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ULTRASOUND GUIDED QUADRATUS LUMBORUM ANALGESIA: DIFFERENT APPROACHES IN ORTHOPEDIC LOWER LIMB SURGERY UNDER SUBARACHNOID ANESTHESIA

By

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ABSTRACT

Background: Ideal regional nerve block analgesia should theoretically achieve maximum pain relief without interfering with early ambulation, or causing serious side effects. The same also applied to hip and proximal femur surgeries.

Objective: To compare the duration of postoperative analgesia provided by different approaches of quadratus lumborum analgesia (QLB-1/ QLB-2/ QLB-3), in orthopedic lower limb surgery under subarachnoid anesthesia.

Patients and Methods: This study was conducted in Orthopedic surgery operating unit from July 2020 and ended at August 2021 in Al-Azhar University Hospitals (Al-Hussein and Sayed Galal), and approved by the ethics committee from the Department of Anesthesia of Faculty of Medicine, Al-Azhar University. Patients gave written informed consents. 120 patients who were scheduled for orthopedic lower limb surgeries under subarachnoid anesthesia (30 controls and 90 cases divided into three subgroups randomly). Once enrolled, patients were randomly assigned into four equal groups: QLB-1 group has received (lateral QLB), QLB-2 group has received (posterior QLB), QLB-3 group has received (transmuscular QLB). QL blocks were done using 20 ml of Bupivacaine 0.25 %, and SAB control group has received (subarachnoid anesthesia only). The following parameters were monitored: time of requirement of first analgesia, total doses of rescue morphine and Visual Analogue Scale (VAS) at the following intervals: immediately and at 2 / 6 / 12 and 24 hours postoperatively.

Results: The time of requirement of first analgesia significantly prolonged in QLB-3 compared to QLB-1, QLB-2 and SAB control and prolonged in QLB-1 and QLB-2 than SAB control with insignificant differences between QLB1 and QLB-2. The total doses of rescue morphine were significantly lower in QLB-3 compared to QLB-1, QLB-2 and SAB control, and lower in QLB-1 and QLB-2 than SAB control with insignificant differences between QLB1 and QLB-2. VAS was significantly different among the four groups at 2, 12 and 24 hours ($P < 0.001$) but was insignificantly different at PACU and 6 hours. VAS at 2 hours was significantly lower in QLB-3 compared to QLB-1, QLB-2 and SAB Control but with insignificant differences among QLB1, QLB-2 and SAB control group. VAS at 12 and 24 hours were significantly lower in QLB-3 compared to QLB-1, QLB-2 and SAB Control and lower in QLB-1 and QLB-2 than SAB Control with insignificant differences between QLB1 and QLB-2.

Conclusion: Ultrasound-guided Transmuscular Quadratus Lumborum Block, using 20 ml of Bupivacaine 0.25 %, prolonged the duration of analgesia, decreased morphine consumption and improved pain relief score compared to Lateral and Posterior Quadratus Lumborum Block in patients undergoing proximal lower limb surgery under subarachnoid anesthesia.

Keywords: Ultrasound-guided quadratus lumborum block; orthopedic lower limb; subarachnoid anesthesia.

INTRODUCTION

Quadratus lumborum block is a block of the posterior abdominal wall, "interfascial plane block," which is performed exclusively under ultrasound guidance. It was described by anesthesiologist Dr. Rafael Blanco as a variant of the transversus abdominis plane block *(Blanco, 2007)*. Much later, he gave a detailed description of the block technique using the name QLB. Blanco described a potential space posterior to the abdominal wall muscles and lateral to the quadratus lumborum muscle (QL) where Local anesthetics (LA) can be injected *(Blanco and McDonnell, 2013)*.

This technique provides analgesia after abdominal surgeries due to spread of LA from its lumbar deposition cranially into the thoracic paravertebral space (TPVS) where lateral and anterior cutaneous branches from Th7 to L1 nerves can be blocked *(Aygun et al., 2020)*.

Several approaches have been described for QLB. Lateral QLB (or QLB-1) implies the application of local anesthetics on the lateral side of QL muscle in the area of its contact with the transversalis fascia, at the level where transversus abdominis muscle (TA) tapers off into its aponeurosis *(La Colla et al., 2017)*.

