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Original Article

A Randomized Study on Quadratus Lumborum and Transversus Abdominis Plane Blocks for Postoperative Pain Management after Cesarean Delivery

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Abstract

Background: Effective postoperative analgesia after caesarean section is crucial for early ambulation and quality of life. Quadratus lumborum [QL] block is gaining wide acceptance for pain control after lower abdominal surgery.

Aim of the study: The current work aimed to compare between transversus abdominis plane [TAP] block and Quadratus Lumborum Block [QLB] in patients undergoing elective cesarean delivery [CD] under spinal anesthesia.

Patients and Methods: The study included 200 patients who were divided randomly into two equal groups according to the type of anesthetic blocks [Ultrasound guided QLB and TAP block]. All underwent cesarean delivery using Pfannenstiel incision and subarachnoid anesthesia with 0.25% bupivacaine. Preoperatively all women were assessed clinically and by laboratory investigations. The visual analogue scale [VAS] was the proper method for postoperative pain assessment. Women demographics and preoperative hemodynamics were recorded. After the procedure, hemodynamics and pain assessment was continued on regular intervals. The time for first analgesic request, the total dose of analgesics and any complications were documented.

Results: QLB group had significantly lower pain score at 4 and 6 hours, and from 10 hours till the end of assessment duration. Both groups were comparable after surgery and at 2 hours. The heart rate and respiratory rate were significantly lower in the QLB than the TAB group. However, values were in the normal range. The time for the first analgesic request was significantly longer in QLB than TAP block [458.79±39.68 vs 262.75±30.92 minutes. The total dose of analgesics was significantly lower in QLB than TAPB. The somatic pain was reported by 17% and 45% in QLB and TAPB groups respectively.

Conclusion: The Quadratus lumborum block was a safe, reliable, and effective option for postoperative pain relief after elective caesarean delivery. QLB was superior to the TAP block for pain control and both were comparable as the rate of complications.

Keywords: Cesarean Delivery; Visual Analogue Scale; Pain; Quadratus Lumborum; Transversus Abdominis.

INTRODUCTION

Cesarean section [CS] is a common surgery all over the world, and its use is rising in developed and developing countries. It is usually practiced under regional anesthesia [spinal or epidural], as it provides satisfactory post-operative analgesia. However, its analgesia effect is short, and women may experience sever postoperative pain [1].

Post-CS pain may delay recovery and returning to normal daily activities. In addition, the mother-child bonding is impaired with maternal psychological issues that could affect breastfeeding. In addition, inadequate post-CS analgesia may lead to hyperalgesia and persistent pain. Postoperative pain is usually under-treated due to fears of maternal and neonatal-side effects of anesthetic drugs and post-CS pain is often underestimated [2]. Post-CS pain is composed of two main types, somatic and visceral. The somatic part is originated from pain receptors in the abdominal section and conducted by the anterior division of spinal segmental nerves of T10 to L1, which runs in the anterior abdominal wall from medial to lateral among the transverse internal oblique and abdominis muscles. Visceral pain is originated from the uterine nociceptors and transmitted through afferent nerve fibers of the inferior hypogastric plexus to enter the spinal cord through the vertebrae T10- L1 [3].

Understanding the anatomical initiation and distribution of pain leads to development of alternative analgesic measures [e.g., opioids and fascial plane blocks] [4].

Fascial plane Blocks are regional methods of anesthesia. It involves an injection of local anesthetic into fascial planes rather than around distinct nerves. Several fascial plane block methods have been developed for thoracic analgesia [e.g., pectoral nerves [Pecs] 1 and 2, serratus anterior plane and parasternal blocks]. Paraspinal fascial plane blocks are developed [e.g., the erector spinae muscle [ESM], the retrolaminar and the mid-point transverse process to pleura [MTP] blocks]. A local anesthetic is injected into a musculofascial plane adjacent to the bony vertebrae, rather than directly into the paravertebral space. The truncal analgesia includes transversus abdominal plane block, quadratus lumborum block and rectus sheath block. These methods have found specific application as an alternative to thoracic epidural and paravertebral blocks [5]. More recently, ultrasound [US]-guided regional analgesia and anesthesia methods have been used in multimodal and rescue analgesia. The transversus abdominis plane block [TAPB] and the quadratus lumborum block [QLB] are new techniques of truncal plane blocks, and their roles in post-CS analgesia are still under investigation [1]. US-guided quadratus lumborum block is a type of fascial plane block where local anesthetic is injected adjacent to the quadratus lumborum muscle with the goal of blocking the thoracolumbar nerves [6].

