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A COMPARATIVE STUDY OF ULTRASOUND-GUIDED TRANSVERSE ABDOMINIS PLANE BLOCK WITH BUPIVACAINE AND ROPIVACAINE FOR POSTOPERATIVE ANALGESIA IN LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

Background: Effective and immediate management of postoperative pain after abdominal surgery is the main factor contributing early patients' recovery. Postoperative pain in laparoscopic surgery arises mainly from the abdominal wall and stretching of the parietal peritoneum. Successful blockade of these relevant intercostal nerves within the transversus abdominis muscle and abdominal oblique internus muscle producing full thickness anaesthesia of anterior abdominal wall. **Aim and Objective:** The study was designed to compare the better drug among Ropivacaine and Bupivacaine with respect to their analgesic efficacy and safety profile. **Methodology:** The study was carried out in 60 adult patients of ASA Grade I and II in 18- 65 years of age-group scheduled for elective Laparoscopic Cholecystectomy under general anaesthesia. They were divided into two groups of 30 each. Group A was given 40 ml Inj. Bupivacaine 0.25% (20ml on each side) and Group B was given40 ml Inj. Ropivacaine 0.375% (20ml on each side) USG guided Subcostal TAP Block was given before reversal of anaesthesia and patients were observed for VAS scores 30 mmin,1,2,4,6,8,10,14,16 and 20 hrs postoperatively. **Results:** The mean heart rate and blood pressure (systolic, diastolic and mean) readings post-operatively remained stable with no statistically significant difference between Bupivacaine and Ropivacaine groups. Mean duration of analgesia in our study was longer in Ropivacaine group (16.51± 5.58 hour) as compared to Bupivacaine group (14.03±2.03) p value 0.025, which was statistically significant. Though the postoperative analgesic requirement (rescue/demand) in Bupivacaine group was clinically earlier and statistically significant as compared to Ropivacaine group. Postoperative VAS score of 6 or more was considered benchmark for providing rescue analgesia in form of injection Diclofenac 75mg IV. The mean VAS scores at extubation was similar in both the groups and inter group comparison was not statistically significant. However, comparison of pain score from 30min to 14 hrs postoperatively showed significant difference in both the groups with Bupivacaine having significantly higher VAS scores and lower VAS scores with Ropivacaine. Thus, suggesting shorter duration of action of 0.25% Bupivacaine as compared to **Conclusion:** Subcostal TAP Block reduces postoperative pain effectively in laparoscopic Cholecystectomy. 0.375% Ropivacaine when compared with 0.25% Bupivacaine provides a longer duration of analgesia in ultrasound guided TAP block. Thus, it is concluded that Ropivacaine can be used as a safe alternative for Bupivacaine, routinely for TAP block for laparoscopic Cholecystectomy surgeries.

KEYWORDS: laparosopic cholycystetomy; subcostal TAP block; Ropivacaine; Bupivacaine; postoperative analgesia.

INTRODUCTION

Postoperative alleviation of pain is the sole essence of anaesthesia. Ever since the introduction of local anaesthetics, anaesthesiologist and physicians have investigated different methods of using them. Pain is a vexations sensory and emotional experience resulting from actual or potential damage. Laparoscopic cholecystectomy is one of the most common surgical endoscopic interventions today. Although it is minimally invasive procedure, moderate level of pain is

experienced by patients in early postoperative period which could be because of various reasons[1-3] i.e. from laparoscopic port sites, carboperitoneum induced abdominal stretch and hepatic bed disturbances due to cholecystectomy. Management of the postoperative pain is important as it increases the risk of morbidity and hospital stay. Numerous modalities have been used to alleviate pain after laparoscopic cholecystectomy which include non-steroidal anti-inflammatory drugs (parecoxib, ketoprofen) intravenous (IV) opioids, patient controlled analgesia, local anaesthetic (LA) infiltration (before and/or after pneumoperitoneum), thoracic epidural block and multi-modal analgesia.[2] Transversus abdominis plane (TAP) block is accepted as another constituent of multimodal analgesia.[3-5] IV opioids have number of side effects such as nausea, vomiting, constipation, urinary retention, sedation and resulting respiratory depression.[2,3] Thoracic epidural analgesia for postoperative pain could be more effective than patient controlled intravenous analgesia but it is associated with risk factors like dural puncture, high level epidural block, epidural hematoma and epidural infection.[2,6] NSAIDS has side effects like haemostasis alteration, renal dysfunction, gastrointestinal hemorrhage which limits its use.[3,7,8] By introducing LA into the neuro fascial plane between the internal oblique and transversus abdominis muscles, abdominal neural afferents are inhibited by TAP block.[5] It is used for the management of pain in the postoperative period after various surgical procedures namely open/laparoscopic Appendicectomy, cesarean section, total abdominal hysterectomy, laparoscopic cholecystectomy, open prostatectomy, renal transplantation and abdominoplasty.[1,5,9-,11]

Subcostal TAP block provides sensory nerve blockade of T_7-T_{12} nerves as against the classical posterior approach which provides sensory block from T_{10}-L_1 spinal segment levels.[3,6] The landmark guided technique at "Petit triangle'' where conventional TAP block is given between neurofascial planes by "double pop" method. The unpredictability and limited clinical utility of conventional TAP block lead to less efficacy. The major reason for its less efficacy is lack of clearly defined anatomical landmarks leading to uncertainty regarding the exact location of needle position and lack of evidence of LA deposition in correct plane. This blind technique also leads to fatal complications like bowel puncture and liver injury. Ultrasound (USG) guided TAP block reduces time length taken for intervention, decreases number of attempts, increases the accuracy and reduces the time of onset of effect with almost negligible possibility of accidental puncture of gastrointestinal organs. Thus USG guided TAP block is proved to be a good choice for postoperative analgesia in laparoscopic cholecystectomy.[1,3,9,10,12]

Various LA agents have been utilized for post-operative analgesia with ultrasound-guided TAP block.[1,2] Ropivacaine and Bupivacaine share a similar pka and plasma protein binding property and are commonly used as LA agents for the TAP block with no comparison prior for their relative effectiveness and efficacy.

