

COMPARISON OF SUBCOSTAL TRANSVERSUS ABDOMINIS PLANE BLOCK WITH PORT SITE INFILTRATION OF LOCAL ANAESTHESIA IN LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

Objective: To compare the efficacy of ultrasound guided subcostaltransversus abdominis plane block and port site infiltration of local anaesthesia in patients undergoing laparoscopic cholecystectomy.

Study Design: Comparative cross sectional study.

Place and Duration of Study: Anesthesiology department, Pak Emirates Military Hospital, Rawalpindi, from Jan to Jun 2019.

Methodology: A sample size of 62 patients calculated by World Health Organization calculator were randomized in a double-blind study to undergo Sub costal transversus abdominis plane block or port site infiltration by non-probability, consecutive sampling into two equal groups. Group A received sub costal transversus abdominis plane block and group B local anaesthetic. Postoperative pain perception was measured using visual analogue scale.

Results: The mean age of patients in group A was 33.39 ± 8.91 years and in group B was 33.77 ± 8.45 years. Out of 62 patients 38 (61.29%) were males and 24 (38.71%) were females. Mean pain score in group A (ultrasound guided sub costal transversus abdominis plane block) was 1.61 ± 0.91 while in group B (port site infiltration of local anaesthetic) was 3.61 ± 1.05 (p -value 0.0001).

Conclusion: The mean pain score was less following use of ultrasound guided sub costal transversus abdominis plane block in patients undergoing laparoscopic cholecystectomy as compared to port site infiltration of local anaesthesia.

Keywords: Regional anaesthesia, Subcostal block, Transverse adominis plane block.

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INTRODUCTION

Laparoscopic cholecystectomy (LC) was initially performed by Philippe Mouret in 1987. It is considered as the treatment of choice for cholelithiasis¹. It is one of the most frequently performed surgery in USA. LC leads to early recovery and is associated with shorter hospitalization period². Laparoscopic cholecystectomy leads to moderate pain in early postoperative period necessitating the use of multimodal analgesic approach for it such as the use of opioid analgesics and local anaesthetics at port site³.

Ultrasound guided (US) transversus abdominis plane (TAP) blockade, a recent advancement, for post surgical pain relief. Moreover, subcostal method, which is modification of TAP blockade which produces satisfactory supraumbilical pain relief in early post-operative period. TAP blockade involves administration of analgesia at Petit triangle¹¹.

It is observed according to some studies that US guided subcostal TAP blockade provides enhanced analgesia due to lesser pain scores and decreased opioid requirement after laparoscopic cholecystectomy compared to port site infiltration⁶, also it reduces

rescue analgesic requirement⁷, and prolongs the time for first pain-relieving demand in early post-surgical time⁸. The cost-effectiveness of anaesthesia has also been found to be better in patients receiving subcostal blockade in patients undergoing LC⁹. On the contrary, some studies say that there is no difference in effectiveness of both, measured in terms of 24 hour morphine requirement.

In a recent study pertaining to my research, mean analgesic (fentanyl) requirement in US guided-subcostal TAP blockade versus regional infiltration group after LC was 33.16 mcg (SD 54.17) and 86.90 mcg (SD 73.97) respectively¹⁰.

Subcostal TAP blockade has recently been used for post surgical analgesia after LC in our setup. Since there is difference in the results of different studies, some saying subcostal TAP block is superior but according to some no variance between subcostal TAP blockade and local analgesia, thus, the rationale of our study was to measure the efficacy of subcostal TAP block versus conventional port site infiltration of local anaesthetic in reduction of postsurgical pain.

METHODOLOGY

This comparative cross sectional study was conducted in department of Anaesthesiology, of Pak

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Emirates Military Hospital, Rawalpindi, from January to June 2019. Study was initiated after approval from hospital research ethics committee. Sample size was determined using WHO sample size calculator with following assumptions: Power of test 80%, Significance level of 5%, test value of the population mean = 86.9010, Anticipated population mean = 33.1610, Mean pain score in US guided subcostal transversus abdominis plane blockade was mean \pm SD 3.67 \pm 2.20 while in port site infiltration of local anaesthetic was mean \pm SD 3.00 \pm 2.17. (*p*-value 0.31). Mean sample size *n*=31 patients in each group, total=62 patients. Sampling technique was non-probability, consecutive sampling.