Previous trials have investigated the role of the QLB in postoperative analgesia after CS. The QLB reduced pain severity and opioid need in comparison to the controlled group [1]. In TAPB, the cutaneous nerves supplying the anterior abdominal wall [T6 to L1] pass in the neurofascial plane between the internal oblique and the transversus abdominis muscles. These cutaneous nerves can be blocked by injecting an anesthetic into this plane [7].

The rational of the Study: The US-guided inter-fascial plane blocks represent a new route of transmission for local anesthetic to various anatomic locations. However, much more research is warranted.

THE AIM OF THE WORK

This study aims to compare the effects of the ultrasound guided Quadratus Lumborum Block [QLB] and the Transversus Abdominis plane Block [TAPB] in post cesarean pain relief.

PATIENTS AND METHODS

After approval of local medical Ethics Committee and having written informed consent from each patient. The study was carried out in the Department of Obstetrics and Gynecology, Al-Azhar University Hospital [New Damietta]. It included 200 patients who were divided randomly into two equal groups according to the type of anesthetic blocks [Ultrasound guided Quadratus Lumborum block and Transversus Abdominis Plane block]. All underwent Cesarean Section using Pfannenstiel incision and subarachnoid anesthesia with 0.25% bupivacaine.

To be included in the study, the women must be 18-40 years old, scheduled for elective CS and ASA class I-II. On the other side, women were excluded if refused to participate, had morbid obesity, had local skin infection at the block injection site, CS by other incisions than Pfannenstiel, those who operated under epidural and patient controlled analgesia [PCA], sensitivity to prescribed analgesia, coagulopathies or who had uncontrolled chronic medical disease [e.g., diabetes mellitus, hypertension, or cardiac diseases].

Grouping: The randomization was achieved by computer generated random and kept in a closed envelope. On arrival to the operating room, the envelope had been open by a nurse not included in the study and anesthesia was performed accordingly. The first group received Quadratus Lumborum block performed with 20 ml of diluted bupivacaine 0.25% on each side [odd, enveloped numbers]. The second group received Transversus Abdominis Plane block performed with 20 ml of diluted bupivacaine 25% on each side [even enveloped numbers].

Preoperative Evaluation: Evaluation of patients were carried out through proper history taking regarding any pelvi-abdominal surgery, clinical examination [general and abdominal], routine laboratory investigations [complete blood count, bleeding time, clotting time, prothrombin time [PT], partial thromboplastin time [PTT], international normalization ration [INR], urea, aspartate transaminase [AST], alanine transaminase [ALT] and blood glucose level] and classified according to American Society of Anesthesiology [ASA] classification. All patients were informed with procedures and were trained to use visual analogue scale [VAS] for pain assessment. Written informed consents were signed by each patient and her husband.

Preoperative Preparation and Medication: Patients had nothing per month for 8-12 hours before surgery. After admission to the operating theater, a peripheral line cannula [18g] was inserted, and the patient received 500 ml of normal saline before anesthesia. A multichannel monitor [Vamos-Drager Germany] was connected to the patient for continuous display of Electrocardiography to monitor heart rate [beats/min] and detection of dysrhythmias [lead2]. Baseline monitoring data of blood pressure, heart rate and oxygen saturation] were recorded.

Intraoperative Procedures: All surgical procedures were performed by the same surgeons who participated in this study, using

the Pfannenstiel incision. Ultrasound guided TAP& QL blocks were done for all patients after the end of surgery. Both blocks were performed by the same anesthetist, with guidance of ultrasound machine [Medison SONACE R5, SAMSUNG MEDISON CO., LTD, South Korea] powered by convex probe with decreasing depth to 3cm for better visualization and better control of the procedure using spinal needle 22G, 70-90mm in length.