AIMS AND OBJECTIVES

We did study to find out whether Ropivacaine was superior to Bupivacaine for providing postoperative analgesia with its inherent advantages, when used for TAP block in patients undergoing Laparoscopic Cholecystectomy and evaluation of analgesia was done by comparing the time taken for the block procedure, duration of post operative analgesia, visual analogue score(VAS) during the first 24 hours, Quality of VAS and incidence of complications during first 24 hours.

METHODOLOGY

This is a prospective double blind, randomized controlled study which was conducted on 60 ASA physical status I and II adult patients of age 18-65 years of either gender posted for elective laparoscopic cholecystectomy under general anaesthesia after getting approval from Institutional Ethical Committee. Patients with history of acute or chronic renal disease, liver disease, neurological and cardiovascular diseases, with known psychiatric disorders, coagulopathy disorders, allergy to amide LA, inability to understand VAS scoring, infection at local needle site insertion and patient refusal were **excluded** from the study.

All the patients underwent thorough PAC(pre- anesthetic checkup) which included history taking, general and physical examination and routine investigations. Hence any exclusion criterias were ruled out. On PAC visit each patient's baseline heart rate (HR), blood pressure (BP) and respiratory rate (RR) were recorded. Visual Analogue Scale (VAS) was explained to the patient before surgery.

After fulfilling inclusion criteria, patients were allocated Group A and Group B on the basis of computer generated randomization prepared by PSM department of our college.

Group A (n = 30)	40 ml Inj. Bupivacaine 0.25% (20ml on each side)
Group B (n = 30)	40 ml Inj. Ropivacaine 0.375% (20ml on each side)

All patients were given Tablet pantoprazole 40mg (HS) night before surgery and were kept nil- by -mouth over night before surgery. After taking the patient to operating room on the operating day an intravenous line was secured with 18 or 20 gauge cannula. 5 para monitor was applied and baseline pulse, blood pressure, oxygen saturation and respiratory rate were recorded.

Premedication was given with Inj glycopyrrolate 0.04mg/kg, Inj Ondansetron 0.008mg/kg, Inj midazolam

0.02mg/kg and Inj fentanyl 2µg/kg intravenously. General anaesthesia was induced with Inj Propofol 2mg/kg and Inj scoline 2mg/kg was given for facilitation of endotracheal intubation with appropriate sized cuffed ETT and anaesthesia was maintained with Oxygen, nitrous oxide, sevoflurane and Vecuronium After completion of surgical procedure and before reversal under full asepsis, ultrasound-guided Subcostal TAP block was administered under real-time guidance with a high-frequency (5-10 MHz) ultrasound linear probe (Micromaxx™ Sonosite). After confirming negative aspiration of blood, 20 ml of 0.25% plain bupivacaine or 0.375% plain ropivacaine was administered on each side as per the randomization.

Technique

Under strict asepsis, ultrasound transducer was positioned horizontally across the abdomen. The muscle layers in the antero-lateral part of the abdomen were traced by scanning from the midline towards the area between the iliac crest and the costal margin in the mid-axillary line. The rectus abdominis muscle was identified, just off the midline, as an oval / elliptical structure. This fascial plane then gives rise to 3 muscle layers: external oblique, internal oblique and transversus abdominis. The ultrasound transducer was moved to scan laterally where the 3 muscle layers can be seen parallel to one another then moved more posteriorly to view the point where the transversus abdominis muscle begins to tail off.(fig1 -1 & 2) With an adequate ultrasound image, the spinal needle no 23 was inserted anterior to the transducer.

The LA was then slowly injected, the fascial plane was seen to separate and form a well-defined, hypoechoic, elliptical shape between the internal oblique and transversus abdominis muscles (fig1-3). All patients were observed by another Doctor under the following areas after the extubation (after fulfilling reversal criteria) : Post operative Vitals, VAS scores at 30 mins, 1 hours, 2 hours, 4 hours, 6 hours, 8 hours, 10 hours, 12 hours, 14 hours, 16 hours, 18 hours, 20 hours, 22 hours and 24 hours after shifting to PACU., Time for rescue analgesia(Inj Diclofenac Sodium 75mg) requirement, Post operative complications like pruritis, PONV, ECG Changes and any signs of adverse effects of techniques like local site infection, hematoma formation and LA toxicity.

The scale consists of 10cm or 100 mm line anchored at one end by a label ‘’no pain’’ and at the other end by a label ‘’the worst pain imaginable’’. The patient simply marks the line to indicate pain intensity and a slide rule like device with the line on patient’s side. VAS is most common method for measuring pain and pain relief in clinical practice. Fig 2.

Statistical analysis

Sample size was taken 60. Data analysis was performed by using Statistical Package for Social Sciences (SPSS) version 17.0 software. Data from study were expressed as mean ± standard deviation. The statistical significance was determined by subjects’ t test. Two tailed p values were used throughout and p value less than 0.05 were judged as statistical significant. Statistical analysis id done with SPSS. P values <0.05 were taken as statistically significant.

RESULTS

There was no significant difference in both groups in terms of demographic variables. The mean age in years was 37.87 ± 10.76 in Group **A**, while 38.53 ± 14.47 in Group **B** with p value 0.58 which was not significant.

Mean weight in kilograms was 60.67 ± 8.02 in Group **A** while 62.6 ± 8.57 in Group **B** with p value 0.37 which was also not significant.

Both groups had equal sex ratio with 5 males and 25 females.