A total of 62 patients of both gender with cholelithiasis, ASA status I and II, BMI <30 and normal coagulation profile were included in the study. Patient with acute cholecystitis & pancreatic cholangitis, previous open upper abdominal surgery, unfit for regional anaesthesia and unfit for pneumoperitoneum were excluded.

Informed written consent was obtained after explaining purpose of study and advantages and disadvantages of each technique used. Participants were designated from laparoscopic surgeon outpatient department and pre-anaesthetic clinic. They were randomized in a double-blind way to undergo Subcostal TAP block or port site infiltration by non-probability, consecutive sampling into two equal groups. The patients in Group A: subcostal TAP block with 20 G spinal needle with 0.25% bupivacaine 10ml bilateral were given under US guidance. Group B: port site infiltration of 10 ml of 0.5% bupivacaine.

General anaesthesia was given by classified anaesthetist and a standardized general anaesthetic regime was employed, consisting of propofol (2.5 mg/kg), and atracurium besylate (0.5 mg/kg), maintenance by isoflurane (2%-3%), with intraoperative opioid analgesia of nalbuphine (0.1 mg/kg).

All patients will undergo the standard laparoscopic cholecystectomy performed by a laparoscopic surgeon with at least one-year experience of laparoscopic surgeries. Three subcostal and one periumbilical port sites were employed in all cases. The volume and dose of local anaesthetic did not differ between the groups. The subcostal TAP block was performed by an anaesthetist whereas port-site infiltration was performed by the surgeon at the end of surgery.

Postoperative pain perception was measured using visual analogue scale at different hours, by well-trained different house officers, who were kept blind

regarding the intervention. Visual analogue score was measured at 0 hours (upon receiving patient in recovery), 2 hours and 4 hours after surgery. Average of three readings was calculated as per operational definition. This information along with age, gender, duration of surgery, status was noted.

Data was analysed using SPSS-23. Quantitative variables were analysed as mean and standard deviation. Group A (Subcostal TAP block) and group B (port site infiltration) were compared for mean post-operative pain by applying independent sample t-test. For normal data t-test was applied to compare mean pain scores between groups at different points of time. For non-normal data Mann-Whitney U test was applied to compare mean pain score. A *p*-value \leq 0.05 was considered significant.

RESULTS

A sample size of 62 patients calculated by WHO calculator of year requiring laparoscopic cholecystectomy of both genders were randomized in a double-blind study to undergo Subcostal TAP block or port site infiltration by non-probability, consecutive sampling into two equal groups. Mean age of patients was

Table-I: Comparison of pain score with respect to age groups.

Age of Patients (years)	Group A (n=31)	Group B (n=31)	<i>p</i> -value
	Pain Score Mean \pm SD	Pain Score Mean \pm SD	
20-35	1.84 \pm 1.07	3.69 \pm 1.14	0.0001
36-50	1.75 \pm 0.62	3.53 \pm 0.99	0.0001

Table-II: Comparison of pain score with respect to gender.

Gender	Group A (n=31)	Group B (n=31)	<i>p</i> -value
	Pain Score Mean \pm SD	Pain Score Mean \pm SD	
Male	1.83 \pm 1.03	4.00 \pm 1.13	0.0001
Female	1.79 \pm 0.86	3.37 \pm 0.96	0.0001

Table-III: Comparison of pain score with respect to duration of operation.

Duration of Operation (minutes)	Group A (n=31)	Group B (n=31)	<i>p</i> -value
	Pain Score Mean \pm SD	Pain Score Mean \pm SD	
\leq 30	1.73 \pm 1.03	3.38 \pm 1.02	0.0001
>30	1.88 \pm 0.81	3.87 \pm 1.06	0.0001

Table-IV: Comparison of pain score with respect to body mass index.