QLB anterior Approach: The technique of the Anterior Approach Quadratus Lumborum [QLB] block, performed for regional anesthesia, was conducted with the patient in a lateral position. The ultrasound probe was placed between the iliac crest and the costal margin, at the level of the anterior axillary line then complete to the posterior axillary line where the site of injection. The aim was to locate the three thin parallel muscles of the anterolateral abdominal wall [external oblique muscle, internal oblique muscle, and transversus abdominis muscle] through ultrasound imaging, and to follow the narrowing of the muscles until the muscle fibers of the transversus abdominis muscle tapered off into its aponeurosis. The injection site for the Quadratus Lumborum [QLB] block was typically located at the anterior border of the quadratus lumborum muscle, a muscle located in the lower back. The following landmarks were commonly used to locate the site [the posterior superior iliac spine [PSIS], the iliac crest, rib number 12, and the transverse process of the L1 vertebra].

The injection site was located by palpating the anterior border of the quadratus lumborum muscle and injecting the anesthetic at that point. The QLB muscle was located by drawing a line between the 12th rib and the transverse process of L1, just superior to the iliac crest. The injection site for the QLB block was typically located between psoas major and quadratus lumborum muscle. A radiological examination was performed and, when the desired hyperechogenic sign was detected, the needle was introduced and advanced into the skin 1-2 cm above the probe, following the muscles to the local anesthetic application site, avoiding transversus abdominis muscle perforation. The needle was introduced at a 90-degree angle and redirected in the desired direction after skin perforation.

Spinal needles 70-90 mm in length were used for the procedure, and local anesthetics were administered after a negative aspiration test. The injection of 1 ml of the solution created visible hydrodissection, separating the muscle from the fascia, representing the desired location. Aspiration tests were performed after every 5 ml of local anesthetic to confirm the extravascular location of the needle tip [Figure 1]. During a Quadratus Lumborum [QLB] block, the following radiological signs were observed after an intramuscular anesthetic injection [spread of local anesthetic, loss of tissue pattern, dilation of blood vessels, and loss of hyperechogenicity

TAP Block:

All participants were kept in a supine position. During the block, a needle was used with a high frequency convex transducer. The operator placed the ultrasound probe inferior and parallel to the costal margin and scanned along the oblique subcostal line. This scan/examination was from the xiphoid to the anterior portion of the iliac crest to identify the 4 muscles of the anterior and lateral abdominal wall [rectus abdominis, external oblique, internal oblique, and transversus abdominis] [Figure 2]. The probe was tilted inferior medially to get a clear ultrasound image of the transversus abdominis muscle beneath the rectus abdominis muscle, thereby allowing a closer approach to the xiphoid with the TAP block.

Effective needle placement for the TAP block was achieved using an in-plane technique near the xiphoid with subsequent injection of 1 to 2 mL of local anesthetic solution into the fascial plane to confirm the location of needle tip in the target plane. Proper needle positioning was confirmed when a convex lens-shaped collection of fluid was identified between the rectus abdominis sheath and the transversus abdominis. Local anesthetic was then injected incrementally to dilate the intermuscular space [hydrodissection].

The dilating plane was opened anterior to the needle, and the needle was advanced toward the lateral-inferior end of the dilating plane [with simultaneous manipulation of needle advancement and hydro-dissection]. This sequence was repeated until the edge of the transducer reached the anterior part of the iliac crest.

Using needle advancement and hydrodissection [starting near the xiphoid and costal margin], the needle was passed between rectus abdominis sheath and the transversus abdominis. It was then directed beneath the aponeurosis of the linea semilunaris and passed through the fascial layer of the internal abdominis and transversus abdominis muscles toward the anterior portion of the iliac crest. 6- to 7-mL volume of solution was required for the hydrodissection in the TAP medial to the semilunaris. The remainder of the volume was used to hydrodissect the planes between internal abdominis and transversus abdominis.