The ASA physical status I: II ratio was 21: 9 in Group **A** and 13: 17 in Group **B**. (Table **1)**

The mean time taken for the TAP block procedure was almost similar in both the groups and the difference was not significant. **(Table 2**)

The first dose of rescue analgesia (mean duration of analgesia) was given at 14.03 ± 2.03hours in Group **A** and 16.51 ± 5.58 hours in Group **B**, which is highly significant. (**Table 3)**

After extubation patients of both groups had VAS ≥ 3. Mean VAS score was 4.96 ± 0.76 in Group **A** and 4.97 ± 1.06 in Group **B**.

In Group **A** 73.33% patients had mild pain and 26.67% patients had moderate pain while in Group **B** 66.67% patients had mild pain and 33.33% patients had moderate pain at the time of extubation.(**Table 4)**

The quality of VAS score was highly significant in both the groups. On comparison, VAS score didn’t cross 4 until 18 hours in Group **B** where as it crossed at 14 hours in Group **A**, signifying that quality of analgesia is better with Ropivacaine.(**Table 5 and Chart 1)**

After 30 mins, 76.67% of patients had no pain and 23.33 of patients had mild pain in Group **A**, while 100 of patients had no pain in Group **B**.

At 1 hour, 73.33 had no pain and 26.67 had mild pain in Group **A**, while 96.67 had no pain and 3.33 had mild pain in Group **B**.

At 2 hours, 80 had no pain and 20 had mild pain in Group **A**, while 100 had no pain in Group **B**.

At 4 hours, 66.67 had no pain and 33.33 had mild pain in Group **A**, while 96.67 had no pain and 3.33 had mild pain in Group **B**.

At 6 hours, 60 had no pain and 40 had mild pain in Group **A**, while 90 had no pain and 10 patients were

given rescue analgesia at 5 hrs in Group **B**.

At 8 hours, 60 had no pain and 40 had mild pain in Group **A**, while 86.67 had no pain, 3.33 had mild pain and 10 patients had already been given rescue analgesia in Group **B**.

At 10 hours, 50 had no pain, 43.33 mild pain and rescue analgesia was given at 9 hours to 3.33 and at 3.33 patients at 10 hours in Group **A**. In Group **B** 80 had no pain, 10 had mild pain and 10 patients had already been given rescue analgesia.

At 12 hours, 20 had no pain, 56.66 had mild pain, 10 had moderate pain and rescue analgesia was at 12 hours, while rescue analgesia was already given to 6.66 before, 3.33 at 10.5 hours and at 11.5 hours in Group **A**. In Group **B** 60 had no pain, 30 had mild pain10 patients had already been given rescue analgesia.

At 14 hours, 15 had mild pain, 20 had moderate pain and rescue analgesia given at 14 hours, while rescue analgesia was already given to 23.33 before and 3.33 at 12.5 hours, 3.33 at 13.5 hours in Group **A**. In Group **B** 56.67 had no pain, 26.67 had mild pain and 6.67 had moderate pain and rescue analgesia was given to them, while rescue analgesia was already given to 10.

At 16 hours, 6.67 had mild pain, 23.33 had moderate pain and rescue analgesia was given at 16 hours, while rescue analgesia was already given to 50 before and to 6.67 at 14.5 hours, 13.33 at 15 hours, and 3.33 at 15.5 hours in Group **A**. In Group **B**, 43.33 had no pain and 33.33 had mild pain, while rescue analgesia was already given to 16.7 before and to 3.33 at 15 hours and to 3.33 at 15. 5 hours.

At 18 hours, rescue analgesia was already given to 93.33 before, while to 3.33 at 16.5 hours and to 3.33 at 17 hours in Group **A**. In Group **B** 3.33 had no pain, 20 had mild pain, 3.33 moderate pain and rescue analgesia was given to them, while rescue analgesia was already given to 23.33 before and to 3.33 at 16.5 hours, to 13.33 at 17 hours and to 3.33 at 17.5 hours.

At 20 hours, in Group **B** 3.33 had no pain, 20 had mild pain, 10 had moderate pain and rescue analgesia was given to them, while rescue analgesia was already given to 46.66 and to 6.67 at 18.5 hours, 3.33 at 19 hours and 10 at 19.5 hours.

At 22 hours, in Group **B** 3.33 had no pain, 3.33 had mild pain, 3.33 had moderate pain and rescue analgesia was already given to them, while rescue analgesia was already given to 76 before and to 6.67 at 20.5 hours and to 6.67 at 21 hours.

At 24 hours, in Group **B** 3.33 had no pain, while rescue analgesia was already given to 93.33 before and to 3.33 at 22.5 hours. But 3.33 of them received rescue analgesia at 24.5 hours. (**Table 6)**

The mean heart rate and Mean Arterial Blood pressure in both groups were not comparable in both groups from extubation till 24th hour postoperatively. P value throughout was not significant and there were no complications reported in either of groups.

DISCUSSION

An adequate postoperative analgesia provides low morbidity rates, reduces the sensitivity of endocrine and metabolic response due to surgery and shortens the recovery period.[60] Over the last decade the effectiveness of TAP block for postoperative pain control has complimented general anaesthesia. With Effective analgesia there is reduced pain intensity, lower incidence of side effects from analgesics and improved patients' comfort.

TAP block was initiated by Rafi[2] as a landmark based technique within the lumbar "triangle of petit". Conventional TAP block used "double pop" technique which depended solely on the palpated sensation without a visual guide. It can cause intestinal puncture and unexpected diffusion of LA into other body parts. It may result in subsequent motor nerve paralysis and even severe complications such as liver damage.

We used **subcostal type** TAP Block in which LA is deposited between rectus abdominis and transversus abdominis muscle which blocks T_6-T_{10} with lower chances of complications.

