Laparoscopic Cholecystectomy and Post-operative Pain Management Our Experience from Medical College Hospital

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ABSTRACT

Aim: The study was aimed to compare the efficacy of Trans Abdominal Plane (TAP) block with port site infiltration on postoperative pain and analgesia requirement in patients undergoing laparoscopic cholecystectomy.

Methods: The Prospective observational study was conducted at SKIMS Medical College Hospital over 1 year. A total of 112 subjects between 20 to 70 years of age with the American Society of Anaesthesiologists(ASA) physical status I/II undergone laparoscopic cholecystectomy were included. The patients were divided into two groups using computer-generated random numbers; Group A included patients who received Ultrasound-guided bilateral subcostal transabdominal plane (TAP) block and Group B included patients who received port-site infiltration. The patients were assessed for pain in the first 24 hours period using the Visual analogue pain scale (VAS) at 0, 2, 6, 12 And 24 hours. The data was collected and analyzed.

Results: Among 112 patients who met the inclusion criteria, 37.5% were males with a male: female ratio of 0.6. The maximum number of patients were in the age group of 40-50 years (41.05%) with the mean age in the TAP group 43.96 years and port-site infiltration group 44.74 years. There was no statistical differences between the two groups and were comparable in gender, age and American society of anaesthesiology(ASA) physical status. At 24 hours, subjects with TAP block had a mean VAS score less than the port site infiltration group (0.2 vs 0.4). The overall VAS Score was significantly lower in TAP block subjects (p-value of 0.0011). No significant statistical difference with regards to time to oral intake, ambulation after surgery and hospital discharge was found between the two groups of patients. All the patients did well and were fully satisfied.

Conclusion: Ultrasound-guided TAP block is an effective, safe, efficient and satisfactory method of analgesia after laparoscopic cholecystectomy. Port-site infiltration also improves the postoperative outcome but is less efficient than TAP block in laparoscopic cholecystectomy.

Key Words: Analgesia, Laparoscopy, Cholecystectomy, Transverse abdominis plane block, Ultrasound, Post-operative pain

INTRODUCTION

Symptomatic cholelithiasis is one of the commonest disease processes treated by general surgeons. Regardless of underlying indications, laparoscopic surgery has become the procedure of choice for cholecystectomy. Laparoscopic cholecystectomy though being a minimally invasive procedure results in significant post-operative pain and therefore analgesia requirement.

Appropriate postoperative pain control is essential to relieve the patients from stress and suffering and to improve the overall postoperative status. Common methods of pain relief include Intravenous infusion of narcotics, epidural an-

algesia using local anaesthetics with or without narcotics, oral administration of narcotics and use of non-narcotic oral medication such as NSAIDs etc. Effective management of postoperative pain helps in wound healing, early ambulation and mobilization, prevention of deep vein thrombosis and improve acute and long-term patient outcomes.

Use of long-acting local anaesthetics or placement of indwelling catheter provides long-term pain relief. Local infiltration of anaesthesia with lidocaine is suitable for minor superficial operations including the skin and subcutaneous tissue. Bupivacaine (0.5% or 0.25% with or without adrenaline) is the long-acting local anaesthetic agent. Although being slower in onset than lidocaine, the effectiveness is prolonged for up to 8 hours

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henceforth used for post-operative pain management.²TAP block under ultrasound guidance causing somatic anaesthesia of abdominal wall has become the common method of analgesia in case of any abdominal surgery. The anterolateral abdominal wall and parietal peritoneum are innervated by the upper (subcostal or intercostal plexus) and lower (in the vicinity of the deep circumflex iliac artery) TAPplexus formed by communication of intercostal, subcostal and L1 segmented nerves. Ultrasound-guided injection of local anaesthesia into the fascial plane between the internal oblique and transverse abdominus muscle allows a block of T6-L1 segmented nerves and excellent anaesthesia of the anterior abdominal wall.³ In literature, TAP-block has been found effective in general,^{4,5} urological,⁶ plastic,^{7,8} gynecological,^{9,10,11} and colorectal surgeries,¹² for post-operative analgesia. Our study aimed to compare the efficacy of Trans Abdominal Plane (TAP) block with port-site infiltration on postoperative pain score and analgesic requirement in patients undergoing laparoscopic cholecystectomy.

MATERIALS AND METHODS

The Prospective observational study was conducted at SKIMS Medical College and associate hospital over 1 year. The study included a total of 112 subjects. All our patients were evaluated starting from complete history taking and clinical examination in the pre-anaesthesia check-up room. The patients were subjected to routine investigations including Full blood count, liver and kidney function test, serum electrolytes, Hepatitis and viral serology, radiograph chest and abdominal ultrasonography. All the patients between 20 to 70 years of age with the American Society of Anaesthesiologists (ASA) physical status I/II undergone laparoscopic cholecystectomy were included in our study. The patients with ASA grade > II, allergic subjects, patients with a history of opioid medication or addiction, patients with skin infections and dermatological problems and patients who received analgesic medication within 24 hours of procedure were excluded from the study. The informed written consent was taken from each subject after explaining the nature of anaesthesia and options of post-operative analgesia.