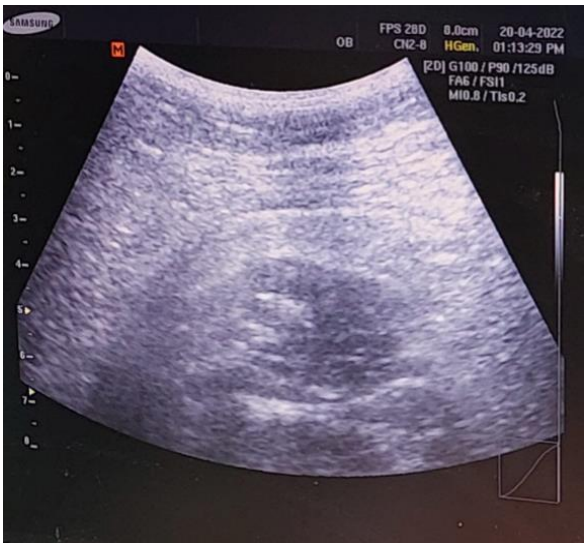

Figure [1]: identification, anesthetic injection of QL

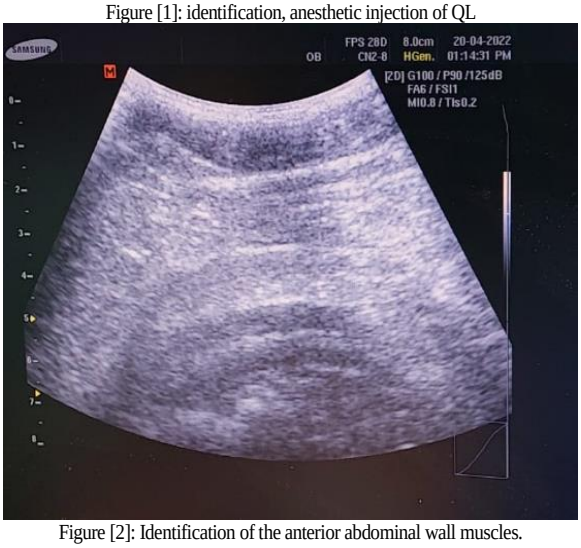

Figure [2]: Identification of the anterior abdominal wall muscles.

For all women, the following measures were recorded:

1- Hemodynamics [Heart rate [beat/min], mean arterial blood pressure [MABP] in mmHg, oxygen saturation, and respiratory rate]. Hemodynamics were recorded just after the end of the block [baseline], every two hours for the first 12 hours, every four hours for the next 12 hours and at the end of the 48 hours.

2- Visual Analogue Scale was recorded every 2 hours at the first postoperative 12 hours, and every 4 hours for the rest of 48 hours.

3-Rescue analgesia in the form of nalbuphine 4mg was given IV when VAS score >4 at any time for first request [recorded from the end of surgery to the first analgesic dose] and total amount of rescue analgesia was recorded.

4- Postoperative complications related to surgery or anesthesia were recorded [e.g., hypotension, bradycardia, numbness in the tongue and around the mouth].

Data management and Statistical Analysis:

After recording in an excel sheet, data was exported to SPSS version 20 [IBM® Inc., Armonk, USA] to calculate statistical measures in line with the type of variables. Qualitative variables were summarized by their relative frequency and percentages, while quantitative variables were summarized by their mean and standard deviation. The following tests were used to test differences for significance [Chi Square and independent samples "t" test for P value was set at <0.05 for significant results.

RESULTS

The results of this study are illustrated in the following tables [Tables 1 – 4].

Table [1] presented the patient demographics, obstetrics history and preoperative hemodynamic measures. It was revealed that there was no statistically significant differences between QLB and TAB groups. The women were in their twenties, mainly overweight, the majority had previous abortion at least once and more than 90% had living children. The preoperative hemodynamics were in the normal range.

The assessment of postoperative pain during the first 48 hours revealed that, QLB group had significantly lower pain score at 4 and 6 hours, and from 10 hours till the end of assessment duration. However, at the 8 hours, the VAS scores were significantly lower in TAB group. Both groups were comparable after surgery and at 2 hours [Table 2].

Postoperative hemodynamics showed non-significant differences between QLB and TAB groups regarding systolic and diastolic blood pressure at any time of observation period. However, heart rate was significantly lower in the QLB than the TAB group at 2, 4, 6, 10, 12, 16, and 20 hours after surgery. Similarly, respiratory rate was significantly lower in the QLB than the TAB group immediately after surgery, and at 2, 6, 8, 10, 12, 16, 20, 24 and 48 hours after surgery. But it was significantly higher in QLB than TAB group at 4 hours after surgery [Table 3].

Postoperatively, the time for the first analgesic request was significantly longer in QLB than TAP block [458.79±39.68 vs 262.75±30.92 minutes after the procedure]. In addition, the time to release from the bed was significantly shorter and the total dose of Nalbuphine was significantly lower in QLB than TAPB. The overall complications [visceral injury, infection, or hematoma in the injection site] were reported for 8 and 9 women in QLB and TAPB respectively. The somatic pain was reported by 17% and 45% of QLB and TAPB groups respectively with significant differences [Table 4].

