



## QUADRATUS LUMBORUM BLOCK IN PATIENTS OF LAPAROSCOPIC CHOLECYSTECTOMY FOR POSTOPERATIVE ANALGESIA

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### ABSTRACT

**Background:** Quadratus lumborum block is done ultrasonographically in thoracolumbar fascial plane at the level of quadratus lumborum muscle to decrease post-operative pain in patients who underwent laparoscopic cholecystectomy.

**Methods:** A prospective, randomized and comparative study was conducted in Pt. B.D. Sharma PGIMS, Rohtak. After informed and written consent, patients were recruited in the study and assigned into 2 groups. A detailed history was taken and examination was carried out. Group 1 patients received Inj. diclofenac IM (intramuscular) 75 mg and in group 2 Bilateral QL (quadratus lumborum) block was given using 15 ml of 0.25 percent levobupivacaine. The results were measured by VAS score and 24hrs fentanyl consumption. At the end of the study, data was compiled and analyzed using SPSS version 17.

**Results:** In the present study, there was no statistical significant difference between the two groups. We found that the patients who received quadratus lumborum block had lesser fentanyl consumption and the VAS scores were also better.

### KEYWORDS :

#### INTRODUCTION

The rapid recovery following laparoscopic surgery is crucial to allow shorter duration of hospital stay. Quadratus Lumborum block is a multi-modal technique to reduce postoperative pain. Laparoscopic Cholecystectomy is minimally invasive technique for removal of gallbladder. It is an indicated treatment for cholecystitis, gallbladder polyps, biliary dyskinesia, gallbladder masses and gallstone pancreatitis. Gall bladder is on the inferior aspect of liver bed under 4a and 5 liver segments'. Laparotomy leads to parietal pain, and laparoscopy causes a visceral pain, a somatic pain and shoulder pain due to the irritation of diaphragm. As viscera is supplied by autonomic nerve fibers therefore visceral pain is diffuse, whereas somatic pain is localized. Visceral pain is seen in areas innervated by same segments of spinal cord as the painful viscus, therefore the visceral pain is felt in dermatomes (T5-9) on lower chest and upper abdominal walls. The method of performing laparoscopic cholecystectomy uses 4 ports, 1<sup>st</sup> is at the umbilicus, an optical port for 30° telescope, 2<sup>nd</sup> at subxiphoid, 3<sup>rd</sup> is 2 finger-breadths below the costal margin close to the mid-clavicular line and 4<sup>th</sup> laterally along anterior axillary line below subcostal margin thus causing incisional pain from dermatome T6-T10. Many multi-modal analgesic techniques such as NSAIDs, evacuation of the insufflating gas, application of local anesthetic to the site of surgery, infiltration of local anaesthetic to the skin and muscle wounds, intraperitoneal local anaesthetic, intraperitoneal saline, a gas drain, heated gas, low-pressure gas and nitrous oxide pneumoperitoneum, use of mechanical lifting device, epidural analgesia, and transversus abdominis plane (TAP) block are used to decrease post-operative pain<sup>2-4</sup>. Quadratus lumborum block is done ultrasonographically in thoracolumbar fascial plane at the level of quadratus lumborum muscle to decrease post-operative pain in patients who underwent laparoscopic-cholecystectomy.

#### AIMS AND OBJECTIVE

Quadratus lumborum block in patients of laparoscopic cholecystectomy via posterior approach using local anaesthetic levobupivacaine for postoperative analgesia.

#### METHODS

A prospective, randomized and comparative study was conducted in Pt. B.D. Sharma PGIMS, Rohtak. After informed

and written consent, patients were recruited in the study and assigned into 2 groups of 25 patients each. A detailed history was taken and examination was carried out. Group 1 patients received Inj. diclofenac IM (intramuscular) 75 mg and in group 2 Bilateral QL block was given using 15 ml of 0.25 percent levobupivacaine.

After securing venous access, the patients were asked to lie in prone position with the head resting on a soft ring. Routine monitoring such heart rate, non-invasive blood pressure, ECG, oxygen saturation and respiratory rate were set up. Preoxygenation with 100% oxygen was done for 3 min. Induction of anaesthesia was achieved with standardized general anaesthesia technique comprising of Inj. Glycopyrolate 0.2 mg, Inj. fentanyl 2 mcg/kg and Inj. Propofol 2.5 mg/kg. Increments of propofol was given till there was loss of response to verbal commands. muscle relaxation with vecuronium was provided after confirming proper placement of the endotracheal tube. Positive Pressure ventilation was instituted with 66% Nitrous oxide in oxygen and sevoflurane with a tidal volume of 8 ml/kg, respiratory rate of 12/min and I:E ratio of 1:2. The surgery then commenced.

