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# EFFICACY OF ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POST OPERATIVE ANALGESIA IN LAPAROSCOPIC CHOLECYSTECTOMY: COMPARISON OF TWO DIFFERENT CONCENTRATION AND VOLUME OF BUPIVACAINE

Anaesthesiology

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## ABSTRACT

Laparoscopic Cholecystectomy is one of the most common surgical procedure considered as the gold standard for the treatment of symptomatic gallbladder disease.Pain at the port sites is due to stretching by pneumoperitoneum and hepatic bed disturbances.Different techniques are in practice for postoperative analgesia. Now a days, Transversus Abdominis Plane (TAP) block is commonly performed truncal neural block owing to its high success rate, feasibility, safety and its ability to provide prolonged postoperative pain relief. In this block, local anaesthetic is infiltrated between the internal oblique and transversus abdominis muscle which blocks ventral rami of lower six thoracic and upper lumbar nerves (T7 to L1) especially subcostal (T12), ilioinguinal (L1) and iliohypogastric(L1). The study was designed to evaluate the efficacy and safety of USG guided Right sided Subcostal TAP block using two different concentration and volume of Bupivacaine and their efficacy to produce postoperative analgesia in patients undergoing laparoscopic cholecystectomy.Larger volume with lower concentration of Bupivacaine (0.16%) 30 ml provides better analgesia, longer duration of effective analgesia, better hemodynamic stability and requires less analgesic consumption in postoperative period.

## KEYWORDS

TAP block, Ultrasound, Bupivacaine,Postoperative analgesia

## INTRODUCTION

Laparoscopic cholecystectomy is one of the most common surgical procedure considered as the gold standard for the treatment of symptomatic gallbladder diseases like Cholelithiasis and Cholecystitis. As the laparoscopic procedures are minimally invasive, it is observed that it produces lesser pain as compared to open procedures in postoperative period. It is necessary to alleviate the pain in postoperative period which is required for early ambulation there by reduces the postoperative complications and also for better clinical and surgical outcomes. Pain at the port sites is due to stretching by pneumoperitoneum and hepatic bed disturbances [1].

Various analgesic drugs like Paracetamol, Nonsteroidal Anti-inflammatory drugs (NSAIDS) and Opioids etc by different routes are in practice to relieve postoperative pain. NSAIDS are associated with its own adverse effects and it should be used with caution due to its possible side effects in elderly patients, patients with renal, cardiac and liver disease and in patients with history of gastrointestinal bleeding [2]. Use of opioids is limited by its side effects like nausea, vomiting, respiratory depression, urinary retention, etc.

Now a days, Transversus Abdominis Plane (TAP) block is commonly performed truncal neural block owing to its high success rate, feasibility, safety and its ability to provide prolonged postoperative pain relief. In this block, local anaesthetic is infiltrated between the internal oblique and transversus abdominis muscle which blocks ventral rami of lower six thoracic and upper lumber nerves (T7 to L1) especially subcostal (T12), ilioinguinal (L1) and iliohypogastric (L1). It can be given blindly but Ultrasound guided technique provides direct visualization of transversus abdominis plane, requires minimal time and decreases number of attempts thereby it is more accurate and safer with minimal complications. [3,4,5,6]

Of various local anaesthetics used for Transverse Abdominal Plane (TAP) block, Bupivacaine is the most commonly administered long acting drug in anaesthesia practice. It has onset of 20-30 minutes and its effect lasts for 8-9 hours [7,8]. In our study we chose Ultrasound guided right subcostal Transversus Abdominis Plane block with two different concentration and volume of Bupivacaine and their efficacy to produce postoperative analgesia in patients undergoing laparoscopic cholecystectomy. [3,7]

## METHODS

### METHOD OF COLLECTION OF DATA:

This study was carried out after obtaining permission from institutional ethical committee and obtaining written informed consent of the patient's relative. We recruited 60 patients aged 18-65 years with ASA Risk I, II, III scheduled for Laparoscopic cholecystectomy for the prospective research study.