Posterior QLB (or QLB-2) implies the application of medication on the posterior side of the QL muscle between the QL and the medial lamina of thoracolumbar fascia which separates QL from the latissimus dorsi muscle and paraspinal muscles *(Gupta et al., 2019)*.

Another novel approach is the transmuscular QLB (or QLB-3), where the needle is advanced through the QL muscle, penetrating the ventral proper fascia of the QL muscle and LA is finally injected between the QL muscle and Psoas Major (PM) muscle *(Ahiskalioglu et al., 2018)*.

QLB is safe and has found its place in multimodal postoperative pain therapy in patients undergoing abdominal surgery, gynecological and obstetric procedures, and orthopedic interventions on hips *(Akerman et al., 2018)*.

Patients who receive QLB as part of a postoperative pain therapy, have lower pain levels both when resting and moving, which is important for early mobilization. The analgesic effect is as good as the one achieved by opioids, and there are no unwanted opioid effects such as nausea and vomiting *(Ishio et al., 2017)*.

According to prospective studies published by *(Blanco et al. 2015 and 2016)* the need for morphine has been significantly reduced postoperatively in patients who received paracetamol, NSAID, and QLB as part of the multimodal postoperative analgesia compared to patients who received only paracetamol and NSAID but did not receive QLB.

The aim of the present work was to compare the duration of postoperative analgesia provided by different approaches of quadratus lumborum analgesia (QLB-1 / QLB-2 / QLB-3), in orthopedic lower limb surgery under subarachnoid anesthesia.

PATIENTS AND METHODS

This study was conducted in Orthopedic surgery operating unit from July 2019 and ended at August 2020 in Al-Azhar University Hospitals (Al-Hussein and Sayed Galal), and approved by the ethics committee from the Department of Anesthesia of Faculty of Medicine, Al-Azhar University. Patients gave written informed consents.

Exclusion criteria: Patient's refusal, patients with severe cardiovascular disease, cerebrovascular insufficiency, coagulation abnormities due to liver, blood diseases or therapeutic anticoagulation, renal or hepatic insufficiency, infection at the injection site or systemic bacteremia, known hypersensitivity to the local anesthetics, preexisting neurological disorder, inability to communicate or cooperate with investigators and chronic pain patients or those receiving chronic pain medications were excluded from the study.

Patients scheduled for orthopedic lower limb surgeries under subarachnoid anesthesia, were randomly assigned into four equal groups (30 patients each): QLB-1 group who received (lateral QLB), QLB-2 group who received (posterior QLB), QLB-3 group who received (transmuscular QLB) and C group was the control group who received (subarachnoid anesthesia only).

Pre-anesthetic assessment was done recording a detailed history and performing a complete physical examination. Complete blood count, renal function test, blood grouping, random blood sugar, electrocardiograph and chest X-ray were done.

The study included patients aged from 18 to 50 years of both genders, ASA physical status I, II, patients scheduled for hip and or thigh orthopedic lower limb surgery under subarachnoid anesthesia and unilaterality in surgical orthopedic procedure for hip and or thigh.

Patients were transferred to the operation theatre after confirming eight hours preoperative fasting status and brief preoperative review examination. The anesthetic management of all the patients was standardized.

All selected patients and control meeting the eligibility criteria were subjected to: personal characteristics of Name, age, sex, weight, height, BMI, ASA physical status. Before surgery, an intravenous line (18G catheter) was inserted, 0.02 mg/kg midazolam was given, and a coload of 15 ml/ kg of Ringer acetate infusion was infused. A five-lead electrocardiogram, a pulse oximeter and a noninvasive blood pressure monitor were applied. All patients were positioned in lateral position with the side to be anesthetized faced upwards, sterilized and covered with sterile sheets. Aseptic precautions were taken by wearing sterile gowns and gloves. Ultrasound was used with broadband convex probe covered with sterile plastic sheath. 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 abdominus muscle became aponeurotic, and this aponeurosis was followed until the QL muscle was clearly visualized with its

attachment to the lateral edge of the transverse process of L4 vertebral body and visualize the thoracolumbar fascia at the lateral edge of the QL muscle.