At the end of surgery group I patients received IM (intragluteal) diclofenac 75 mg (3 ml) and group II patients received ultrasound guided bilateral quadratus lumborum block.

Ultrasound guided QL block was performed on both sides using posterior approach. For block on each side patient was positioned supine and was brought on edge of OT table and wedge was kept under ipsilateral buttock, flanks and back were cleaned and draped.

Under all aseptic measures the ultrasound 6-13 MHz high frequency linear array probe was covered with sterile sleeve and was placed horizontally between the costal margin and the iliac crest. Images were obtained using a Sonosite M Turbo ultrasound machine with probe placed above the iliac crest<sup>5</sup>. The 3 muscle layers of the abdominal wall were identified: external oblique, internal oblique, and transversus abdominis muscles in the anterior axillary line. Then the probe was moved to the mid axillary line and at this juncture the 3 layers start to taper. Then the probe was moved and placed in the posterior axillary line (as per lateral approach),

sonographic anatomy will show first the transversus abdominis disappearing then the internal oblique and external oblique forming aponeurosis and appearance of quadratus lumborum at the end<sup>5</sup>. The fascia surrounding the transversus abdominis muscle was tracked posteriorly to its origin where the transversus abdominis muscle merges with the thoracolumbar fascia surrounding the quadratus lumborum muscle<sup>5</sup>.

A 23 G Spinal needle was inserted in plane with the ultrasound probe and targeted towards the fascia transversalis and its tip is advanced till the posterior aspect of QL muscle is reached. Test Inj. ection of normal saline 3 ml was used to verify saline spread posterior to QL muscle (hydro dissection) then 15 ml of 0.25 percent levobupivacaine was Inj. ectioned in the same plane after negative aspiration<sup>5</sup>.

In both the groups postoperative HR, NIBP, SpO2 and respiratory rate was monitored every 15 minutes till 1 hour then at 2,4,6,12 and 24hours. The presence and severity of pain was assessed by an investigator (candidate) blinded to group allocation, using VAS score 10 cm line in which 0 cm = no pain and 10 cm =worst pain imaginable. All patients were asked to score their pain at rest and on movement (knee flexion) 0, 1, 2, 4, 6, 12 & 24hours after surgery.

Rescue analgesia- In surgical ward Inj. fentanyl via PCA pump was given intravenously when patient has spontaneous pain (unrelated to movement or other incident) / incident pain (related to an activity, action or event)/ end of previous dose pain (occurring just prior to the next scheduled dose). A bolus dose of 20 µg of Inj. fentanyl was given as rescue analgesic when VAS score is >4 followed by 10 µg of Inj. fentanyl with lock out interval of 10 mins and max dose of 60 µg<sup>hr</sup><sup>-1</sup> for next 24hrs was given. Total consumption of PCA fentanyl was noted over 24hrs.

Patient satisfaction questionnaire regarding overall satisfaction and willingness to undergo same procedure if required again, was asked 24hrs postoperatively.

The primary outcome measured in the study was VAS score and 24hrs rescue analgesic (fentanyl) consumption. Secondary outcome measured includes time of demand of first rescue analgesic dose, patient satisfaction, nausea and vomiting, sedation, respiratory depression (rate < 10), any episode of hypotension (decrease in MAP > 10 percent of baseline value), bradycardia (HR < 60/min) or any other side effect as a result of QL block or fentanyl use, was recorded and managed appropriately.

At the end of the study all the data was compiled and analysed statistically. The SPSS Version 17.0 statistical package was used for statistical analysis. Unpaired t test was used to test the difference in age, weight, height, duration of surgery, postoperative vitals (pulse rate, blood pressure and SpO2), first PCA demand after surgery and VAS score at rest and on knee flexion in between the two groups. Mann Whitney U test was used to compare total fentanyl consumption in between the two groups. Chi square test was used to compare the patient satisfaction level and postoperative complications such as nausea, sedation, hypotension and bradycardia. Results were considered statistically significant if the p value was ≤ 0.05.

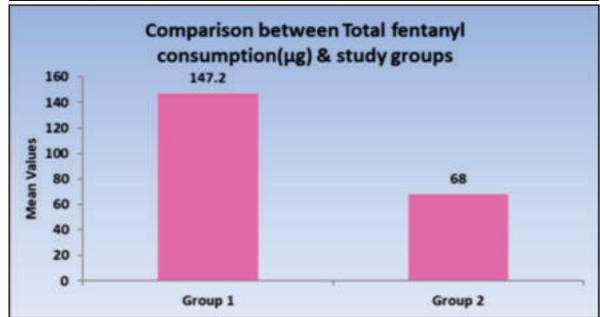
Blanco et al have reported the morphine demand at 48 hrs postoperative period as 12.75 ± 11.5 in the levobupivacaine group as against 34.5 ± 27.45 in the normal saline group. Assuming these as the reference values, sample size of 21 per group was calculated based on a difference of 1 in patient's mean pain score between two groups, with a standard deviation of 1, at two-sided alpha of 0.05, and a power of 90 percent<sup>6</sup>.