The patients were randomly divided into two groups before the procedure. Group A included 54 patients who received Ultrasound-guided bilateral subcostal TAP block [15ml of Bupivacaine 0.2% each side] and Group B included 58 patients who received port-site infiltration [5ml bupivacaine 0.2% each site]. All our patients received the same pre-anaesthesia medication in the recovery room and induction was done with propofol (1 to 1.5 mg/kg) and fentanyl (2 to 20 mcg/kg). Using video laryngoscopy, the patients were intubated with the properly sized cuffed endotracheal tube under the cover of short-acting muscle relaxants. Anaesthesia was maintained with a standard protocol regimen including oxygen, nitrous oxide and injectable muscle relaxants. Strict

intra-operative monitoring of vitals was made throughout the procedure.

Intra-operatively each of our subjects received 1 g of paracetamol infusion and 75 mg of intravenous diclofenac. After the procedure, the patients were strictly monitored for vitals and post-operative pain in our High-dependency unit of the surgical ward. All our patients received 1g paracetamol 12hourly and intra-muscular Tramadol 100mg for breakthrough pain in the post-operative period. The patients were assessed for pain at 0,2,6,12 And 24hours using Visual Analogue scale scores. The data was collected and analyzed.

RESULTS

A total of 112 patients was studied including 37.5% males and 62.5% females with a male: female ratio of 0.6. Maximum number of patients were in age group of 40 to 50years (41.05%), followed by 30-40years (19.64%), 50-60 years (19.04%), 20-30years (12.5%) and 60-70 years (7.14%). The mean age in the TAP group was 43.96 years and in the port-site infiltration group 44.74 years. There was no statistical differences between the two groups and were comparable in gender and other demographic characteristics. 58 patients belonged to the American society of anaesthesiology physical status 1 and 54 patients to ASA II. No statistically significant difference was found between the groups concerning the ASA classification of patients.

Post-operatively patients were strictly monitored and pain and analgesic requirements were recorded. We use the Visual analogue scale (VAS) as a primary assessment of post-operative pain at each point in time. VAS scores are recorded on a 10 cm horizontal line, anchored by word descriptors at each end that represents a continuum between 'no pain' and 'severe pain'. The patient marks on the line the point that they feel represents their perception of pain and the VAS score is determined by measuring in millimetre from the left-hand end of the line to the point that the patient marks. On this VAS, 0 indicates no pain and 10 indicate very severe pain in the wound. This was recorded at 0,2,6,12, and 24 hours post-operatively [0= no pain; 1-3=Mild pain; 4-6= moderate to severe pain; 7-9= very severe pain; 10=worst pain possible]. The mean VAS score at 0-hour postoperative period was 1.8 in TAP group subjects while as it was 1.9 in the port-site infiltration group. At 24 hours patients with TAP block has a mean VAS score of less than port site infiltration group patients (0.2 vs 0.4). The overall VAS Score was significantly lower in TAP block subjects with a p-value of 0.0011. [Table 1].

All the subjects were encouraged for ambulation a few hours after the surgery. 59.82% of our patients were fully ambulated and started oral feeds within 12 to 24 hours of surgery. However, time to oral intake and ambulation after surgery

was statistically insignificant between the two groups of patients. [Table: 2]

The majority of our subjects (67.85%) were discharged within 36 hours after surgery. The difference between the two groups was statistically insignificant [Table 3].

None of our patients experiences any complications during the administration of anaesthetic drugs like intravascular or intraperitoneal injection, local bleeding or infection and anaesthetic overdosage. All our subjects were discharged within 48 hours of the post-operative period on oral paracetamol 650 mg 12hourly and attached to our outpatient department on weekly follow-up. All the patients did well and were fully satisfied.

DISCUSSION

Post-operative pain is an unavoidable consequence of any surgical procedure. Since the advent of laparoscopy, about 90% of elective procedures and 70% of urgent cholecystectomies are being performed laparoscopically.¹³ Though being minimal invasive procedure with reduced surgical trauma response, patients of laparoscopic cholecystectomy experience significant postoperative pain.