### MODE OF SELECTION OF CASES:

Randomised computer sampling technique into 2 groups with each group including 30 patients:

**Group A:**Patients received TAP block with (Bupivacaine0.5%50 mg+10 ml Saline Solution) = Bupivacaine 0.25% Total 20ml
**Group B:**Patients received TAP block with (Bupivacaine0.5%50 mg+20 ml Saline Solution) = Bupivacaine 0.16% Total 30ml

### Inclusion Criteria:

Age of patient 18-65 years, ASA Grade I, II, III, Either Sex, Weight 40-80 kg, Scheduled for elective laparoscopic cholecystectomy. Written informed consent by patient and patient's relative

### Exclusion Criteria:

Patient refusal, ASA Grade IV and V, Allergy to amide group of local anaesthetic agent, Contraindication to Transversus Abdominis Plane (TAP) block, Renal disease, Cardiac disease, Respiratory disease and psychiatric history, Inability to comply with study assessment, Pregnancy and lactation, Patient on anticoagulants or having bleeding

disorder, Underlying other significant systemic disease, Patient with severe hemodynamic instability.

**PROCEDURE:**

Following a comprehensive pre-anaesthetic evaluation, all the patients were explained about VAS. They were electively fasted 8 hours preoperatively.

After arrival in operating room, routine monitoring (ECG, pulse oximetry, non-invasive arterial blood pressure) were applied and intravenous line was secured into a suitable vein. Administration of 500ml DNS (0.9% sodium chloride & 5% dextrose) or selective fluid of choice via peripheral access was started. Baseline vitals were recorded. The patient was given premedication in the form of Inj. Glycopyrrolate (0.004 mg/kg), Inj. Ondansetron (0.15mg/kg) and Inj. Fentanyl (0.002mg/kg) intravenously. All patients were then pre-oxygenated with 100% oxygen via Bain circuit with fresh gas flow of 8 L/min for 3-5 mins. General Anaesthesia was induced with Inj. Propofol (2.5mg/kg) premixed with preservative free Inj. Lignocaine (2%) (1.5 mg/kg) intravenously. Laryngoscopy and intubation were facilitated by giving Depolarizing muscle relaxant Inj. Succinylcholine (2mg/kg) intravenously. For maintenance oxygen (100%), sevoflurane (0.2-2%) and Non-Depolarizing muscle relaxant Inj. Atracurium (0.5mg/kg) loading dose intravenously was given and thereafter (0.1mg/kg) intravenously was given intermittently. Intraoperative monitoring (Pulse Rate, Non-invasive blood pressure, $SpO_2$, $EtCO_2$, Input-Output) was done.

After completion of surgery, all patients received Ultrasound guided right side subcostal TAP block using SONOSITE M-TURBO transportable Ultrasonography machine with a linear array transducer probe (L25x) (13-6 MHz) by in plane technique. After preparing the abdomen and USG probe in a sterile manner, the USG probe was placed 2 cm below the xiphisternum and moved laterally on right side along the subcostal margin up to the anterior axillary linebetween 12th rib and iliac crest.The transversus abdominis and internal oblique muscles were identified which lies beneath rectus abdominis muscle and extending laterally and appeared as striated hypoechoic structures with hyperechoic layers of fascia at their borders within neurovascular plane.Aninsulated 21 G, 100 mm Stimuplex needle was inserted just inferior to the right costal margin at the anterior axillary line in such a way that the tip lay in the transversus abdominis plane. Following careful negative aspiration of blood and confirmation, selected volume of bupivacaine was administered according to the group assigned observing the elliptical spread of local anaesthetic between two fascial layers.

In Group A patients, TAP block was given with (Bupivacaine0.5% 50 mg+10 ml Saline Solution) = Bupivacaine0.25% Total 20ml

In Group B patients, TAP block was given with (Bupivacaine0.5% 50 mg+20 ml Saline Solution) =Bupivacaine0.16% Total 30ml.

After completion of procedure, all patients were reversed from neuromuscular block with Acetylcholinesterase enzyme inhibitor Inj. Neostigmine (0.05mg/kg) intravenously premedicated with Anticholinergic Inj. Glycopyrrolate (0.008mg/kg) intravenously. After oral and tracheal suction, extubation was done after assessing the patient. At end of the operation, the first assessment of pain was undertaken at 30 mins. The presence and severity of pain, nausea, vomiting and any other side effects were assessed for all patients in both groups. Pain scores and vitals were evaluated every 30mins for 2hours and then every 2 hours for 24 hours and time for rescue analgesia in both groups were noted by the observer who is unaware of study protocol. If Visual Analogue Score (VAS) score is >4 rescue analgesic [Inj. Diclofenac sodium (1.5 mg/kg)] intravenously was given. The time of first onset & the time of first request for analgesia requirements during the first 24 hours were noted.