Pain after laparoscopic cholecystectomy may be differentiated into three parts. One is visceral, second is abdominal wall and third is referred to shoulder. Visceral pain in the biliary tract is carried by the sympathetic fibers, originating from T_7-T_{10} and parasympathetic fibers from both the vagus nerves. The anterior abdominal wall sensory innervations were from T_6-L^1. Referred pain to shoulder is carried by phrenic nerve. The LA agents in TAP block produces excellent analgesia to the skin and musculature of anterior abdominal wall for visceral abdominal and reffered pain.[14,15]

Bharti et al.[16] Bajaj et al.[17], Niraj et al.[18] and Tihan et al.[19] and compared TAP block with conventional mode of analgesia however Sinha et al.[20] and Kuthiala et al.[13] compared efficacy of different LA drugs in TAP block. We compared analgesic effect of USG guided TAP block injecting Inj Bupivacaine 0.25% with Inj Ropivacaine 0.375% 20ml each side in patients posted for elective laparoscopic cholecystectomy under general anaesthesia.

The demographic data in terms of age, weight, sex and ASA physical status were comparable in both the groups of our study.

Time taken for procedure was reduced over the period of

time from 7 mins to 4 mins which further explains that TAP block was fairly simple procedure and we can decrease this procedural time with expertise.

Mean duration of analgesia was more with Group B (16.51 ± 5.58) as compared to Group **A** (14.03 ± 2.03) with p value 0.025 which is just significant which correlated with the study of Sinha et al.[20] They also found the rescue analgesia was significant with Ropivacaine than Bupivacaine with median of 4.00 (3.00 - 7.25) in Bupivacaine and 5.65 (4.00 – 9.00) in Ropivacaine. Kuthiala et al.[13] also found morphine consumption was higher in conventional analgesic method as compared to USG guided TAP block with standard IV analgesics. Mean dose of morphine consumption was 2.44 ± 2.44 in TAP block group and 3.96 ± 2.56 in conventional analgesics group with p value 0.003 showing highly significance.

Percentage of VAS score and Mean VAS Score: In our study was higher 73.33 of patients had mild pain and 26.67 of them had moderate pain in Group A, while 66.67 had mild pain and 33.33 had moderate pain in Group **B** after extubation.

There was mild to moderate pain in both groups at the time of extubation in our study. Mean VAS score was 4.96 ± 0.76 in Group A and 4.97 ± 1.06 in Group B with p value 0.96, which was not significant.

After 30 mins, in our study mean VAS score was 1.9 ± 0.75 in group **A** and 1.07 ± 0.64 in group B with p value <0.0001, which is highly significant in our study. 76.67 of patients had no pain and 23.33 of patients had mild pain in Group A, while 100 of patients had no pain in Group B. It suggested that TAP block provides excellent analgesia. It correlated with the study conducted by Sinha et al.[20] They found VAS was with median value of 1 (0.00 – 1.00) with Bupivacaine and 0.00 (0.00 – 0.00) with Ropivacaine with p value 0.003 at 30 mins. Kuthiala et al.[13] recorded mean VAS score at rest 3.22 in TAP block group while 4.00 in conventional analgesic group at 30 mins and VAS score at coughing was 4.22 in TAP block group and 5.46 in other group.

1 hour postoperatively in our study, mean VAS score was 2 ± 0.74 in Group A and 0.73 ± 0.87 in Group B with p value < 0.0001 which was highly significant. 73.33 of patients had no pain and 26.67 had mild pain in Group A, while 96.67 patients had no pain and 3.33 had mild pain in Group B suggested effective pain relief with Ropivacaine. Our findings correlated with study conducted by Sinha et al.[20], showing median value of 1.50 (0.75 – 2.25) with Bupivacaine and 0.00 (0.00 – 2.00) with Ropivacaine and p value 0.020 at 1 hour.

2 hours postoperatively in our study, mean VAS score was 2.03 ± 0.61 in Group A and 0.57 ± 0.68 in Group B, p value was <0.0001 in our study suggested satisfactory analgesia with Ropivacaine. 80 had no pain and 20 had mild pain in Group A, while 100 had no pain in Group B suggested superior analgesia with Ropivacaine at that hour.

4 hours postoperatively in our study, mean VAS score was 2.16 ± 0.70 in Group A and 0.6 ± 0.89 in Group B, p value was <0.0001 in our study showing highly significance. 66.67 had no pain in Group A, while 33.33 had mild pain in Group B. Findings of our study were consistent with study of Sinha et al.[20] Their median VAS score was 2.00 (1.00 – 5.00) with Bupivacaine and 2.00 (1.00 – 4.00) with Ropivacaine and p value 0.44 at 4 hours. In study done by Kuthiala et al.[13] mean VAS score at rest was 0.80 in group A and 1.04 in group B, while mean VAS score at coughing was 1.26 in group A and 1.78 in group B at 4 hours.

6 hours postoperatively in our study mean VAS score was 2.36 ± 0.92 in Group A and 0.52 ± 0.58 in Group B with p value <0.0001 showing highly significance., 60 had no pain and 40 had mild pain in Group A, while 90 had no pain. Rescue analgesia was given at 5 hours to 10 in Group B but that could either be due to less expertise for the procedure or some extra manipulation of the abdominal organs during the study.

8 hours postoperatively in our study, mean VAS score was 2.53 ± 1.17 in Group A and 1.19 ± 1.08 in Group B with p value <0.0001, which was highly significant. 60 of patients had no pain and 40 had mild pain in Group A, while 86.67 had no pain, 3.33 had mild pain and 10 patients already had given rescue analgesia in Group B. It was correlated to Sinha et al.[20] They found median VAS score was 2.00 (1.00 - 2.00) in Group A and 2.00 (1.00 – 4.25) with p value 0.16 at 8 hours which was not significant.

