*=15)	TAP group (*n*=15)	control group (*n*=15)	F	*P*-value
Baseline	76.7±6.6	76.6±7.3	78.2±7.4	24.0	0.788
At admission to PACU	80.9±8.8	80.7±10.7	87.4±7.5	2.64	0.083
30 mints in PACU	81.4±9.3	81.2±7.9€	90.5±4.8 ¶	7.28	0.002
2 h	76.9±9.7	82.3±10.9	88.4±8.2 ¶	5.28	0.009
4 h	75.5±7.8	81.7±9.3	81.3±8.5	2.45	0.098
6 h	74.8±7.3	78.7±6.3	79.1±7.2 ¶	1.76	0.184
12 h	73.0±4.1	83.8±12.4 ¥	77.3±5.0	6.69	**0.003**
24 h	75.7±6.5	87.7±8.7€	77.2 ±6.4	16.77	**<0.001**

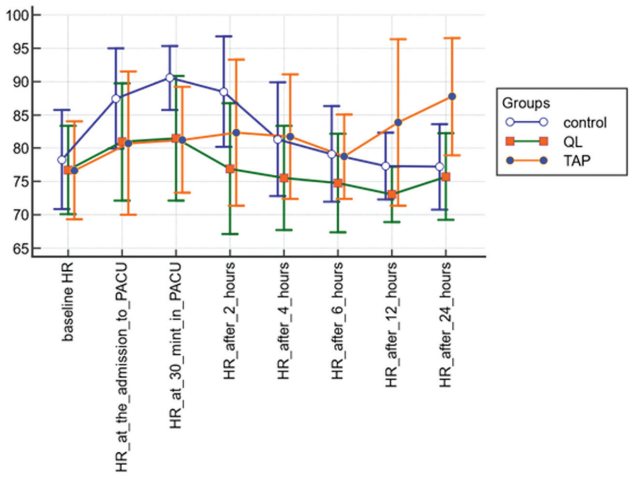
Data expressed as mean ± SD, F=one way a nova, QL= quadrates lumborum group, TAP= transverses abdominaus plane block group, *P*value <0.05 was considered significant, *P*-value <0.001 was considered as highly significant, *P*-value >0.05 was considered non-significant. ¶= post hoc test (Tukey) test significance between control group and QL group. €= post hoc test (Tukey) test significance between control group and TAP group. ¥= post hoc test (Tukey) test significance between QL group and TAP group.

Pain control

The QLB group had superior clinical pain scores than the other groups from PACU arrival to 24 h postoperative with a statistically significant difference at PACU arrival, 30 min, 2 h, and 4 h postoperative. Also, from PACU arrival to 24 h postoperative, the TAP group had a lower VAS score than the control group, with a statistically significant difference at PACU arrival and 4 h postoperative (Table 4, Fig. 8). In comparison to the TAP group, the VAS score was lower in the QLB group, with a statistically significant difference at 30 min postoperatively.

QLB group used pethidine as rescue analgesia mush less than control group with highly statistically significant difference (*P* value <0.001). also, QLB group used pethidine less than TAP group with statistically significant difference (Table 5, Fig. 9). Also, there was statistically significant difference between groups in number of patients needed rescue analgesia (60% of QLB group, 86.7% of TAP group and 100% of control group) (Table 6).

Figure 7



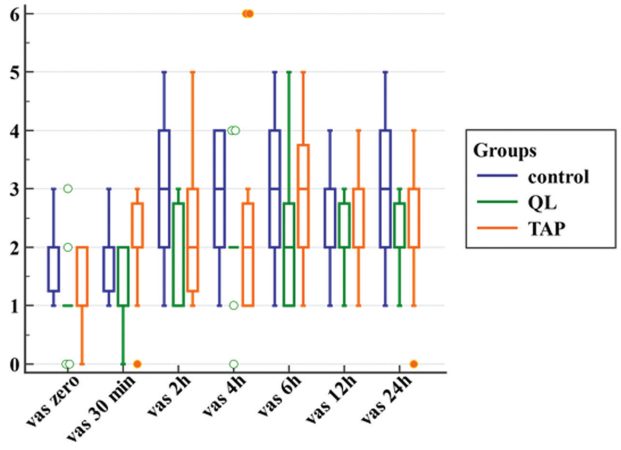
Graph comparison between groups as regard HR.