**PARAMETERS TO BE OBSERVED**

Intraoperative and Postoperative Vitals, ECG, Pulse rate, Systolic Blood Pressure, Diastolic blood pressure, Mean arterial blood pressure, $SpO_2$, $EtCO_2$, Postoperative Assessment of pain by Visual Analogue score

**Pain score (Visual Analogue Pain Scale):**

0 = No Pain 1-3 = Mild Pain
4-6 = moderate Pain. 7-9 = severe Pain
10 = severe excruciating Pain

**OBSERVATION AND RESULTS**

After studying 60 cases, the observation and results were summarized. All the patients were divided into two groups with 30 patients in each group.

- **Group A:** Patients received Bupivacaine (0.5%) 50 mg+10 ml Saline Solution) = Bupivacaine 0.25% Total 20ml
- **Group B:** Patients received Bupivacaine (0.5%) 50 mg+20 ml Saline Solution) = Bupivacaine 0.16% Total 30ml

No significant difference found between the groups in terms of age, weight or ASA status

**INTRA OPRATIVE HEMODYNAMICS PARAMETERS**

**Table 1 : Heart Rate (per min)**

| | | 0 Min | 30 Min | 1 Hour | 1.5 Hours | 2 Hours |
|---|---|---|---|---|---|---|
| Group A | Mean | 89.20 | 96.50 | 96.73 | 91.70 | 91.12 |
| | S.D. | 13.06 | 12.12 | 14.10 | 12.39 | 9.88 |
| Group B | Mean | 86.43 | 96.53 | 94.50 | 85.07 | 82.80 |
| | S.D. | 15.25 | 13.06 | 10.89 | 10.18 | 9.85 |

Table 1 shows the mean Heart Rate in intraoperative period.

**Table 2 : Mean Arterial Pressure (mm of Hg)**

| | | 0 Min | 30 Min | 1 Hour | 1.5 Hours | 2 Hours |
|---|---|---|---|---|---|---|
| Group A | Mean | 92.40 | 99.40 | 96.10 | 88.07 | 86.96 |
| | S.D. | 10.87 | 10.05 | 10.69 | 8.54 | 6.34 |
| Group B | Mean | 95.73 | 103.50 | 97.53 | 90.90 | 74.48 |
| | S.D. | 10.02 | 8.87 | 8.34 | 6.90 | 31.01 |

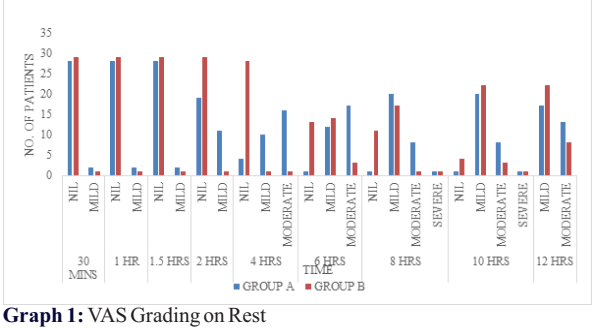
Table 2 shows the Mean Arterial Pressure in intraoperative period.

**Table 3 : $EtCO_2$**

| | | 0 Min | 30 Min | 1 Hour | 1.5 Hours | 2 Hours |
|---|---|---|---|---|---|---|
| Group A | Mean | 22.27 | 29.27 | 35.93 | 34.60 | 33.04 |
| | S.D. | 3.32 | 2.07 | 3.92 | 1.54 | 2.28 |
| Group B | Mean | 22.20 | 27.93 | 38.67 | 35.03 | 31.28 |
| | S.D. | 2.72 | 2.42 | 2.34 | 3.33 | 1.72 |

Table 3 Shows The Mean $EtCO_2$ During Intraoperative Period.

