ORIGINAL RESEARCH PAPER
Volume-8 | Issue-10 | October - 2019 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY TO EVALUATE THE ANALGESIC EFFICACY OF QUADRATUS LUMBORUM BLOCK AFTER LAPAROSCOPIC CHOLECYSTECTOMY: A PROSPECTIVE STUDY

Anaesthesiology

Dr. Rajmala Jaiswal Senior Professor, M.D., Department of Anaesthesia, PGIMS Rohtak India

Dr. Anjali Singh* Postgraduate student 3rd year, Department of Anaesthesia, PGIMS Rohtak India
*Corresponding Author

Dr. Geeta Ahlawat Professor, M.D., Department of Anaesthesia, PGIMS Rohtak India

Dr. Anju Ghai Senior Professor, M.D., Department of Anaesthesia, PGIMS Rohtak India

Dr. Mohit Saini Postgraduate student 3rd year, Department of Anaesthesia, PGIMS Rohtak India

ABSTRACT

INTRODUCTION: We present a study in which fifty patients between 30-60 years, undergoing laparoscopic cholecystectomy for cholelithiasis under general anaesthesia were included. Bilateral Quadratus lumborum (QL) block using local anaesthetic levobupivacaine was given in study group (n=25) and Inj. diclofenac intramuscular (75mg) was given in control group (n=25). Postoperative analgesia of study group was compared with control group using fentanyl via patient controlled analgesia pump over 24hrs.
MATERIAL AND METHODS: After completion of surgery, ultrasound guided QL block was performed on both sides using posterior approach.
OBSERVATIONS AND RESULT: When compared between the two groups the mean total fentanyl consumption and the time of demand of first rescue analgesic dose there was clinically and statistically significant difference ($p < 0.001$).
CONCLUSION: Bilateral QL block via posterior approach is effective in providing post operative pain relief over 24 hrs period after laparoscopic cholecystectomy.

KEYWORDS

Quadratus lumborum block, Levobupivacaine, Diclofenac, Laparoscopic Cholecystectomy

INTRODUCTION

Laparoscopic cholecystectomy is the surgical procedure for laparoscopic removal of gallbladder due to cholecystitis (inflammation of the gallbladder) that occurs most commonly because of an obstruction of the cystic duct by gall stones (cholelithiasis). Laparotomy results in parietal pain, whereas laparoscopy has a visceral component, a somatic component and shoulder pain secondary to diaphragmatic irritation as a result of CO_2 pneumoperitoneum causing diaphragm stretching and phrenic nerve neuropraxia. Clinicians have used various modalities and measures to ameliorate this pain associated with laparoscopy with variable success rate. [1-3]

Recently, Quadratus Lumborum block has been proposed for various abdominal surgeries and is performed ultrasonographically at the level of quadratus lumborum muscle into thoracolumbar fascial plane, this block provides wider spread of local anaesthetic by distribution of local anaesthetic into the posterior abdominal wall and paravertebral space and thus entailing a broader sensory analgesia level from T4-L1 / T5-L1. Professor R Blanco during his presentation in May 2007 at European Survey Research Association (ESRA) in Spain, first described ultrasound guided QL block as infiltration of local anaesthetic solution near the anterolateral & posteromedial aspect of quadratus lumborum muscle which is also known as Blanco block. [4-9]

MATERIALS AND METHODS

This prospective, randomized and comparative study was conducted in the Department of Anaesthesiology and Critical Care, Pt. B.D. Sharma PGIMS, Rohtak. A total of 50 patients between 30-60 years of age, of either sex, belonging to American Society of Anesthesiologists (ASA) physical status I & II undergoing laparoscopic cholecystectomy for cholelithiasis under general anaesthesia were included in this study.

The purpose and protocol of study was explained to patients and informed & written consent was obtained. All patients were randomly allocated to either of two groups comprising of 25 patients each and randomization was done using opaque sealed envelopes. All the patients received general anaesthesia as per standard protocol. At the end of surgery and before reversal of anaesthesia group I (control) patients received IM (intragluteal) diclofenac 75 mg (3 ml) and group II (study) patients received ultrasound guided bilateral quadratus lumborum block using 15 ml of 0.25% levobupivacaine on each side via posterior approach.