10 hours postoperatively in our study, mean VAS score was 2.66 ± 1.32 in Group A and 1.33 ± 1.04 in Group B with p value <0.0001, which was highly significant. 50 of patients had no pain, 43.33 mild pain and rescue analgesia was given at 9 hours to 3.33 and at 10 hours to 3.33 in Group A. In Group B 80 had no pain, 10 had mild pain and 10 patients already had given rescue analgesia that suggested Ropivacaine was better than Bupivacaine in terms of pain relief.

12 hours postoperatively in our study, post mean VAS score was 3.73 ± 1.48 in Group A and 1.85 ± 1.38 in Group B with p value 0.0006, which was highly significant. 20 of patients had no pain, 56.66 had mild pain, 10 had moderate pain and rescue analgesia was given at 12 hrs, while rescue analgesia was already given to 6.66 before, 3.33 at 10.5 hours and at 11.5 hours in Group A. In Group B 60 had no pain, 30 had mild pain and 10 already had given rescue analgesia. It was similar to Sinha et al.[20] They found median VAS score at 12 hours, was 1.50 (1.00 – 2.00) in Group A and 2.00 (1.00 – 2.00) in Group B with p value 0.80, which was not significant. Kuthiala et al.[13] also found mean VAS score

at rest was 0.20 in Group A and 0.20 in Group B with P value <0.01, while mean VAS score at coughing was 0.42 in Group A and 0.56 in Group B with p value <0.0, which was highly significant.

In our study 14 hours postoperatively, mean VAS score was 4.71 ± 1.27 in Group A and 2.07 ± 2.04 in Group B with p value 0.0001 which is highly significant. 15 patients had mild pain, 20 had moderate pain and rescue analgesia given at 14 hrs, while rescue analgesia was already given to 23.33 before and to 3.33 at 12.5 hours, 3.33 at 13.5 hours in Group A. In Group B 56.67 patients had no pain, 26.67 had mild pain and 6.67 had moderate pain and rescue analgesia was given at 14 hrs, while rescue analgesia was already given to 10.

In our study, 16 hours postoperatively, mean VAS score was 6 ± 0.76 in Group A and 2.65 ± 1.15 in Group B with p value 0.89, which was not significant. 6.67 patients had mild pain, 23.33 had moderate pain and rescue analgesia was given at 16 hrs, while rescue analgesia was already given to 50 before and to 6.67 at 14.5 hours, 13.33 at 15 hours, and 3.33 at 15.5 hours in Group A. In Group B, 43.33 had no pain and 33.33 had mild pain, while rescue analgesia was already given to 16.7 before and to 3.33 at 15 hours and to 3.33 at 15. 5 hours.

At 17 hours postoperatively, all the patients had received rescue analgesia 75 mg diclofenac.

In our study, 18 hours postoperatively mean VAS score was 4.18 ± 1.42 in Group B. Rescue analgesia was already given to 93.33 before, while to 3.33 at 16.5 hours and to 3.33 at 17 hours in Group A. In Group B 3.33 had no pain, 20 had mild pain, 3.33 moderate pain and rescue analgesia was given at 18 hrs, while rescue analgesia was already given to 23.33 before and to 3.33 at 16.5 hours, to 13.33 at 17 hours and to 3.33 at 17.5 hours.

In our study, 20 hours postoperatively mean VAS score was 5.2 ± 1.75 in Group B. In Group B 3.33 of patients had no pain, 20 had mild pain, 10 had moderate pain and rescue analgesia was given at 20 hrs, while rescue analgesia was already given to 46.66 and to 6.67 at 18.5 hours, 3.33 at 19 hours and 10 at 19.5 hours.

In our study, 22 hours postoperatively mean VAS score was 4.67 ± 2.52 in Group B. Group B 3.33 of patients had no pain, 3.33 had mild pain, 3.33 had moderate pain and rescue analgesia was already given at 22 hrs, while rescue analgesia was already given to 76 before and to 6.67 at 20.5 hours and to 6.67 at 21 hours.

24 hours postoperatively in our study, in Group B, 3.33 of patients had no pain, while rescue analgesia was already given to 93.33 before and to 3.33 at 22.5 hours. But 3.33 of them received rescue analgesia at 24.5 hours. That suggested mild to moderate pain was seen around 20 – 22 hours with Ropivacaine. It was correlated to the study of Sinha et al.[20] They found median VAS score was 1.00 (1.00 – 2.00) in Group A and 1.00 (1.00 – 2.00) in Group B with p value 1, which was not significant. The study of Kuthiala et al.[13] also found mean VAS score at rest was 1.21 in Group A and 1.43 in Group B with P value <0.01, while mean VAS score at coughing was 1.12 in Group A and 2.18 in Group B with p value <0.0, which is highly significant.

24.5 hours postoperatively in our study, the last patient of Group B was also given rescue analgesia.

There was no significant changes noted in vitals including HR, SBP, DBP, MAP at after extubation, 30 mins, 1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 10 hours, 12 hours, 14 hours, 16 hours, 18 hours, 20 hours, 22 hours and 24 hours postoperatively in both groups in our.

Kuthiala et al.[13] recorded nausea in 2 patients in Group A and 4 patients in Group B but no procedure related complications. Whereas there were no complications like PONV or procedure related noted in other studies[16,17,20] which correlated with our study where none of the patients had complications.