**VAS GRADING IN POSOPERATIVE PERIOD**




**Graph 1:** VAS Grading on Rest

**Table 4 : VAS Grading on Rest**

| Time | VAS Grading | Group A | Group B | P Value |
|---|---|---|---|---|
| 30 min | Nil | 28 (93%) | 29 (97%) | 1 NS |
| | Mild | 2 (7%) | 1 (3%) | |
| 1 hr | Nil | 28(93%) | 29(97%) | 1 NS |
| | Mild | 2(7%) | 1(3%) | |
| 1.5 hrs | Nil | 28(93%) | 29(97%) | 1 NS |
| | Mild | 2(7%) | 1(3%) | |
| 2 hrs | Nil | 19(64%) | 29 (97%) | 0.003 S |
| | Mild | 11(36%) | 1(3%) | |
| 4 hrs | Nil | 4 (13%) | 28 (94%) | 0.00004 S |
| | Mild | 10 (33%) | 1 (3%) | |
| | Moderate | 16 (54%) | 1 (3%) | |
| 6 hrs | Nil | 1 (3%) | 13 (43%) | 0.00005 S |
| | Mild | 12 (40%) | 14 (47%) | |
| | Moderate | 17 (57%) | 3 (10%) | |
| 8 hrs | Nil | 1 (3%) | 11 (37%) | 0.007 S |
| | Mild | 20 (67%) | 17 (57%) | |

| | | | | |
|---|---|---|---|---|
| | Moderate | 8 (27%) | 1 (3%) | |
| | Severe | 1 (3%) | 1 (3%) | |
| 10 hrs | Nil | 1 (3%) | 4 (13%) | 0.24 NS |
| | Mild | 20 (67%) | 22 (74%) | |
| | Moderate | 8 (27%) | 3 (10%) | |
| | Severe | 1 (3%) | 1 (3%) | |
| 12 hrs | Mild | 17 (57%) | 22 (74%) | 0.27 NS |
| | Moderate | 13 (43%) | 8 (26%) | |

Table 4 and graph 1 show VAS grading on rest at different time interval in postoperative period. In Group A most of the patients experienced mild to moderate pain and one patient had severe pain while in Group B most of the patients either had no or mild pain and very few had moderate pain but onlyonepatient had severe pain at 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$).

**Table 5 : VAS Grading On Coughing**

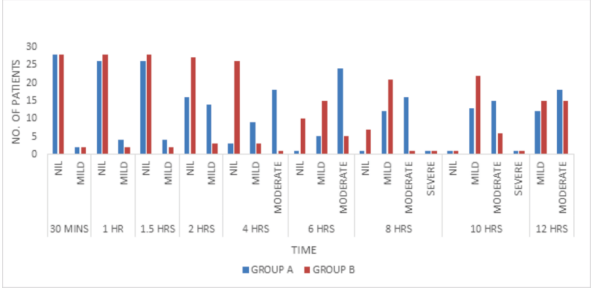
| Time | VAS Grading | Group A | Group B | P Value |
|---|---|---|---|---|
| 30 min | Nil | 28 (93%) | 28 (93%) | 0.6 NS |
| | Mild | 2 (7%) | 2 (7%) | |
| 1 hr | Nil | 26(87%) | 28(93%) | 0.66 NS |
| | Mild | 4(13%) | 2(7%) | |
| 1.5 hrs | Nil | 26(87%) | 29(96%) | 0.35 NS |
| | Mild | 4(13%) | 1(4%) | |
| 2 hrs | Nil | 16 (54%) | 27 (90%) | 0.004 S |
| | Mild | 14(46%) | 3(10%) | |
| 4 hrs | Nil | 3 (10%) | 26 (87%) | 0.00004 S |
| | Mild | 9 (30%) | 3 (10%) | |
| | Moderate | 18 (60%) | 1 (3%) | |
| 6 hrs | Nil | 1 (3%) | 11 (36%) | 0.00004 S |
| | Mild | 5 (17%) | 15 (50%) | |
| | Moderate | 24 (80%) | 4 (14%) | |
| 8 hrs | Nil | 1 (3%) | 8 (27%) | 0.0001 S |
| | Mild | 12 (40%) | 20 (67%) | |
| | Moderate | 16 (54%) | 1 (3%) | |
| | Severe | 1 (3%) | 1 (3%) | |
| 10 hrs | Nil | 1 (3%) | 1 (3%) | 0.10 NS |
| | Mild | 13 (43%) | 22 (74%) | |
| | Moderate | 15 (51%) | 6 (20%) | |
| | Severe | 1 (3%) | 1 (3%) | |
| 12 hrs | Mild | 12 (40%) | 16 (53%) | 0.43 NS |
| | Moderate | 18 (60%) | 14 (47%) | |