BMI (kg/m ²)	Group A (n=31)	Group B (n=31)	<i>p</i> -value
	Pain Score Mean \pm SD	Pain Score Mean \pm SD	
\leq 27	1.95 \pm 0.91	3.67 \pm 0.84	0.0001
28-30	1.58 \pm 0.90	3.54 \pm 1.33	0.0001

33.56 ± 8.61 years. Mean age of participants in group A was 33.39 ± 8.91 years and in group B was 33.77 ± 8.45 years. Most of the patients 35 (56.45%) were between 20-35 years of age. Out of 62 patients 38 (61.29%) were males and 24 (38.71%) were females with male to female ratio of 1.6:1.

Mean pain score in Group A (US guided subcostal transversus abdominis plane blockade) was Mean ± SD 1.61 ± 0.91 while in group B (port site infiltration of local anaesthetic) was Mean ± SD 3.61 ± 1.05. (p -value 0.0001). Comparison of mean pain score in relation to age groups, gender, duration of surgery and BMI were given in (table I-IV).

DISCUSSION

Laparoscopic cholecystectomy has become more popular due to early recovery and shorter hospitalization². LC is accompanied with moderate pain in early postoperative period necessitating the use of multimodal analgesic approach for it such as the use of opioid analgesics and infiltration of regional anaesthetics at port site³.

Subcostal TAP blockade is a frequently used technique after various abdominal surgeries¹². Rafi *et al*¹¹, in 2001 initially substantiated it to be effective in decreasing the opioid use while performing the abdominal field block via the lumbar triangle on >200 patients without any untoward sequelae for 2 years.

Hebbard *et al*¹³, in 2007 explained that US guided subcostal technique can provide pain relief in upper as well as lower abdominal surgeries. Additionally lower complication rate was reported due to use of ultrasound technology.

Suseela *et al*¹⁴, in 2018 explained time to first analgesic (Mean ± SD) in group I and group T was 292.7 ± 67.03 and 510.3 ± 154.55 min and mean tramadol required was 141.8 ± 60.01 mg and 48.69 ± 36.14 mg, (p =0.001) for both subcostal TAP block and port site infiltration bilaterally respectively.

Outcomes of our study validate that the mean pain score following use of US guided subcostal TAP blockade supplemented by port site permeation of local anaesthetic in patients undergoing LC was less at rest as well as on activity. Mean pain score in group A (US guided subcostal transversus abdominis plane blockade) was 1.61 ± 0.91 while in group B (port site infiltration of regional anaesthesia) was 3.61 ± 1.05 (p -value <0.01).

In a recent study by Kadam *et al*¹⁰, in 2016 pertaining to our research, mean analgesic (fentanyl) req-

uirement in US guided TAP blockade versus local infiltration group after LC was 33.16 mcg (SD ± 54.17) and 86.90 mcg (SD ± 73.97) respectively.

On the contrary, study by Kokulu *et al*⁹, in 2014 says that there is no difference in effectiveness of both, measured in terms of 24-hour morphine requirement that is 34.57 ± 14.64 mg in TAP set and 32.76 ± 14.34 mg in regional infiltration set.

El-Dawlatly *et al*¹⁵, in 2009 reported lesser usage of opioids (8.6 µg vs 23 µg; p <0.01), and of morphine within 24 hours (10.5 mg vs 22.8 mg; p <0.05) in TAP group.

On the other hand, Ortiz *et al*¹⁶ in 2016 reported statistically significant difference in postsurgical pain and anaesthesia use in patients who were given TAP blockade, in comparison to port-site regional infiltration of analgesia. Khan *et al*¹⁸, in 2018 claimed 100% result while comparing subcostal TAP group and posterior TAP group.

Baral *et al*¹⁷, in 2019 revealed the 24 hours' opioids consumption was significantly less (125 mg ± 25.42 versus 175 mg ± 25.42, p <0.001) in Subcostal TAP block group. This difference may be due to difference in study method and the type of blockade such as TAP, blind, subcostal or posterior method. Variation in timing of administration, drug or dose may affect the outcomes.

CONCLUSION

Analgesia was longer following use of subcostal TAP block in patients undergoing laparoscopic cholecystectomy as compared to port site infiltration of local anaesthetic. So, we recommend subcostal TAP block may be used in patients undergoing laparoscopic cholecystectomy in order to reduce the morbidity of patients.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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