- **For QLB-1 group (lateral QLB):**

The needle (20G spinal needle filled with Saline 0.9% with bevel up facing the ultrasound probe) was inserted in-plane from anterior to posterior and the tip of the needle was advanced towards the lateral border of the QL muscle, at the level where transversus abdominis muscle (TA) tapers off into its aponeurosis, 1 ml test dose of saline was injected to confirm correct needle-tip position, and then followed by injection of 20 ml of 0.25% bupivacaine.

- **For QLB-2 group (posterior QLB):**

The needle (20G spinal needle filled with Saline 0.9% with bevel up facing the ultrasound probe) 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 muscles, 1 ml test dose of saline was injected to confirm correct needle-tip position, and then followed by injection of 20 ml of 0.25% bupivacaine.

- **For QLB-3 group (transmuscular QLB):**

The needle (20G spinal needle filled with Saline 0.9% with bevel up facing the ultrasound probe) was inserted in-plane from anterior to posterior and the tip of the needle was advanced towards then through the QL muscle, penetrating the ventral proper fascia of the QL muscle. The target site for injection is the plane between QL muscle and PM muscle, 1 ml test dose of saline was injected to confirm correct needle-tip position, and then followed by injection of 20 ml of 0.25% bupivacaine.

- After performing a successful QL block, patients received subarachnoid anesthesia using 3ml of 0.5% injection Bupivacaine with 0.5ml (50 mcg) of injection fentanyl and surgery proceeded.
- C control group received subarachnoid anesthesia only using 3ml of 0.5% injection Bupivacaine with 0.5ml (50 mcg) of injection fentanyl and surgery proceeded.

Parameters Monitored:

- Time to first analgesic request. This also provides the duration of analgesia given by either of the 3 blocks.
- In postoperative period, Visual Analogue Score (VAS) was recorded post-operatively at the following time intervals; immediately, 2, 6, 12, 24 h postoperative. The patients were scheduled to receive I.V. diclofenac sodium infusion 75mg twelve hourly postoperatively.
- If VAS score is ≥ 3, out of a total of 10 points (where 0, none; 10, very severe) patients received intravenous morphine of 0.05 mg/kg that was repeated after 20 min till VAS score reached < 3.
- The total doses of analgesic (Total I.V. Morphine Sulphate consumption) required in the first postoperative 24 hours were recorded.

Sample size was calculated from a previous study done by *Kukreja et al (2019)* 25 who reported in his study that the median hours to the first opioid after

QL block was 6.8 hours while for no block group the median was 5.10 hours by and adjusting power of the test to 80%, confidence interval to 95%, margin of error accepted to 5% and the ratio of controls to cases 1:3; the total sample size needed for this study was found 120 cases (30 controls and 90 cases divided into three subgroups randomly).

Statistical analysis was performed using the SPSS version 26 (IBM Inc., Chicago, IL, USA). Quantitative variables were expressed as mean and standard deviation (SD) and were compared using ANOVA (F) test among the three groups with post hoc (Tuckey) test to compare each two groups. Categorial variables were expressed as frequency and percentage and were statistically analyzed by Chi-square test. A two-tailed P value ≤ 0.05 was considered statistically significant.

Visual Analogue Score was presented as a 100-mm horizontal line on which the patient's pain intensity is represented by a point between the extremes of no pain at all and worst pain imaginable. VAS score is determined by measuring in millimeters from the left-hand end of the line to the point that the patient marks.

RESULTS

There were insignificant differences among the four groups as regard to age, sex, duration of surgery, ASA, weight, height and BMI **(Table 1)**.