**Graph 2:** VAS Grading on Coughing

Table 5 and Graph 2 show VAS grading on coughing at different time interval in postoperative period. In Group A, most of the patients experienced mild to moderate pain and one patient had severe pain while in Group Bmost of the patients either had no or mild pain and very few experienced moderate pain but none of the patients had severe pain at 2, 4, 6 and 8 hours which was statistically significant difference ($p < 0.05$).

**Table 6 : VAS Grading On Deep Inspiration**

| Time | VAS Grading | Group A | Group B | P Value |
|---|---|---|---|---|
| 30 min | Nil | 28 (93%) | 28 (93%) | 0.60 NS |
| | Mild | 2 (7%) | 2 (7%) | |
| 1 hr | Nil | 26(87%) | 28(93%) | 0.66 NS |
| | Mild | 4(13%) | 2(7%) | |
| 1.5 hrs | Nil | 26(87%) | 28 (93%) | 0.66 NS |
| | Mild | 4(13%) | 2 (7%) | |
| 2 hrs | Nil | 16 (54%) | 27 (90%) | 0.004 S |
| | Mild | 14(46%) | 3(10%) | |
| 4 hrs | Nil | 3 (10%) | 26 (87%) | 0.00004 S |
| | Mild | 9 (30%) | 3 (10%) | |
| | Moderate | 18 (60%) | 1 (3%) | |
| 6 hrs | Nil | 1 (3%) | 10 (33%) | 0.00004 S |
| | Mild | 5 (17%) | 15 (50%) | |
| | Moderate | 24 (80%) | 5 (17%) | |
| 8 hrs | Nil | 1 (3%) | 7 (24%) | 0.0001 S |
| | Mild | 12 (40%) | 21 (70%) | |
| | Moderate | 16 (54%) | 1 (3%) | |
| | Severe | 1 (3%) | 1 (3%) | |
| 10 hrs | Nil | 1 (3%) | 1 (3%) | 0.10 NS |
| | Mild | 13 (43%) | 22 (74%) | |
| | Moderate | 15 (51%) | 6 (20%) | |
| | Severe | 1 (3%) | 1 (3%) | |
| 12 hrs | Mild | 12 (40%) | 15 (50%) | 0.60 NS |
| | Moderate | 18 (60%) | 15 (50%) | |

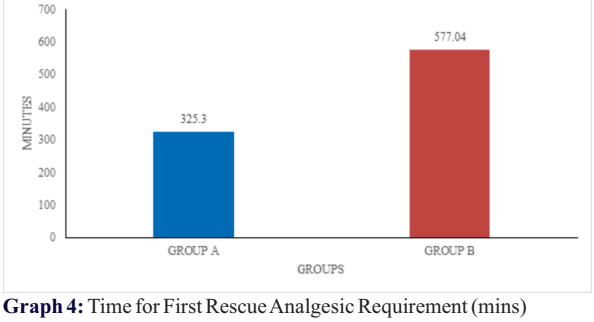



**Graph 3:** VAS Grading on Deep Inspiration

Table 6 and Graph 3 show VAS Grading on deep inspiration noted at different time interval in postoperative period. In Group A, most of the patients experienced mild to moderate pain and one patient had severe pain while in Group B most of the patients experienced no or mild pain and very few experienced moderate pain but none of the patients had severe pain at 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$).