**OBSERVATIONS AND RESULTS**

Both the groups were comparable regarding patient demographic profile (age, weight and sex distribution), duration of surgery and postoperative hemodynamic parameters, there was no statistically significant difference (p > 0.05) between the groups.

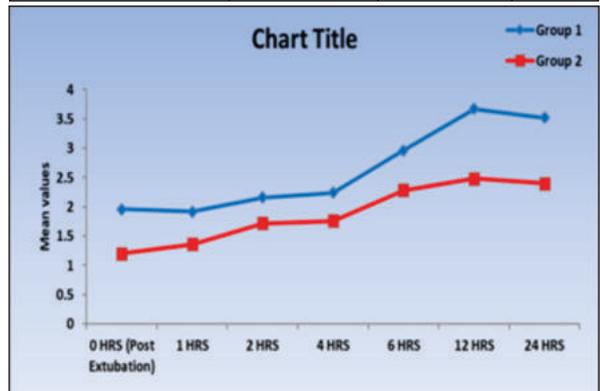
Mean total fentanyl consumption analysis of data in between the two groups was done using Mann Whitney test and was clinically and statistically significant (p < 0.001).

	Group 1	Group 2	p value
	Mean ± SD	Mean ± SD	
Total fentanyl consumption(µg)	147.20 ± 29.23	68.00 ± 29.36	<0.001



When VAS scores were compared between the two groups: the VAS scores at rest and on knee flexion were significantly lower in block group (QL) at all the times (p < 0.05).

REST	Group 1	Group 2	p value
	Mean ± SD	Mean ± SD	
0 HRS (Post Extubation)	1.96 ± 0.46	1.2 ± 0.58	<0.001
1 HRS	1.92 ± 0.49	1.36 ± 0.57	0.001
2 HRS	2.16 ± 0.47	1.72 ± 0.68	0.011
4 HRS	2.24 ± 0.72	1.76 ± 0.66	0.018
6 HRS	2.96 ± 0.79	2.28 ± 0.54	0.001
12 HRS	3.67 ± 0.57	2.48 ± 0.51	<0.001
	3.52 ± 0.59	2.40 ± 0.50	<0.001



KNEE FLEXION	Group 1	Group 2	p value
	Mean ± SD	Mean ± SD	
0 HRS (Post Extubation)	2.52 ± 0.51	1.68 ± 0.85	<0.001
1 HRS	2.56 ± 0.58	1.92 ± 0.76	0.002
2 HRS	2.44 ± 0.51	2.04 ± 0.46	0.005
4 HRS	2.80 ± 0.82	2.24 ± 0.44	0.004
6 HRS	3.56 ± 0.77	2.88 ± 0.53	0.001
12 HRS	4.16 ± 0.62	2.84 ± 0.75	<0.001
24 HRS	3.88 ± 0.44	2.84 ± 0.62	<0.001

Mean time for first PCA demand in group C was 7.36 ± 3.04 hours and in group QL was 1.80 ± 1.38 hours. When compared between the two groups time for the first PCA demand, there was clinically and statistically significant difference (p < 0.001). Time for first PCA demand in group C is late because of quick onset of action of Diclofenac as compared to QL Block.

Postoperative Complications such as nausea, sedation, hypotension and bradycardia after the surgery in the first 24 hours was recorded of all the patients and were comparable regarding the complications and there was no statistical significant difference ( $p > 0.05$ ) in both the groups.

Patient satisfaction was clinically and statistically significant between the two groups ( $p < 0.001$ ).

## DISCUSSION

We found that the patients who received QLB had significantly less rescue analgesia consumption than the control group, the VAS scores were significantly better at every observation time in the QLB group than in control patients and patient satisfaction was clinically and statistically significant between the two groups ( $p < 0.001$ ).

## CONCLUSION

We conclude that Bilateral QL block via posterior approach is effective in providing post operative pain relief after laparoscopic cholecystectomy. Total fentanyl consumption over 24 hours postoperatively and VAS score on rest and knee flexion was reduced in patients with QL block. No complication related to block was seen as block was under ultrasound guidance leading to Injecting drug after visualizing the needle tip and relevant anatomical structures.

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