For performing block on each side, patient was positioned supine with wedge under ipsilateral buttock, then 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. 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), sonoanatomy showed first the transversus abdominis disappearing then the internal oblique and external oblique forming aponeurosis and appearance of quadratus lumborum was noticed. 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. A 23 G spinal needle was inserted in plane technique with the ultrasound probe and targeted towards the fascia transversalis and its tip was advanced till the posterior aspect of QL muscle was reached. Test injection 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 injected in the same plane after negative aspiration. (Image 1,2)

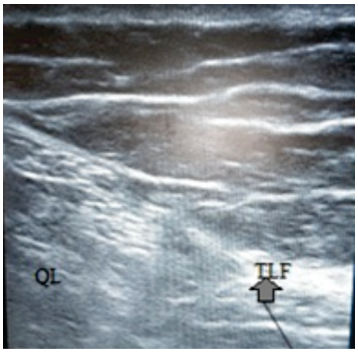

Image 1- Ultrasonographic view of Quadratus lumborum and TLF fascia (Picture Courtesy-Dr Rajmala Jaiswal and Dr Anjali Singh; PGIMS ROHTAK) QL- Quadratus lumborum, TLF- Thoracolumbar fascia

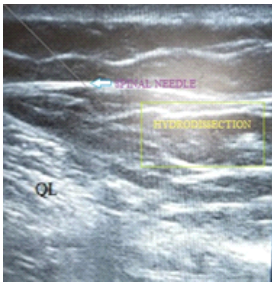

Image 2- Ultrasonographic view of Quadratus lumborum and related muscles after hydro dissection

After extubation patient was transferred to the recovery room. In both the groups postoperative HR, NIBP, SpO_2 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.

In surgical ward via PCA pump 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 μghr^{-1} for next 24hrs. The time of demand of first rescue analgesic and 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 were VAS score and 24hrs rescue analgesic (fentanyl) consumption. Secondary outcome measured includes time of demand of first rescue analgesic dose, 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 were recorded and managed appropriately.

STATASTICALANALYSIS

The relevant data of each patient during the study period i.e. 24 hours postoperatively was noted and entered into the patient proforma. At the end of the study all the data was compiled and analyzed statistically.

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

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.

In our study primary outcome, the mean total fentanyl consumption in group C was 147.20 ± 29.23µg and in group QL was 68.00 ± 29.36µg, it was clinically and statistically significant (p < 0.001) (Figure 1). Similarly, when VAS scores were compared using Student t test 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) (Figure 2,3). The mean time for the first PCA demand in group C was 7.36 ± 3.04 hours and in group QL was 1.80 ± 1.38 hours., there was clinically and statistically significant difference (p < 0.001).

Postoperative Complications such as nausea, sedation, hypotension and bradycardia after the surgery in the first 24 hours were comparable and there was no statistically significant difference (p> 0.05). Patient satisfaction was assessed post operatively 24 hours after the surgery and it was clinically and statistically significant between the two groups (p < 0.001).

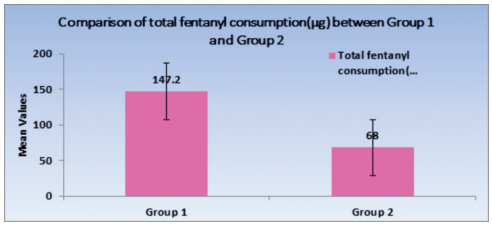

Figure 1: Total Fentanyl Consumption

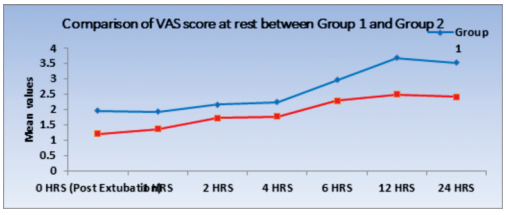

Figure 2: Vas Score at rest

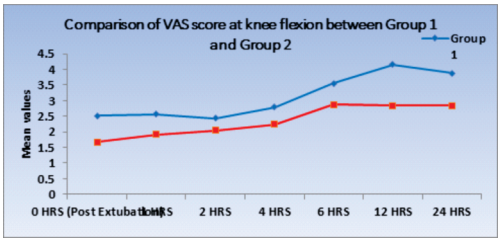

Figure 3: VAS Score on Knee flexion

DISCUSSION

Laparoscopic cholecystectomy has emerged over the open procedure as the gold standard for surgical treatment of symptomatic gallstones. However, postoperative pain management remains an important issue pain after laparoscopic cholecystectomy is most intense for the first 24hrs with a high interindividual variability and dominated by incisional pain (port site wounds) and right upper quadrant pain rather than other pain components such as diaphragmatic and visceral pain.[1-3] Clinicians have used various modalities and measures to ameliorate this pain associated with laparoscopy with variable success rate. Ultrasound guided subcostal approach of TAP Block is popular but in this local anaesthetic solution spreads up to anterior abdominal wall only, so it provides good somatic analgesia but no visceral blockade. Quadratus lumborum blocks (QLBs) have been proposed as more consistent methods with an aim to accomplish somatic as well as visceral analgesia of the abdomen.[1,4,9]