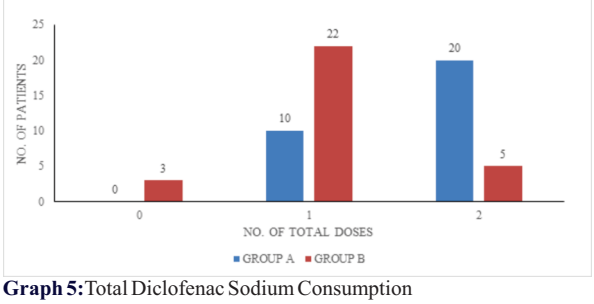
**Table 7: Time For First Rescue Analgesic Requirement (mins)**

| Group A (Mean ± SD) mins | Group B (Mean ± SD) mins | P value |
|---|---|---|
| 325.30±91.65 | 577.04±107.97 | 0.0001S |




**Graph 4:** Time for First Rescue Analgesic Requirement (mins)

Table 7 and Graph 4 show the Duration of Effective Analgesia which was calculated from the time between the end of local anesthetic administration to the time when VAS was in category of moderate and 1st rescue analgesic was administered. Duration of analgesia is more in Group B as time for first rescue analgesia is more in Group B (577.04 mins±107.97) compared to Group A (325.3 mins±91.65) which is statically significant($p = 0.0001$).




**Graph 5:** Total Diclofenac Sodium Consumption

**Table 8: Total Diclofenac Sodium Consumption**

| GROUP | 0 | 1 | 2 | Total | P value |
|---|---|---|---|---|---|
| A | 0(0%) | 10(34%) | 20(66%) | 30 | 0.001 S |
| B | 3(10%) | 22(74%) | 5(16%) | 30 | |

Table 8 and graph 5 show the consumption of rescue analgesics. In Group A, twenty patients received repetitive doses of diclofenac sodium while in Group B, only five patients received repetitive doses which was statistically significant(p=0.001).

## POST OPRATIVE HEMODYNAMICS PARAMETERS

**Table 9 : Pulse Rate (per Min) In Postoperative Period**

| | | 30 Mins | 1 Hour | 1.5 Hours | 2 Hours | 4 Hours | 6 Hours | 8 Hours | 10 Hours | 12 Hours |
|---|---|---|---|---|---|---|---|---|---|---|
| Group A | Mean | 89.20 | 88.80 | 89.10 | 89.00 | 94.73 | 96.67 | 93.83 | 92.33 | 92.47 |
| | S.D. | 8.13 | 7.46 | 7.69 | 7.06 | 8.53 | 7.62 | 8.68 | 7.03 | 8.23 |
| Group B | Mean | 85.83 | 85.10 | 85.27 | 79.07 | 78.53 | 81.27 | 80.97 | 89.00 | 89.23 |
| | S.D. | 7.73 | 8.26 | 8.01 | 6.73 | 6.42 | 8.51 | 7.73 | 6.89 | 7.75 |
| P value | | 0.339 NS | 0.105 3 NS | 0.073 8 NS | 0.063 9 NS | 0.001 S | 0.000 1 S | 0.000 1 S | 0.000 1 S | 0.069 0 NS |

Table 9 shows pulse rate in postoperative period in both the groups but lower side in Group B patients on comparing with Group At 2, 4, 6 and 8 hours which was statistically significant ($p < 0.05$) and no significant change noted at 30 min, 1 hour, 1.5 hours, 10 hours and 12 hours in postoperative period ($P > 0.05$).

**Table 10: Mean Arterial Pressure (mm of Hg) In Postoperative Period**

| | | 30 Mins | 1 Hour | 1.5 Hours | 2 Hours | 4 Hours | 6 Hours | 8 Hours | 10 Hours | 12 Hours |
|---|---|---|---|---|---|---|---|---|---|---|
| Group A | Mean | 94.83 | 94.10 | 93.23 | 93.50 | 97.70 | 100.23 | 95.77 | 94.17 | 94.77 |
| | S.D. | 3.80 | 3.84 | 3.90 | 4.43 | 5.59 | 4.31 | 7.33 | 6.28 | 6.81 |
| Group B | Mean | 94.83 | 94.10 | 93.23 | 93.50 | 97.70 | 100.23 | 95.77 | 94.17 | 94.77 |
| | S.D. | 3.80 | 3.84 | 3.90 | 4.43 | 5.59 | 4.31 | 7.33 | 6.28 | 6.81 |
| P value | | 0.0816 NS | 0.0615 NS | 0.0932 NS | 0.0005 S | 0.0001 S | 0.0001 S | 0.0010 S | 0.2013 NS | 0.1589 NS |

Table 10 shows mean arterial in postoperative period in both the groups but lower side in Group B patients on comparing with Group A at 2, 4, 6 and 8 hours which was statistically significant ( $p < 0.05$) and no significant change noted at 30 min, 1 hour, 1.5 hours, 10 hours and 12 hours in postoperative period ($P > 0.05$).