Table [1]: Demographic, obstetric history, and preoperative hemodynamics among study groups

		Groups		Test of sig.	
		QLB [n=100]	**TAB [n=100]**	**test**	**P-value**
Age [year]		25.09±4.34	26.16±4.93	1.63	0.11
Weight [kg]		76.86±9.91	75.48±10.59	0.95	0.34
Height [cm]		159.24±6.21	160.94±8.24	1.65	0.10
BMI [kg/m^2]		30.49±4.33	29.29±4.60	1.90	0.06
Gravidity		2.41±1.53	2.27±1.28	0.70	0.48
Parity		1.81±0.97	1.82±0.93	0.007	0.99
Previous abortion		87[87.0%]	94 [94.0%]	2.85	0.09
Have living children		86 [96.0%]	91 [91.0%]	1.23	0.268
Hemodynamics	Systolic BP [mmHg]	122.15±5.78	122.70±5.79	0.672	0.502
	Diastolic BP [mmHg]	79.50±5.39	80.90±5.43	1.83	0.069
	MAP [mmHg]	93.57±5.19	94.69±5.18	1.526	0.129
	HR [beat/min]	77.15±5.78	77.70±5.79	0.672	0.502
	RR [cycle/min]	19.82±2.84	19.17±3.00	1.575	0.117

Table [2]: Visual analogue scale [VAS] scores among study groups over the postoperative 48 hours

	QLB		TAB		Test of sig.	
	N=100		N=100			
	Mean	SD	Mean	SD	t/z	P-value
VAS immediately after procedure	1.01	0.10	1.02	0.14	0.579	0.563
VAS at 2h	1.06	0.24	1.10	0.30	1.04	0.300
VAS at 4 h	1.28	0.59	1.67	0.80	3.914	<0.0001*
VAS at 6 h	2.08	0.56	4.77	1.19	20.252	<0.0001*
VAS at 8 h	2.27	1.19	5.08	0.56	21.377	<0.0001*
VAS at 10 h	1.12	0.33	2.24	0.43	20.765	<0.0001*
VAS at 12 h	1.38	0.65	2.78	0.79	13.744	<0.0001*
VAS at 16 h	2.12	0.56	3.23	1.38	7.442	<0.0001*
VAS at 20 h	1.27	0.55	3.31	1.33	14.173	<0.0001*
VAS at 24 h	1.40	0.68	2.91	0.89	13.482	<0.0001*
VAS at 36 h	1.60	0.75	2.97	0.98	11.096	<0.0001*
VAS at 48 h	1.75	0.93	3.26	1.08	10.624	<0.0001*