Table 4 Comparison between groups as regard VAS score

	QL group (*n*=15)			TAP group (*n*=15)			Control group (*n*=15)				
	Range	Median	IQR	Range	Median	IQR	Range	Median	IQR	Z	*P* value
vas zero	0–3	1	1–1	0–2	1	1–2	1–3	2	1.25–2	10.3 ¶€	0.006
vas 30 min	0–2	1	1–2	0–3	2	2–2.75	1–3	2	1.25–2	7.3 ¶¥	0.026
vas 2 h	1–3	1	1–2.75	1–5	2	1.25–3	1–5	3	2–4	7.9 ¶	0.019
vas 4 h	0–4	2	2–2	1–6	2	1–2.75	1–4	3	2–4	7.35 ¶ €	**0.025**
vas 6 h	1–5	2	1–2.75	1–5	3	2–3.75	1–5	3	2–4	5.9	0.052
vas 12 h	1–3	2	2–2.75	1–4	3	2–3	1–4	3	2–3	3.2	0.199
vas 24 h	1–3	2	2–2.75	0–4	2	2–3	1–5	3	2–4	5.2	0.075

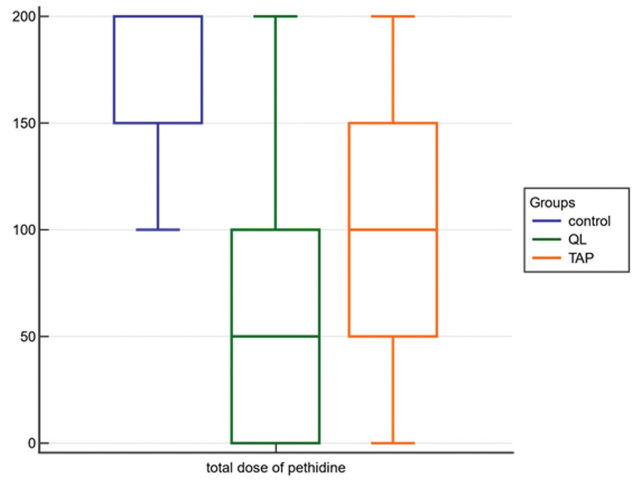
Data expressed as median and IQR, z=Kruskal wallis QL= quadrates lumborum group, TAP=transverses abdominaus plane block group. *P* value<0.05 was considered significant, *P* value <0.001 was considered as highly significant, *P*-value>0.05 was considered non-significant. ¶= post hoc test (conover) test significance between control group and QL group. € = post hoc test (conover) test significance between control group and TAP group. ¥ = post hoc test (conover) test significance between QL group and TAP group.

Figure 8



Box and whisker graph comparison between groups as regard Vas score.

Figure 9



Box and whisker graph comparison between groups as regard pethidine consumption.

Table 5 Comparison between groups as regard Pethidine consumption

	QL group (*n*=15)			TAP group (*n*=15)			Control group (*n*=15)				
	Range	Median	IQR	Range	Median	IQR	Range	Median	IQR	Z	*P* value
Pethidine consumption	0–200	50	0–100	0–200	100 ¥	50–150	0–2000	150 ¶ €	150–200	19.2	<0.001

Data expressed as median and IQR, z=Kruskal wallis QL= quadrates lumborum group, TAP= transverses abdominaus plane block group, *P* value <0.05 was considered significant, *P* value <0.001 was considered as highly significant, *P* value >0.05 was considered non-significant. ¶= post hoc test (conover) test significance between control group and QL group. €= post hoc test (conover) test significance between control group and TAP group. ¥= post hoc test (conover) test significance between QL group and TAP group.

Table 6 Comparison between groups as regard number of patients need rescue analgesia

	QL group (*n*=15)	TAP group (*n*=15)	control group (*n*=15)	X^2	*P* value
Patients need rescue analgesia	9 (60%)	13 (86.7%)	15 (100%)	8.5	0.014

Data expressed as, proportion, X^2= Chi-square, QL= quadrates lumborum group, TAP= transverses abdominaus plane block group, *P* value <0.05 was considered significant, *P* value <0.001 was considered as highly significant, *P* value >0.05 was considered non-significant.

Discussion

The requirement for appropriate postoperative pain management is crucial for patient satisfaction, our study's findings showed that QLB proved to be even more effective than TAP block and IV analgesia. The superiority of the two analgesic technique (TAP block and QLB) was demonstrated by the pain scores (VAS), patients needing rescue analgesia, and total amount of pethidine used. In compared to patients in the TAP group and the QLB group, the patients in the control

group had the highest pain scores, the greatest number of patients who required rescue analgesia, and the greatest overall intake of pethidine within the first 24 h following surgery.

Due to its anatomical benefits, ultrasound-guided QLB is thought to be beneficial against both somatic and visceral pain by producing a local anaesthetic effect in the paravertebral area. Widespread, persistent, and more effective postoperative analgesia is offered by QLB. Few studies, however, have examined the effectiveness of QLB in obese individuals undergoing bariatric surgery. In order to compare the effects of different analgesic techniques on postoperative pain, the current randomised controlled experiment was conducted.

Our findings revealed that Pethidine consumption and number of patients needed rescue analgesia was less in QLB group than TAP group and also less in TAP group than in control group. VAS score was less in QLB group than control group at 0, 30, 2, 4 h post operatively. Also, VAS score was less in QLB group than in TAP group at 30, 2, 6, 12 h post operatively. MAP was less in QLB group than control group at time of PACU admission, 30, 2, 6, 12, and 24 h postoperatively. HR was less in QLB group than control group at 30, 2, 12, 24 h postoperatively, which support Blanco [6] and his colleagues' 2016 finding that the QLB provides longer lasting analgesia than the TAP block. Also, their findings demonstrated that using the QLB as the standard approach can considerably lower opioid use and negative outcomes following caesarean birth.