## DISCUSSION

Cholecystectomy is a common surgical procedure done for various gall bladder disease conditions. With the advancement of surgical technique and anaesthesia, the scope of minimal access surgeries has broadened. Though Laparoscopic cholecystectomy is minimally invasive and known to cause less postoperative pain and faster recovery, pain can be attributed to incision (50-70%), visceroperitoneal pain due to stretch because of pneumoperitoneum (20-30%), hepatic bed disturbances (10-20%) because of operative procedure and shoulder pain due to diaphragmatic irritation by the residual insufflated carbon dioxide gas. Pneumoperitoneum causes both local and systemic reaction: 1) Local effects due to peritoneal and diaphragmatic stretching, acidosis and ischemia. 2) Systemic effects due to hypercarbia causing sympathetic system stimulation with increased local tissue inflammatory response. The somatic pain is more important than visceral pain in the first 24 hours postoperative period and most common region is right upper quadrant.

The use of a TAP block for postoperative analgesia after laparoscopic cholecystectomy has become increasingly popular. Rafi et al described some “trick” points to minimize the possibility of visceral damage such as “double-pop” technique. Hebbard et al were the first mentioned the ultrasound-guided TAP block.

We enrolled 60 patients in study randomized into 2 groups 30 patients in each..

**Group A** received Bupivacaine (0.5%)50 mg+10 ml Saline Solution= Bupivacaine 0.25% Total 20ml

**Group B** received Bupivacaine (0.5%)50 mg +20 ml Saline Solution= Bupivacaine 0.16% Total 30ml

All patients in our study were demographically similar in both groups. There were no statistically significant intergroup variations regarding age, BMI, gender, ASA grading, and duration of pneumoperitoneum, surgery and anaesthesia.

Intra operative heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, $EtCO_2$ and $SpO_2$ remained stable without any significant fluctuation in both groups.

## VAS GRADING IN POSTOPERATIVE PERIOD AT DIFFERENT TIME INTERVAL

From our study, we found that, There was pain relief in both the groups at different situations like at rest, on coughing & on deep inspiration and results are comparable. The quality of pain relief was better in group B but was statistically not significant upto first two hours of postoperative period. At 2, 4, 6, and 8 hours time interval in postoperative period, patients who received bupivacaine 30 ml had better pain relief than Bupivacaine 20 ml which was statistically significant.

## DURATION OF EFFECTIVE ANALGESIA

Duration of effective analgesia i.e. time for 1st rescue analgesic requirement was calculated from the time between the end of local anesthetic administration to the time when VAS was in category of moderate and 1st rescue analgesic was administered. It was longer in group B (577.04 ±107.97 minutes) as compared to group A (325.30±91.65 minutes) for both duration of effective analgesia i.e. time for 1strescue analgesic requirement with statistical significance (p value= 0.0001).

## TOTAL DICLOFENAC SODIUM CONSUMPTION IN POSTOPERATIVE PERIOD

Consumption of rescue analgesic drug was higher in Group A as single dose of Inj. Diclofenac sodium was given in 34% of the patients in Group A while in 74% of the patients in Group B and 2nddose was given in 66% of the patients in Group A while in 16% of the patients in Group B with statistical significance. (p value=0.001).

From the above discussion, severity of pain was lower in Group B than Group A as time for first rescue analgesic drug requirement was longer and total number of rescue analgesic doses given was less in Group B.

## POSTOPERATIVE HEMODYNAMICS AT DIFFERENT TIME INTERVAL:

From the above discussion, we can infer that, better postoperative hemodynamic parameters achieved with the patients who received ultrasound guided TAP block with large volume and lower concentration of bupivacaine.

## CONCLUSION

To conclude, Ultrasound guided right subcostal Transversus Abdominis Plane blockis safe and feasible technique to practise for postoperative analgesia in Laparoscopic cholecystectomy. Larger volume with lower concentration Bupivacaine(0.16%) 30 mlis better as it provides better analgesia, longer duration of effective analgesia, better hemodynamic stability and requires less analgesic consumption in postoperative period.

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