Table (1): Patients' characteristics in the four groups

Parameters \ Groups		QLB-1 Group (n = 30)	QLB-2 Group (n = 30)	QLB-3Group (n = 30)	SAB control Group (n = 30)	P value
Age (years)	Mean±SD	42.30 ± 5.46	41.40 ± 7.30	40.60 ± 5.27	41.67 ± 6.11	0.752
	Range	26 – 50	24 – 50	27 – 49	25 - 50	
Sex	Male	17 (57%)	18 (60%)	16 (53%)	20 (67%)	0.751
	Female	13 (43%)	12 (40%)	14 (47%)	10 (33%)	
Weight (kg)	Mean±SD	77.53 ± 12.41	82.67 ± 10.46	80.53 ± 10.54	78.40 ± 13.25	0.331
	Range	60 – 99	60 – 100	56 – 100	60 - 100	
Height (m)	Mean±SD	1.71 ± 0.08	1.66 ± 0.09	1.68 ± 0.08	1.70 ± 0.08	0.118
	Range	1.59 – 1.83	1.52 – 1.82	1.57 – 1.82	1.56 – 1.87	
BMI (kg/m^2)	Mean±SD	29.90 ± 4.79	31.88 ± 4.04	31.06 ± 4.07	30.25 ± 5.12	0.334
	Range	23.1 – 38.2	23.1 – 38.6	25.1 – 38.6	23.1 – 38.6	
ASA physical status	ASA I	12 (40%)	9 (30%)	11 (37%)	10 (33%)	0.866
	ASA II	18 (60 %)	21 (70%)	19 (63%)	20 (67%)	
Duration of surgery (min)	Mean±SD	148.33 ± 22.76	146.17 ± 17.10	152.83 ± 22.62	147.67 ± 21.96	0.651
	Range	120 – 180	120 – 180	120 – 180	120 – 180	

ASA: American Society of Anesthesiologists, SD: Standard deviation.

Time to requirement of first analgesia was significantly prolonged in QLB-3 compared to QLB-1, QLB-2 and SAB Control and prolonged in QLB- 1 and QLB-2 than SAB Control with insignificant differences between QLB1 and QLB-2. Total doses of I.V. morphine were significantly lower in QLB-3 compared to QLB-1, QLB-2 and SAB Control and lower in QLB-1 and QLB- 2 than SAB Control with insignificant differences between QLB1 and QLB-2. **(Table 2)**.

Table (1): The time to first analgesic requirement and the total doses of I.V. Morphine required in the first postoperative 24 hours (mg).

Parameters \ Groups		QLB-1 Group (n = 30)	QLB-2 Group (n = 30)	QLB-3 Group (n = 30)	SAB Control Group (n = 30)	P value	
Time of requirement of first analgesia (min)	**Mean ± SD**	120.67 ± 40.76	118.00 ± 41.39	234.67 ± 78.90	62.00 ± 20.24	**<0.001**	P1 = 0.997
							P2 <**0.001**
							P3 <**0.001**
	Range	60 – 180	60 – 180	120 – 360	30 - 90		P4 <**0.001**
							P5 <**0.001**
							P6 <**0.001**
The total doses of I.V. Morphine required in the first postoperative 24 hours (mg)	**Mean ± SD**	15.83 ± 4.30	16.20 ± 5.22	10.53 ± 4.93	20.47 ± 6.24	**<0.001**	P1 = 0.993
							P2 <**0.001**
							P3 <**0.001**
	Range	9 – 25	4 – 25	0 – 20	12 - 35		P4 <**0.001**
							P5 <**0.001**
							P6 <**0.001**

SD: Standard deviation, , P1: P value between QLB-1 and QLB-2, P2: P value between QLB-1 and QLB-3, P3: P value between QLB-1 and SAB control group, P4: P value between QLB-2 and QLB-3, P5: P value between QLB-2 and SAB control group, P6: P value between QLB-3 and SAB control group.
Significant Compared to QLB1 and QLB-2 Groups.

VAS was significantly different among the four groups at 2, 12 and 24 hours (P <0.001) but was insignificantly different at PACU and 6 hours. VAS at 2 hours was significantly lower in QLB-3 compared to QLB- 1, QLB-2 and SAB Control but with insignificant differences among QLB1, QLB-2 and SAB control group. VAS at 12 and 24 hours were significantly lower in QLB-3 compared to QLB-1, QLB-2 and SAB Control and lower in QLB-1 and QLB-2 than SAB Control with insignificant differences between QLB1 and QLB-2 **(Table 3)**.