Table [3]: Hemodynamics among study groups over the postoperative 48 hours

Variable		QLB	TAB	Statistics		Variable		QLB	TAB	Statistics	
				test	P-value					test	P-value
Heart rate	Just after	76.45±2.96	76.40±3.56	0.108	0.914	**Respiratory rate**	Just after	18.13±1.60	19.17±2.11	3.93	<0.001*
	At 2h	76.58±3.17	78.46±3.50	3.982	<0.001*		At 2h	17.79±1.67	18.90±2.19	4.03	<0.001*
	At 4h	76.55±3.15	80.10±2.44	8.904	<0.001*		At 4h	19.05±1.45	18.40±2.72	2.11	0.036*
	At 6h	75.80±4.36	78.00±4.32	3.581	<0.001*		At 6h	18.76±1.59	19.31±2.20	2.03	0.044*
	At 8h	75.85±4.27	75.45±4.44	0.649	0.517		At 8h	17.89±1.47	18.52±2.04	2.51	0.013*
	At 10h	75.75±4.29	78.20±4.21	4.077	<0.001*		At 10h	18.16±1.57	19.07±2.10	3.46	0.001*
	At 12h	76.09±5.20	78.00±4.32	2.826	0.005*		At 12h	18.11±1.56	19.00±2.12	3.38	0.001*
	At 16h	75.39±4.43	77.95±4.30	4.144	<0.001*		At 16h	17.73±2.07	19.20±2.45	4.59	<0.001*
	At 20h	76.07±5.09	77.85±4.33	2.664	0.008*		At 20h	17.92±1.85	18.54±2.40	2.05	0.042*
	At 24h	75.45±4.62	76.25±4.23	1.277	0.203		At 24h	18.13±1.95	18.78±2.47	2.07	0.04*
	At 36h	75.83±4.60	75.85±4.33	0.032	0.975		At 36h	18.29±2.05	18.84±2.24	1.81	0.072
	At 48h	75.95±3.87	75.90±4.34	0.086	0.932		At 48h	17.45±1.99	18.70±2.12	4.30	<0.001*
SBP [mmHg]	Just after	118.85±3.17	118.65±3.00	0.458	0.647	**DBP [mmHg]**	Just after	76.65±3.49	76.40±2.85	0.56	0.579
	At 2h	118.65±3.25	118.50±2.89	0.345	0.730		At 2h	76.30±3.53	76.25±3.05	0.11	0.92
	At 4h	118.50±3.37	118.60±2.76	-0.23	0.819		At 4h	76.35±3.54	76.45±3.00	0.11	0.92
	At 6h	118.70±3.15	118.60±2.85	0.236	0.814		At 6h	76.40±3.26	76.35±3.00	0.14	0.90
	At 8h	118.70±3.15	118.50±2.80	0.475	0.635		At 8h	76.35±3.54	76.25±2.96	0.22	0.83
	At 10h	118.85±2.92	118.55±2.78	0.744	0.457		At 10h	76.60±3.40	76.30±2.90	0.67	0.50
	At 12h	118.45±3.39	118.55±2.87	-0.225	0.822		At 12h	76.15±3.68	76.30±2.98	0.32	0.75
	At 16h	118.65±3.09	118.60±2.76	0.121	0.904		At 16h	76.40±3.34	76.35±2.92	0.12	0.91
	At 20h	118.45±3.31	118.55±2.78	-0.231	0.817		At 20h	76.20±3.42	76.30±2.98	0.22	0.83
	At 24h	118.20±3.37	118.50±2.89	-0.676	0.500		At 24h	75.95±3.60	76.25±3.05	0.64	0.53
	At 36h	118.60±3.18	118.85±2.74	-0.595	0.552		At 36h	76.35±3.32	76.60±2.83	0.57	0.57
	At 48h	118.20±3.45	118.90±2.52	-1.639	0.103		At 48h	76.25±3.36	76.65±3.02	0.89	0.38

Table [4]: Postoperative analgesia, complications, and type of pain among study groups

		QLB N=100		TAPB N=100		Test of sig.	
		Mean	SD	Mean	SD	t/z	P-value
PO analgesia	Time to first request	458.79	39.68	262.75	30.92	38.975	<0.0001
	Time till release from bed	8.09	0.54	11.02	0.60	-36.121	<0.0001
	Nalufin total dose	0.76	0.16	1.18	0.05	-24.707	<0.0001
Complications	Total	8	8%	9	9%	0.06	0.80
	Visceral injury	1	1%	0	0%	1.195	0.274
	Injection site infection	3	3%	4	4%	0.084	0.772
	Injection site hematoma	4	4%	5	5%	0.052	0.819
PO pain	Visceral pain	44	44%	45	45%	0.02	0.89
	Somatic pain	17	17%	45	45%	18.33	<0.001*

DISCUSSION

The main aim of the study was to study the analgesic efficacy of ultrasound-guided bilateral trans-muscular quadratus lumborum block [QLB] compared to bilateral transversus abdominis plane [TAP] in patients undergoing Cesarean section under spinal anesthesia. Results revealed comparable results between both groups regarding demographics and obstetric history. These results are in line with **Borys *et al.*** [8] **and Verma *et al.*** [9] who compared the same techniques after CS and reported comparable results irrespective of the fact that the mean age of their patients was higher than the current one [the median age was 31.7 and 32.8 in Borys et al. [8] and 28.0±3.0 vs 30.0±3.0 in **Verma *et al.*** [9] in TAP and QLB groups respectively]. **Blanco *et al.*** [10] compared the analgesic efficacy of WLB to patient-controlled analgesia and their subjects were homogenous regarding demographics and obstetric history data. In addition, **Nihal *et al.*** [11] reported non-significant differences between groups regarding parity. It was 2.3±1.4 in TAB and 1.8±0.8 in iliohypogastric and inguinal block groups. **Blanco *et al.*** [12] reported that no statistically significant differences were found in oxygen saturation, heart rate, respiratory rate, and blood pressure [systolic and diastolic]. These results are consistent with the results of the current study. In addition, **öksüz *et al.*** [13] reported that there was no significant difference between groups regarding the clinical and the hemodynamic data. These results were confirmed in a more recent study by **Tarek *et al.*** [14].