We have used QL 2 block in our study group which is also known as posterior QL block because it involves injecting local anaesthetic between QL muscle and latissimus dorsi muscle and the patient being in supine position using linear high frequency probe. The posterior approach has the advantage of a more superficial point of injection with better ultrasonographic resolution and providing analgesia from T4-L1. It is also potentially safer because the needle tip is separated from the peritoneum by the quadratus lumborum muscle, reducing the risk of intraperitoneal injection and bowel injury.[4,8]

The analgesic efficacy of QL block for postoperative analgesia in patients undergoing abdominal surgery has been demonstrated in various clinical trials. Blanco et al (2014) followed by Krogh et al (2017) performed randomized control clinical trial to study analgesic efficacy of bilateral QL block using Bupivacaine and Ropivacaine respectively for postoperative pain relief after caesarean section as a part of multimodal approach of analgesia. The results of our study are in concordance with those of Blanco et al and Krogh et al.[10-11]

CONCLUSION

We conclude that bilateral QL block via posterior approach is effective in providing post operative pain relief over 24 hrs period after laparoscopic cholecystectomy surgery. Total rescue analgesic (fentanyl) consumption over 24 hours postoperatively was significantly and statistically reduced postoperatively and the VAS

scores at rest and on knee flexion were significantly lower in block group at all the times compared to patients in control group. No difficulty in performing the QL block was seen in any of our patient. No complication such as kidney injury, vessel injury or gut perforation related to block technique was seen as the block was performed by expertized anaesthetist under ultrasound guidance and the drug was administered after visualizing the needle tip and relevant anatomical structures. Side effects related to systemic toxicity of levobupivacaine or rescue analgesic were not seen in our study. Patient satisfaction was also significantly higher in the study group than the control group.

Our study population was small (50 patients) and postoperative follow up period was also limited to 24 hours. Therefore, suggestion for further studies are to include large number of patients, to extend study period upto 48hrs, to compare different types of local anaesthetics and of varying concentrations before routine use of bilateral QL block to provide postoperative analgesia.

REFERENCES

1. Khurana S, Garg K, Grewal A, Kaul T, Bose A. A comparative study on postoperative pain relief in laparoscopic cholecystectomy: Intraperitoneal bupivacaine versus combination of bupivacaine and buprenorphine. Anesth Essays Res 2016;10:23-8.
2. Dabbagh AA. Pain after laparoscopic cholecystectomy. Zanco J Med Sci 2009;13(2):1-6.
3. Wills VL, Hunt DR. Pain after laparoscopic cholecystectomy. Br J Surg 2000;87:273-84.
4. Kadam VR. Ultasound guided quadratus lumborum block as a postoperative analgesic technique for laparotomy. J Anaesthesiol Clin Pharmacol 2013;29:550-2.
5. Jaiswal R, Yadav N. A prospective study to evaluate the analgesic efficacy of quadratus lumborum block after inguinal hernia surgery. Int J Sci Res 2018;7(6): 347-8.
6. Jaiswal R, Yadav N, Ahlawat G, Yadav M. Post operative pain management in paediatric patients: quadratus lumborum block via intramuscular approach. Int J Sci Res 2018;7(1):639-40.
7. Carney J, Finnrty O, Rauf J, Bergin D, Laffey JG, Mc Donnell JG. Studies on the spread of local anaesthetic solution in transverses abdominis plane blocks. Anaesthesia 2011; 66:1023-30.
8. Ueshima H, Otake H, Lin JA. Ultrasound guided quadratus lumborum block an updated review of anatomy and techniques. BioMed Res Int 2017;2017:1-7.
9. Blanco R. Tap block under ultrasound guidance: the description of a no pops technique. Reg Anesth Pain Med 2007;32:130.
10. Blanco R, Ansari T, Girgis E. Quadratus lumorum block for postoperative pain after caeserian section. Eur J Anaesthesiol 2015;32:812-8.
11. Krohg A, Ullensvang K, Rosseland LA, Langesæter E, Saute AR. The analgesic effect of ultrasound-guided quadratus lumborum block after cesarean delivery: randomized clinical trial. Anesth Analg 2018;126(2):559-65.