Table (2): Visual analogue scale (VAS) in the four groups

Parameters \ Groups		QLB-1 Group (n = 30)	QLB-2 Group (n = 30)	QLB-3 Group (n = 30)	SAB Control Group (n= 30)	P value	
Immediately	**Mean**	0.70	0.97	0.73	1.07	0.203	---

	SD	0.75	0.85	0.69	0.83		---

After 2 hours	**Mean**	1.87	1.97	1.10	2.27	**<0.001**	P1 = 0.979
							P2 = **0.015**
							P3 = 0.392
	SD	1.02	1.03	0.73	1.08		P4 = **0.005**
							P5 = 0.636
							P6 <**0.001**
After 6 hours	**Mean**	3.73	3.50	3.57	4.03	0.416	---

	SD	1.08	1.01	1.43	1.69		---

After 12 hours	**Mean**	3.63	3.67	2.50	4.90	**<0.001**	P1 = 1
							P2 = **0.012**
							P3 = **0.004**
	SD	1.38	1.32	1.25	1.63		P4 = **0.009**
							P5 = **0.005**
							P6 <**0.001**
After 24 hours	**Mean**	4.07	4.10	3.03	5.33	**<0.001**	P1 = 1
							P2 = **0.043**
							P3 = **0.008**
	SD	1.46	1.47	1.34	1.71		P4 = **0.035**
							P5 = **0.01**
							P6 <**0.001**

SD: Standard deviation. P1: P value between QLB-1 and QLB-2, P2: P value between QLB-1 and QLB-3, P3: P value between QLB-1 and SAB control group, P4: P value between QLB-2 and QLB-3, P5: P value between QLB-2 and SAB control group, P6: P value between QLB-3 and SAB control group.

DISCUSSION

The treatment options for patients with hip osteoarthritis or fractures include conservative therapies and surgery *(Kikuchi et al., 2020)*.

In our study, Time to requirement of first analgesia prolonged in patients who received QLB-3 compared to those received QLB-1, QLB-2 and patient of SAB, and prolonged in QLB-1 and QLB-2 than SAB control with no differences between QLB1 and QLB-2.

Also, total doses of I.V. morphine was lower in QLB-3 patients compared to patients of QLB-1, QLB-2 and SAB, and lower in QLB-1 and QLB-2 than SAB control with no differences between QLB1 and QLB-2.

Our results were in accordance with *Kukreja et al. (2019-a)* who compared analgesia and opioid consumption for patients undergoing primary total hip arthroplasty with preoperative posterior quadratus lumborum block with patients who did not receive quadratus lumborum block. They found that patients who received quadratus lumborum block, the 24-hour total oral morphine equivalent (milligram) requirements were lower, compared to the patients who did not receive quadratus lumborum block. Opioid requirements were consistently lower for the patients who received quadratus lumborum block at each additional assessment time point up to 48 hours.

In accordance to our results, *Kikuchi et al. (2020)* allocated the participants to either the anterior QLB or placebo in THA, using a set of random numbers for the allocation sequence. They found that in patients who received quadratus lumborum block, the total opioid requirements were consistently lower at each additional assessment time point up to 48 hours.

In agreement with our finding, *Kukreja et al. (2019-b)* found that cumulative opioid consumption was significantly lower in the QL patients at 12, 12–24, 24, and 48 hours after surgery as compared with the control patients.

He et al. (2020) found morphine use was lower in patients who received QLB compared to patients who did not receive QLB during 0–24 h and during 24–48 h.

In agreement with our results *Tulgar et al. (2018)*, compared the effectiveness of L-ESPB and QLB-T in providing postoperative analgesia in patients undergoing hip and femur operations. They found that tramadol consumption during the first 12 h, total tramadol consumption and the number of patients required rescue analgesic in 24 h were higher in the patients who did not receive QLB compared to who did.

In agreement with our results, *Green et al. (2018)* found that Length of stay was shorter in patients receiving QL block (2.9 days) versus patients not receiving QL block (5.1 days). Intra-operative use of fentanyl was lower in patients receiving QL block (183.5 mcg) versus patients not receiving QL block (240 mcg).

In agreement with our results, *Yuan et al. (2020)*. evaluated the postoperative analgesic effect of ultrasound-guided quadratus lumborum block (QLB) in patients undergoing arthroscopic hip surgery. Patients who were scheduled to undergo elective arthroscopic hip surgery

were randomly assigned to the QLB (Q) or control (C) group. After general anesthesia induction, unilateral QLB was performed under ultrasound guidance in the Q group. They found that at 24 hours post-surgery, opioid consumption amounts via PCA in the Q group were significantly lower compared with the C group. A significant reduction in opioid consumption was observed between the two groups at each time point.