Tables and Charts and Figures

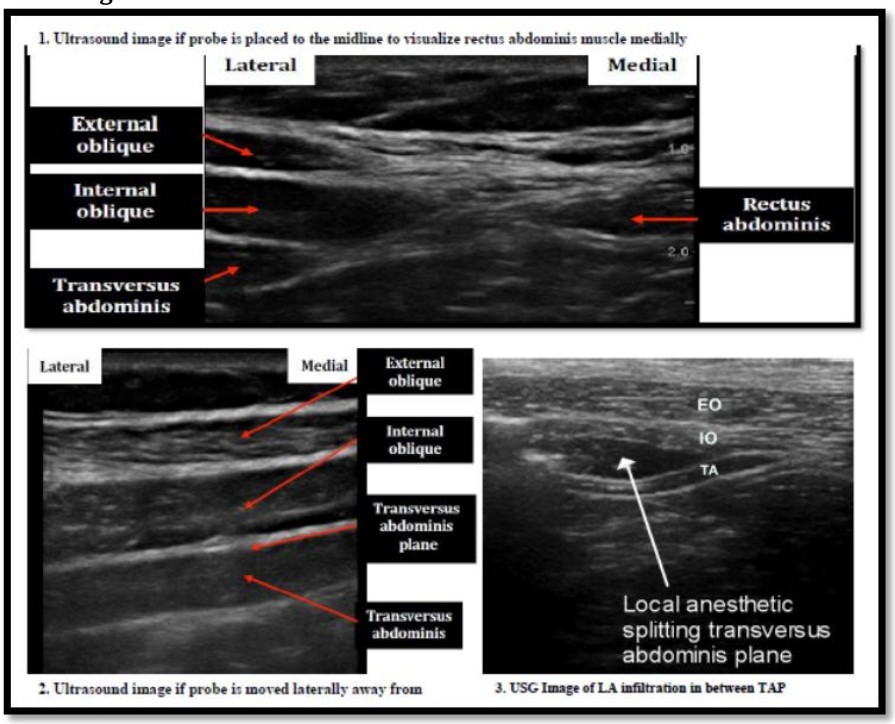

Figure 1

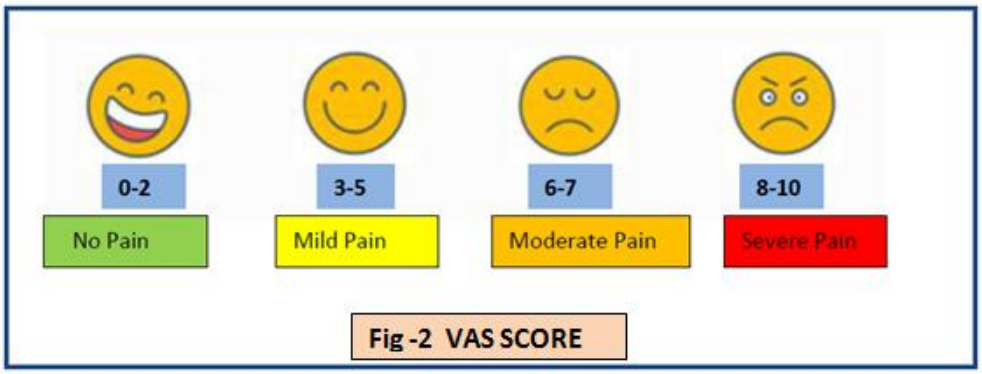

Table 1: Demographic Variables.			
Variables Mean ± SD	**Group A n = 30**	**Group B n = 30**	**P Value**
Age (yrs)	37.87 ± 10.76	38.53 ± 14.47	0.58
Sex (M : F)	5 : 25	5 : 25	
Weight (kgs)	60.67 ± 8.02	62.6 ± 8.57	0.37
ASA Grade (I : II)	21 : 9	13 : 17	

Table 2: Time taken for the Procedure.			
Time taken for The block Procedure (mins)	**Group A n = 30**	**Group B n = 30**	**P Value**
4 mins	15	14	
5 mins	9	10	
6 mins	3	3	
7 mins	3	3	
Mean ± SD	7.5 ± 5.75	7.5 ± 5.45	1

Table 3: Mean Duration of Analgesia.			
	Group A n = 30	**Group B n = 30**	**P Value**
Duration of analgesia (hrs) ± SD	14.03 ± 2.03	16.51 ± 5.58	0.025

Table 4: Percentage of VAS Score at the time of extubation.		
VAS Score	**Group A n=30 (%)**	**Group B n=30 (%)**
0 - 2 (No Pain)	-	-
3 - 5 (Mild Pain)	22 (73.33)	20 (66.67)
6 – 7 (Moderate Pain)	8 (26.67)	10 (33.33)
8 – 10 (Severe Pain)	-	-

Table 5: VAS score Mean ± SD.			
Duration	**Group A**	**Group B**	**P value**
After Extubation	4.96 ± 0.76	4.97 ± 1.06	0.96
30 Mins	1.9 ±0.75	1.07 ± 0.64	<0.0001
1 hour	2 ± 0.74	0.73 ± 0.87	<0.0001
2 hours	2.03 ± 0.61	0.57 ± 0.68	<0.0001
4 hours	2.16 ± 0.70	0.6 ± 0.89	<0.0001
6 hours	2.36 ± 0.92	0.52 ±0.58	<0.0001
8 hours	2.53 ± 1.17	1.19 ± 1.08	<0.0001
10 hours	2.66 ± 1.32	1.33 ± 1.04	<0.0001
12 hours	3.73 ± 1.48	1.85 ± 1.38	0.0006
14 hours	4.71 ± 1.27	2.07 ± 2.04	0.0001
16 hours	6 ± 0.76	2.65 ± 1.15	0.89
18 hours		4.18 ± 1.42	
20 hours		5.2 ± 1.75	
22 hours		4.67 ± 2.52	