The multipronged approach of opioids, peripheral nerve block and non-opioid analgesia should be incorporated for effective and satisfactory post-operative pain management in both laparoscopy and open procedures. Local anaesthesia temporally blocks nerve conduction by binding to neuronal sodium channels and is used for short-term post-operative pain relief. Field block targets the small cutaneous sensory nerve fibres, used more commonly to achieve moderate sensory blockade for postoperative analgesia. Transabdominal plane block, adductor canal block, intercostal nerve block, and local infiltration of long-acting anaesthetic agents are procedures used for postoperative analgesia. This study was done to compare the efficacy of TAP block versus local infiltration of port sites in laparoscopic cholecystectomy.

A total of 112 patients was studied including 37.5% males and 62.5% females with a male: female ratio of 0.6.54 patients received TAP block and 58 received port-site infiltration. A maximum number of patients were in the age group of 40 to 50 years (41.05%) with the mean age in the TAP group 43.96 years and the port-site infiltration group 44.74 years. 58 patients had American Society of anaesthesiology physical status-I and 54 patients with American society of anaesthesiology-II. No statistical differences between the two groups concerning age, gender and ASA physical status was noted. The findings are comparable with the study done by Suseela et al.¹⁴

We use the Visual analogue (VAS) score as a primary assessment of post-operative pain at each point in time. VAS pain

score considered the gold standard of pain quantification,¹⁵ is usually a horizontal line, 10 cm in length, anchored by word descriptors at each end. The VAS score is determined by measuring in millimetres from the left-hand end of the line to the point that the patient marks. On this VAS, 0 indicates no pain and 10 indicate very severe pain in the wound. The mean VAS score at 0-hour postoperative period was 1.8 in TAP group subjects while as it was 1.9 in the port-site infiltration group. At 24 hours patients with TAP block has a mean VAS Score of less than port site infiltration group patients (0.2 vs 0.4). The overall VAS Score was significantly lower in TAP block subjects than the local anaesthesia infiltration group with a p-value of 0.0011. We found that TAP group subjects had lower mean pain scores as the time passes post-operatively. Local infiltration of anaesthesia agents is short-acting with maximum effects at 1-hour post-surgery and the effect decreases to minimal by 8 hours and vanishes at 16 hours.¹⁶ While as TAP block, effects lasts longer than local infiltration. Ortiz and other researchers found that the efficacy of TAP is of prolonged duration than that of LAI and demonstrates its advantages gradually over time.¹⁷ Literature has proven that TAP block turned out to be superior once compared with port-site infiltration and with epidural analgesia for different abdominal surgeries.^{17,18,19}

All the subjects were encouraged for ambulation a few hours after the surgery. 59.82% of our patients were fully ambulated and started oral feeds within 12 to 24 hours of surgery. 67.85% of our subjects were discharged within 36 hours after surgery. We found no statistically significant difference between the two groups with regards to postoperative feeding and ambulation time and discharge from the hospital. All our subjects were discharged within 48 hours of the post-operative period on oral paracetamol 650 mg 12hourly and attached to our outpatient department weekly follow-up. The study done by De Oliveira et al. found that TAP block subjects with reduced pain decreased opioid consumption, and provided earlier discharge readiness as compared to placebo in laparoscopic surgery.²⁰

None of our patients experiences any complications during the administration of anaesthetic drugs like intravascular or intraperitoneal injection, local bleeding or infection and anaesthetic overdosage. All the patients did well and were fully satisfied.

CONCLUSION

Post-operative pain control plays a significant role in overall outcome after laparoscopic cholecystectomy. Ultrasound-guided TAP block is an effective, safe, efficient and satisfactory method of analgesia after laparoscopic cholecystectomy. Port-site infiltration also improves the post-operative outcome but is less efficient than TAP block in laparoscopic cholecystectomy.

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Authors Contribution:

Authors 1,2 and 3 have a role in conception and designing, data collection, writing and critical review. We are taking responsibility for the authenticity and integrity of the research process

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Table 1: VAS-Score in the study population

Time	TAP Block Group (Mean)	Port-site Infiltration Group (Mean)
0 hour	1.8	1.9
2 hours	1.6	1.8
6 hours	0.90	1.2
12 hours	0.65	0.72
24 hours	0.20	0.40

p- value = 0.0011

Table 2: Time to oral intake and full ambulation

Oral intake and Ambulation	TAP Group	Port Site Infiltration Group
<6 hours	4(7.4%)	2(3.45%)
6-12 hours	20(37.04%)	14(24.14%)
12-24 hours	28(51.85%)	39(67.24%)
>24 hours	2(3.70%)	3(5.17%)

p- value = 0.0720

Table 3: Stay in hospital

Stay in Hospital	TAP Group (Frequency/% age)	Port site infiltration Group (Frequency/% age)
<24 hours	4(7.4%)	3(5.17%)
24-36 hours	40(74.07%)	36(62.09%)
>36 hours	10(8.52%)	19(32.76%)

p-value=0.222