In accordance to our results, *McCrum et al. (2018)* evaluated patients who underwent hip arthroscopy following a preoperative QL block. They found that QL block patients required significantly less hydromorphone and oxycodone during their time in the PACU, and significantly fewer morphine equivalents overall and per hour in the PACU.

In agreement with our results, *Abduallah et al. (2020)* who assessed the effect of transmuscular ultrasound-guided quadratus lumborum (QL) block on post-operative analgesic consumption after hip arthroplasty in elderly patients. They found that the use of QLB in the second group significantly decreased intravenous morphine consumption postoperatively with a significant prolongation of the time to the first call for analgesia.

In accordance to our results, *Polania Gutierrez et al. (2021)* assessed that QLB type 3 (QLB3) produce a non-inferior analgesic effect compared with LPB for primary hip replacement. This double-blinded, non-inferiority trial randomized 46 patients undergoing primary hip replacement to receive either QLB3 or LPB. They found that there were no significant differences between groups in total opioid consumption at 24 hours or in time to achieve 100 feet of walking.

In accordance to our results, *Hockett et al. (2016)* showed a 69-year-old man with a history of chronic pain and opioid use presented for total hip arthroplasty. In the interests of ensuring early mobilization and pain control, they deployed a continuous quadratus lumborum block technique assuming that it would be motor-sparing. While the perineural catheter was infused, the patient required no IV opioids. He was able to ambulate on the first postoperative day.

In accordance to our results, *Yayik et al. (2019)* showed performed continuous quadratus lumborum type 3 block in two patients who underwent hip arthroplasty. Patient was mobilized in the early postoperative period without additional opioid analgesic requirement and without muscle weakness.

In accordance to our finding, *Bak et al. (2020)* reported the case of an 83-year-old man who received a continuous transmuscular QLB as part of a multimodal analgesia after hardware removal and total hip arthroplasty. The patient received a continuous infusion of 0.2% ropivacaine at 8 ml/h through an indwelling catheter in addition to patient-controlled analgesia with intravenous fentanyl and oral celecoxib. The patient's pain scores did not exceed 4, and no additional analgesics were required until postoperative day 5.

In the present study, VAS was different among the four groups at 2, 12 and 24 hours, but was insignificantly different at PACU and 6 hours. VAS at 2 hours was lower in QLB-3 compared to QLB-1, QLB-2 and SAB Control but with no

differences among QLB1, QLB-2 and SAB control group. VAS at 12 and 24 hours were lower in QLB-3 compared to QLB-1, QLB-2 and SAB Control and lower in QLB-1 and QLB-2 than SAB Control with differences between QLB1 and QLB-2.

In agreement with our results, *Kukreja et al. (2019)* found that Pain Visual Analog Scale scores were lower up to 12 hours after surgery for the patients who received a posterior quadratus lumborum block, and the post-anesthesia care unit length of stay was shorter for the patients who received quadratus lumborum block.

In accordance to our results, *Yayik et al. (2019)* performed continuous quadratus lumborum type 3 block in two patients who underwent hip arthroplasty. Patient was mobilized in the early postoperative period without any pain.

In accordance to our finding, *Bak et al. (2020)* reported the case of an 83-year-old man who received a continuous transmuscular QLB as part of a multimodal analgesia after hardware removal and total hip arthroplasty. The patient received a continuous infusion of 0.2% ropivacaine at 8 ml/h through an indwelling catheter in addition to patient-controlled analgesia with intravenous fentanyl and oral celecoxib. The patient's pain scores did not exceed 4, and no additional analgesics were required until postoperative day 5.

In conformity with our results, *Polania Gutierrez et al. (2021)* demonstrated that The QLB3 did not cross the non-inferiority delta of 2 points on the NRS pain score.

On a similar basis with our results, *Hockett et al. (2016)* demonstrated that a continuous quadratus lumborum block technique for total hip arthroplasty, reporting pain scores between 0 and 3/10.