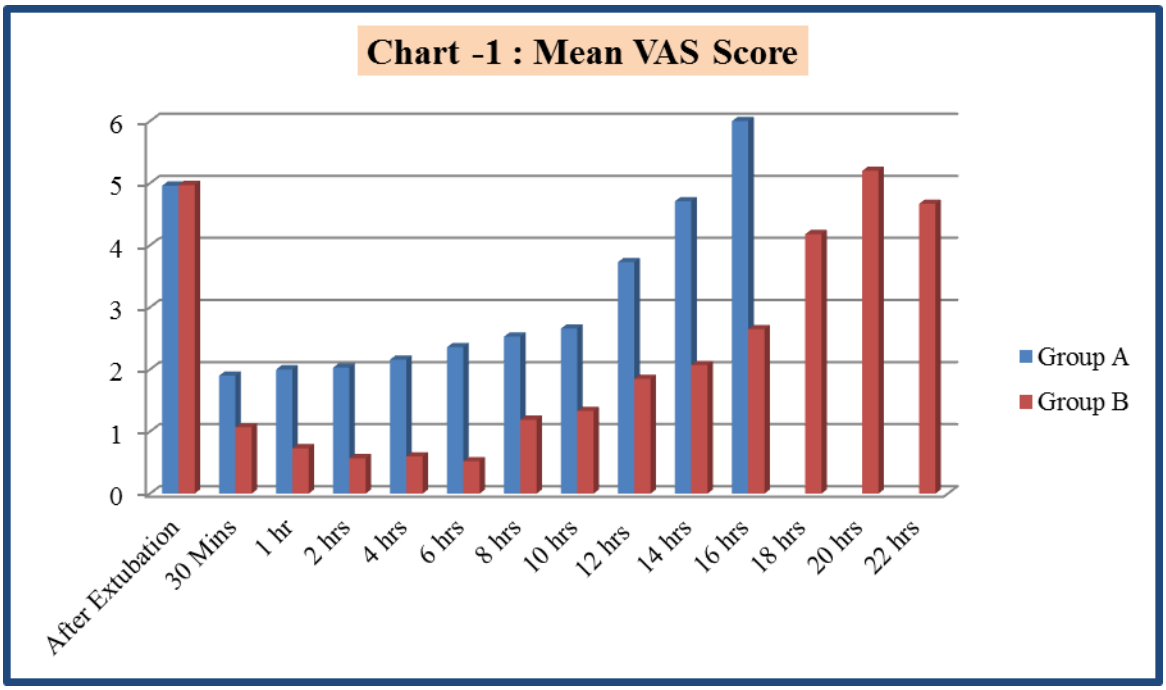

Table 6: Percentage of VAS Score.

Duration	Group	0 – 2 (no pain)	3 – 5 (mild pain)	6 – 7 (moderate pain)	8 -10 (severe pain)
30 Mins	A	23 (76.67%)	7 (23.33%)	-	-
	B	30 (100%)	-	-	-
1 Hour	A	22 (73.33%)	8 (26.67%)	-	-
	B	29 (96.67%)	1 (3.33%)	-	-
2 Hours	A	24 (80%)	6 (20%)	-	-
	B	30 (100%)	-	-	-
4 Hours	A	20 (66.67%)	10 (33.33%)	-	-
	B	29 (96.67%)	1 (3.33%)	-	-
6 Hours	A	18 (60%)	12 (40%)	-	-
	B	27 (90%)	-	3(10%)analgesia given at 5 hrs	-
8 Hours	A	18 (60%)	12 (40%)	-	-
	B	26 (86.67%)	1 (3.33%)	-	-
10 Hours	A	15 (50%)	13 (43.33%)	1(3.33%)analgesia given at 9 hrs 1(3.33%)analgesia given at 10 hrs	-
	B	24 (80%)	3 (10%)	-	-
12 Hours	A	6 (20%)	17 (56.66%)	2 (6.6%) analgesia already given 1(3.33%) analgesia given at10.5 hrs 1(3.33%)analgesia given at 11.5 hrs 3(10%)analgesia given at 12 hrs	-
	B	18 (60%)	9 (30%)	-	-
14 Hours	A	-	15 (50%)	7(23.33%) analgesia already given 1(3.33%)analgesia given at 12.5 hrs 1(3.33%)analgesia given at 13.5 hrs 6(20%)analgesia given at 14 hrs	-
	B	17 (56.66%)	8 (26.67%)	3(10%) analgesia already given 2(6.67%)analgesia given at 14 hrs	-
16 Hours	A	-	2 (6.67%)	15 (50%) analgesia already given 2(6.67%)analgesia given at 14.5 hrs 4(13.33%)analgesia given at 15 hrs 1(3.33%)analgesia given at 15.5 hrs 7(23.33%)analgesia given at 16 hrs	-
	B	13 (43.33%)	10 (33.33%)	5 (16.7%)analgesia already given 1(3.33%)analgesia given at 15 hrs 1(3.33%)analgesia given at 15.5 hrs	-
18 Hours	A	-	-	28 (93.33%) analgesia already given 1 (3.33%) analgesia given at 16.5 hrs 1(3.33%) analgesia given at 17 hrs	-
	B	1 (3.33%)	15 (50%)	7 (23.33%) analgesia already given 1(3.33%)analgesia given at 16.5 hrs 4(13.33%)analgesia given at 17 hrs 1(3.33%)analgesia given at 17.5 hrs 1(3.33%)analgesia given at 18hrs	-

20 Hours	A	-	-	-	-
	B	1 (3.33%)	6 (20%)	14 (46.66%) analgesia already given 2(6.67%)analgesia given at 18.5 hrs 1(3.33%)analgesia given at 19 hrs 3(10%)analgesia given at 19.5 hrs 3(10%)analgesia given at 20 hrs	-
22 Hours	A	-	-	-	-
	B	1 (3.33%)	1 (3.33%)	23 (76%) analgesia already given 2(6.67%)analgesia given at 20.5 hrs 2(6.67%)analgesia given at 21 hrs 1(3.33%)analgesia given at 22 hrs	-
24 Hours	A	-	-	-	-
	B	1 (3.33%)	-	28(93.33%) analgesia already given 1(3.33%)analgesia given at 22.5 hrs	-
25 Hours	A	-	-		
	B	-	-	29 (96.66%) analgesia already given 1(3.33%) analgesia given at 24.5 hrs	

CONCLUSIONS

Subcostal TAP Block reduces postoperative pain effectively in laparoscopic Cholecystectomy. 0.375% Ropivacaine when compared with 0.25% Bupivacaine provides a longer duration of analgesia in ultrasound guided TAP block. Thus, it is concluded that Ropivacaine can be used as a safe alternative for Bupivacaine, routinely for TAP block for laparoscopic Cholecystectomy surgeries.