Similar research was conducted in 2015 by Blanco [8] and his colleagues on the impact of QLB versus placebo on PCA morphine dosages and requests following caesarean delivery. They discovered that between six- and twelve-hours following surgery, individuals who got QLB consumed much less morphine than those in the control group. Also, they had considerably less need for morphine at all times following caesarean surgery. The VAS scores were significantly better at every observation time in the QLB group than in control patients.

A comparison of the QL and TAP blocks for postoperative pain reduction following lower abdominal surgery in children was also conducted in 2017 by Gözen [9] and his colleagues. The QLB offered more effective pain relief than the TAP block, according to the study's findings, and had no negative side effects.

Anterior QLB and TAP block were compared in a patient having subtotal colectomy with a midline incision reaching from above the umbilicus to the pubic symphysis in a case report by Elsharkawy [10] and his coworkers in 2016. After about 48 h, this patient had consistent sensory blockage in the matching dermatome distribution on the QLB side; however, the TAP block on the opposing side did not extend the whole length of the incision. It shown how QLB may induce sensory blocking, induce analgesia, and prolong analgesia for abdominal procedures along the mid and lower thoracic dermatomes which agree with or study results.

The conclusion reached by Takeshi [11] and his collaborators in 2016 supports our finding they discovered that the effects of a single injection QLB with 20 mL of ropivacaine in laparoscopic ovarian surgery could extend to T7–T12 and endure for about 24 h indicating that the duration of analgesia was substantially longer for QLB than for TAP block.

In the first 24 h following a laparotomy for the removal of a duodenal tumour, Vasanth [12] in 2013 discovered decreased pain ratings and an opioid demand. While this study was conducted on 20 patients with Field [13] in 2011, the opioid consumption was comparable to the first day following continuous TAP block for major abdominal surgery through supra-umbilical or infra-umbilical incisions. He was comparing one patient who received single injection QLB to 10 patients who had continuous TAP block, which may account for the similarity in the day-one opioid intake between the case report and the study.

In support of our findings, Turk [14] discovered that patients who underwent elective open upper abdominal surgery under GA and received US-guided QLB had lower postoperative pain scores, a longer time before they requested their first opioid analgesic, fewer morphine doses in the first 24 h after surgery, a lower 24-hour total morphine consumption, and higher patient satisfaction compared to patients who received US-guided TAP block.

Complication from TAP block and QLB have been few. Intravascular injection, local anesthetic systemic toxicity and laceration from enlarged liver/spleen have been noted. With US guidance, these complications have been reduced. A rare complication was reported by a case report in Salaria [15] and his colleagues in 2017 during performing TAP block for a patient undergoing CS a transient femoral nerve palsy with the involvement of the sacral plexus, as a result of high

volume and concentration of local anesthetic and the pressure of the abdominal binder but in our study no complication recorded after performing TAP block or QL block.

But Michał Borys [16] and his colleagues considered the TAB or QL block didn't control the postoperative chronic pain e.g. They measure the pain post-operative up to 1st, 3rd, and 6th month after the CS surgery anyway here we didn't cover these items Because it is unlogic to examine analgesic effects to a single injection after 3-6 months. However, regarding the first 24 h postoperative QLB technique succeeded in controlling the pain as previously mentioned.

Technical problems

Technical problems encountered during the study included the need of assistance to tilt the patients on both sides in order to perform bilateral injections in the QLB group; because we included morbidly obese patients with BMI between 35 and 45 kg/m^2, whose repositioning after induction of general anesthesia was quite difficult. Moreover, ultrasound visualization was also difficult sometimes for the same reason.

Limitations

limitations in our study included that we evaluated only single-injection technique for both QLB and TAP blocks, while patients of the three groups were allowed to take intravenous pethidine as needed.

Despite the use of ultrasound guidance for performing QLB and TAP blocks, we did not test the sensory block plane in these patients.

Also, the small sample size of our study can affect the validity of our result. Finally, we excluded the patients with ASA physical status >II and BMI >45 kg/m^2 or <35 kg/m^2, which limits the external generalizability of the results.

Key messages

Generally, most studies seem to agree that QLB is more effective than TAP or general anesthesia alone. This is part of utilizing multimodal approach and direct block of sensory nerves using local analgesia and their adjuvants. As a result of adequate analgesia provided stress response presenting as increased blood pressure and increased heart rate is attenuated.

Conclusion

This study found that QLB was the most efficient approach for delivering analgesia following LSG surgery without causing concomitant hemodynamic instability. In situations where QLB is not possible, TAP block has the potential to offer a middle ground between GA with conventional analgesics and GA with QLB.

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Conflicts of interest

No conflict of interest.

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