On the light of our outcome, *Abduallah et al. (2020)* demonstrated significant decreased post-operative visual analogue score 4 h, 6 h and 8 h postoperatively in QLB group.

In accordance with our results, *Kikuchi et al. (2020)* found that Pain Visual Analog Scale scores were lower up after surgery for the patients who received a posterior quadratus lumborum block.

In accordance to our finding, *Yuan et al. (2020)* demonstrated that resting and movement VAS scores at each time point were significantly lower in the QLB compared with the Control group.

In agreement with our finding, *Kukreja et al. (2019)* found that VAS pain score at 24 hours was significantly lower in the anterior QL group at 12, 12–24, 24, 24–48, and 48 hours after surgery as compared with the control group.

In line with our findings, *Jian et al. (2020)* demonstrated that postoperative pain intensity was lower in Group QLB compared to Control Group at rest after 3, 6, 12, 24, 36, and 48 h and during mobilization after 24, 36, and 48 h.

In agreement with our results, *Tulgar et al. (2018)* demonstrated that there was no difference in Numeric Rating Scale (NRS) score at any hour between the block groups; NRS scores at the 1st, 3rd and 6th h but lower than control group so L-ESPB and QLB-T have similar effect, they improve analgesia quality in patients undergoing hip and proximal femoral

surgery when compared to standard intravenous analgesia regimen.

Consistent with our finding, *McCrum et al. (2018)* demonstrated that despite receiving less opioid analgesia, QL block patients had significantly less pain immediately postoperatively and at the time of discharge.

In contrast to our results, *Green et al. (2018)* found that 24-hour VAS score, and length of operative procedure lacked statistical significance, though the study was not powered for these outcomes.

CONCLUSION

Ultrasound-guided Transmuscular Quadratus Lumborum Block, using 20 ml of Bupivacaine 0.25% prolonged the duration of analgesia, decreased morphine consumption and improved pain relief score compared to Lateral and Posterior Quadratus Lumborum Block in patients undergoing proximal lower limb surgery under subarachnoid anesthesia.

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حقن المخدر الموضعي للعضلة المربعة القطنية إسترشادا بجهاز الموجات فوق الصوتية بطرق مختلفة لتسكين الألم في ما بعد جراحات العظام بالأطراف السفلى المجراة تحت التخدير النصفي

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خلفية البحث: تخدير العضلة المربعة القطنية هو تخدير آمن قد احتل مكانة مميزة في سياسة علاج الألم الجراحي المتعدد الطرق في المرضى الذين يخضعون لجراحات البطن، وعمليات أمراض النساء والتوليد، والتدخلات العظمية الجراحية في الوركين.

الهدف من البحث: تم إجراء هذه الدراسة بهدف مقارنة المدد الزمنية لتسكين الألم التي توفرها المداخل المختلفة الثلاثة لتخدير العضلة المربعة القطنية (QLB 1،2،3) لتسكين الألم في ما بعد جراحات العظام بالأطراف السفلى المجراة تحت التخدير النصفي.

المرضى وطرق البحث: أجريت هذه الدراسة على 120 مريضا مقرر لهم إجراء جراحات عظمية بالأطراف السفلية تحت التخدير النصفي 30) مريضا في المجموعة الضابطة (SAB) و 90 مريضا مقسمين إلى ثلاث مجموعات فرعية بشكل عشوائي .(بمجرد التسجيل؛ تم تعيين المرضى عشوائيا إلى أربع مجموعات متساوية : تلقت المجموعة الضابطة (SAB) تخديرا نصفيا فقط، أما باقي المجموعات فقد تلقت تخديرا نصفيا بالإضافة الى تخدير العضلة المربعة القطنية بطرق ثلاث مختلفة وهي