REFERENCES

1. S. Chartlon, A. M. Cyna, P. Middleton, and J. D. Griffiths, "Perioperative transversus abdominis plane (TAP) blocks for analgesia after abdominal surgery", Cochrane Database of systemic Reviews, 2010; 8(12): CD007705.
2. A. N. Rafi, "Abdominal field block: a new approach via the lumbar triangle", Anaesthesia, 2001; 10(56): 1024-1026.
3. Yıldırım Ar, A Erdoğan Arı, D Yiğit Kuplay, Y. İşcan, Y., Karadoğan, F., Kırım, D, & Akgün, F. N.Ultrasound-guided transversus abdominis plane block in patients undergoing laparoscopic cholecystectomy: comparison of efficacy of bupivacaine and levobupivacaine on postoperative pain control. Brazilian Journal of Anesthesiology, 2018; 68(5): 455-461.
4. R. J. Kearns and S. J. Young, "Transversus abdominis plane blocks; a national survey of techniques used by UK obstetric anaesthetists", International Journal of Obstetric Anesthesia, vol. 20, no.1, pp. 103-104, 2011; 1(20): 103-104.
5. R. S. Atkinson, G. B. Rushman, and J. A. Lee, A Synopsis of Anaesthesia, Wright, Bristol, UK, 10th edition, 1987.
6. J. G. McDonnell, B. D. O'Donnell, D Tuite, T. Farrell, and C. Power, "The Regional Abdominal Field Infiltration (R.A.F.I.) technique computerized tomographic and anatomical identification of a novel approach to the transversus abdominis neuro-vascular fascial plain", in Proceeding of the American Society of Anesthesiologists Annual Meeting, 2004, A-899. Abstract.
7. J. G. McDonnell, B.D. O'Donnell, T. Farrell et al., "Transversus abdominis plane block: a cadaveric and radiological evaluation" Regional Anesthesia and Pain Medicine, 2007; 5(32).
8. Fuladi, N., Deshmukh, S., & Bhure, A. comparative study of Bupivacaine 0.25%versus Ropivacaine 0.5%in Transversus abdominis Plane block for postoperative analgesia in lower abdominal surgeries : A randomised controlled trial. Journal of Evolution of Medical and Dental Sciences, 2014; 3(17): 4569–4576.
9. J. G. McDonnell and J. G. Laffey, "Transversus abdominis plane block" Anesthesia and Analgesia, 2007; 3(105): 883-884.
10. B. D. O'Donnell, J. G. McDonnell and A. J. Mcshane, "The Transversus Abdominis Plane (TAP) block in open retropubic prostatectomy" Regional Anesthesia and PainMedicine, 2006; 1(31): 91.
11. K. Webster, "The Transversus Abdominis Plane (TAP) block: abdominal plane regional anesthesia" Update in Anaesthesia, 2008; 1(24): 24-29.
12. W. M. Rozen, T. M. N. Tran, M. W. Asthon, M. J. Barrington, J. J. Ivanusic and G. I. Taylor "Refining the course of the thoracolumbar nerves: a new understanding of the innervations of the anterior abdominal wall" Clinical Anatomy, 2008; 4(21): 325-33.
13. Kuthiala Gaurav, Ritu Mehta, Anupam Sgrivastava, Venus Aggarwal. Efficacy of ultrasound guided transverse abdominis plane block for postoperative analgesia in laparoscopic cholecystectomy, a prospective randomized controlled trial. Northern Journal Site, 2017; 2: 15-20.
14. Joris J. thiry E. Paris. P.Weerts J.Lamy M. Pain after laparoscopic cholecystectomy: characteristics and effect of intraperitoneal Bupivacaine. Anesth Analg, 1995; 81: 37-84.
15. Schulz KF. Chalmers I. Grimes DA. Altman DG. Assessing the quality of randomization from reports

of controlling trials published in obstetrics and gynecology journals. JAMA, 1994; 272: 125-8.

16. N. Bharti, P. Kumar, I. Bala and V. Gupta "The efficacy of a novel approach to transversus abdominis plane block for postoperative analgesia after colorectal surgery" Anesthesia and Analgesia, 2011; 6(112): 1504-1508.
17. J. M. Baaj, R. A. Alsatli, H. A. Majaj, Z. A. Babay and A. K. Thallaj "Efficacy of ultrasound-guided transversus abdominis plane (TAP) block for post cesarean section delivery analgesia – a double-blind, placebo controlled, randomized study" Middle East Journal of Anesthesiology, 2010; 6(20): 821-826.
18. G. Niraj, A. Searle, M. Mathews et al. "Analgesic efficacy of ultrasound guided transversus abdominis plane block in patients undergoing open appendicectomy" British Journal of Anaesthesia, 2009; 4(103): 601-605.
19. Tihan, D., Totoz, T., Tokocin, M., Ercan, G., Calikoglu, T. K., Vartanoglu, T. Celebi F, Dandin O, Kafa, I. M. Efficacy of laparoscopic transversus abdominis plane block for elective laparoscopic cholecystectomy in elderly patients. Bosnian Journal of Basic Medical Sciences, 2016; 16(2): 139–144.
20. Sinha, S., Palta, S., Saroa, R., & Prasad: A Comparison of ultrasound-guided transverses abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laparoscopic cholecystectomies. Indian Journal of Anaesthesia, 2016; 60(4): 264–269.