In the current work, we noted that VAS score of the studied groups over 48 hours was statistically significant lower VAS score in those who received QLB than those who received TAB except at 8 hours after the procedure, where there was a significant increase in QLB than TAB. These results are in line with **Khanna *et al.*** [15] who aimed to study QLB versus TAP for post-CS analgesia and reported no significant differences at the first two hours after surgery. After that, there were significant differences and maximum differences were noted at 10 to 20 hours after procedure. The scores were lower in the QLB than in the TAP group. By the end of the first day, the differences were abolished and become statistically non-significant. **Verma *et al.*** [9] also reported significant reduction of VAS scores in QLB than TAP blood at observation time. Moreover, **Borys *et al.*** [1] reported lower VAS scores in QLB than the TAP block from the second to the 24th hour after the procedure. Interestingly, they included a control group and results confirmed the superiority of both QLB and TAP block than the control group. **Wang *et al.*** [16] and **Blanco *et al.*** [12] reported that QLB was superior to TAP block in alleviation of post-procedure pain. More recently, **Alansary *et al.*** [17] assessed the initial time to rescue analgesia and total amount of opioids [pethidine] used in the first day after surgery. TAP block showed significantly higher pain values than QLB. However, the QLB approach was superior to the TAP block technique in terms of analgesia [pethidine], total opioid consumption, and VAS score. Patients in TAP block group had higher pain scores and were the first to request assistance.

Regarding hemodynamics, our results agree with **Naaz *et al.*** [18] who found that the heart and respiratory rates were comparable between the QLB and the TAB at the first day after procedure. However, **Vaghela *et al.*** [19] reported a significant difference, where heart rate was significantly higher in the B than the A group at 12, 18 and 24 hours after the procedure. This could be explained by different inclusion and exclusion criteria. However, they reported a significant increase of mean arterial blood pressure in the TAP than QL groups at 12, 18 and 24 hours.

The results of the current study were consistent with **Verma *et al.*** [9] who found that the time for rescue analgesic requirement [tramadol 100 mg intravenously] was significantly prolonged in the QLB than the TAP block, p value < 0.001. **Tarek *et al.*** [14] also reported that the mean duration of analgesia in the QLB group [5.7±0.97 hours] which was significantly longer than the TAP block group [4.55±0.9 hours]. The mean average of total analgesics [ketorolac and pethidine] consumption [mg] in the first postoperative 24 hours, was significantly lower in QLB than TAP block. **Naaz *et al.*** [18] controlled trial was performed to evaluate ultrasound guided QLB Versus TAP bock for post-operative analgesia after total abdominal hysterectomy. They reported a significant difference in the duration of analgesia among the groups. It was significantly longer in QLB compared to group TAP block.

Contrary to our results, **El-Boghdadly *et al.*** [20] observed that QLB was not associated with a reduction in 24 hours IV morphine when compared with TAP block. This could be explained by the different inclusion criteria and different sample sizes.

Regarding complication rate, the current study is consistent **Blanco *et al.*** [12] who reported that no complications were encountered in patients who had a cesarean delivery, particularly because the QL2 block is a superficial and safe block. It also agreed with the conclusion of **Verma *et al.*** [9] who stated that QLB block had an efficacy

advantage in blocking both visceral and somatic pain. However, a recent meta-analysis of randomized controlled trials performed by **El-Boghdadly *et al.*** [20] did not prove the superiority of one block over the other due to data inconsistency and methodological limitations.

Finally, our results are in line with **Abo-Elkhair** *et al.* [21] who concluded that, the Quadratus lumborum block was a safe, reliable, and effective option for postoperative pain relief after elective caesarean delivery. QLB was superior to the TAP block for pain control and both were comparable as the rate of complications

To summarize, in a homogeneous sample of women underwent elective cesarean delivery, the QLB was associated with better reduction of postoperative pain, which reflected on the time to ask for rescue analgesia and total consumed dose of analgesics in the first 24 hours after the procedure. This was confirmed by lower somatic pain in QLB than TAP block. Complication rates were comparable, and hemodialysis was within normal values. Thus, we could advocate QLB over TAP block for post-elective CS surgery. However, the absence of control group and small sample size represent a limitation of the study and let us recommend future studies on a large scale.

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