كـــالاتي: المجموعـــة (QLB-1) تـلقـــت تخـديرالعضلـــة المربعـــة القطـــنية مـــن النـاحيـــة الجانبيـــة، بيـنـــما تلـــقت المجموعـــة (QLB-2) تـخـديـرالعضـــلة المربعـــة القطنيـــة مـــن الناحيـــة الخلفيـــة، واخـــيرا تلقـــت المجموعـــة (QLB-3) تخديرالعضـــلة المربعـــة القطنيـــة مـــن المسارالعبرعضـــلي وقـــد تـــم التخديرللعضـــلة المربعـــة القطنيـــة باســـتخدام (20 ملليليتـــر مـــن عقـــار البيوبيفاكـــايين بتركيـــز 0.25%). و قـــد تـــم رصـــد المقـــاييس التاليـــة: 1 - مقيـــاس المكـــافئ الابصـــاري للشـــعور بـــالالم (VAS) بعـــد العمليـــة مباشـــرة ثـــم بســـاعتين وســـت ســـاعات واثنـــي عشـــرة ســـاعة و أربعـــة وعشـــرين ســـاعة بعـــد العمليـــة، 2- احتســـاب الـــزمن المنقضـــي مـــن انتهـــاء العمليـــة و أول طلـــب مـــن المـــريض للمســـكن الـــذي كـــان فـــي الدراســـة هـــو المـــورفين، 3- الجرعـــات الإجماليـــة مـــن المـــورفين المســـتهلكة للمـــريض خـــلال اول اربعـــة و عشـــرين ســـاعة بعـــد العملية.

نتـــائج البحـــث: كـــان الـــزمن المنقضـــي لأول طلـــب مـــن المـــريض للمســـكن أطـــــول بشـــــكل كبـــــيرفي المجموعـــــة (QLB-3) مقارنـــــة ببـــــاقي المجموعـــــات (QLB-1وQLB-2 و SAB) وطـــــال أمـــــده فـــــي (QLB-1 وQLB-2) عـــــن المجموعـــــة الضـــــابطة (SAB) مـــــع فروقات ضئيلة بين (QLB1 و .QLB-2).

كـــانت الجرعـــات الإجماليـــة مـــن المـــورفين المســـتهلكة للمـــريض خـــلال اول اربعـــة و عشـــرين ســـاعة بعـــد العمليـــة أقـــل بكثيـــر فـــي المجموعـــــة (QLB-3) مقارنـــــة ببـــــاقي المجموعـــــات (QLB-1 و QLB-2 و SAB) وأقـــــــل فـــــــي (QLB-1 و QLB-2) مـــــــن

المجموعة الضابطة (SAB) مع فروقات ضئيلة بين (QLB1 و QLB-2).

أما مقياس المكافئ الابصاري للشعور بالالم (VAS) فقد اختلف اختلافا كبيرا بين المجموعات الأربع في الساعات 2 و12 و24 بعد العملية حيث كانت (P <0.001) ولكنه كان مختلفا اختلافا ضئيلا في غرفة الافاقة و بعد ست ساعات من العملية. بينما كان في مدة ساعتين بعد العملية أقل بكثير في المجموعة (QLB-3) مقارنة بباقي المجموعات (QLB-1 و QLB-2 و SAB) مع فروقات ضئيلة في قيمته بين المجموعات (QLB-1 و QLB-2 و SAB). بينما كان مقياس المكافئ الابصاري للشعور بالالم (VAS) في الساعات 12 و24 بعد العملية أقل بكثير في المجموعة (QLB-3) مقارنة بباقي المجموعات (QLB-1 و QLB-2 و SAB) وأقل في (QLB-1 و QLB-2) من المجموعة الضابطة (SAB) مع اختلافات ضئيلة بين (QLB1 و QLB-2).

الاستنتاج: المدخل الثالث (QLB-3) لتخدير العضلة المربعة القطنية من المسار العبر عضلي، باستعمال جهاز الموجات الفوق صوتية باستخدام (20 ملليليتر من عقار البيوبيفاكايين بتركيز 0.25%)، يطيل مدة تسكين الألم ويقلل استهلاك المخدر الافيوني (المورفين) و يحسن من معدلات تخفيف الألم بشكل أفضل عند مقارنته بالمدخلين الأول و الثاني للتخدير في العضلة المربعة القطنية للمرضى اللذين خضعوا لجراحات عظمية في الطرف السفلي تحت التخدير النصفي.

الكلمـــات الدالـــة: العضـــلة المربعـــة القطنيـــة، استرشـــادا بجهـــاز الموجـــات فـــوق الصـــوتية، جراحـــات العـظـــام بالأطـــراف الســـفلى، التـخـديـر النصـفي.