



Original Article

Transversus Abdominis Plane Block in Laparoscopic Surgery

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ABSTRACT

Good postoperative pain relief has been observed following various inguinal and abdominal procedures using transversus abdominis plane (TAP) block. **Objective:** To determine the outcome of laparoscopically assisted transverses abdominis plane block in laparoscopic cholecystectomy in comparison to periportal local anaesthesia in terms of mean pain. **Methods:** The study was conducted at the Department of General Surgery, Pakistan Atomic Energy Commission Hospital, Islamabad from January 2020 to June, 2020. In this randomized controlled trial, 92 patients underwent elective laparoscopic cholecystectomy were enrolled. Pain score was calculated by visual analogue score at 24 hours post-operatively. Data were entered in SPSS version 25.0. Comparison of both groups was done for pain score using t-test. Data were stratified. The t-test was performed. **Results:** Total 92 patients underwent elective laparoscopic cholecystectomy were selected for the study. The subjects were divided into two categories such as Group 1 or A (TAP block) and Group 2 or B (Periportal local anaesthesia). In the group A the 34(73.9%) subjects were males while the other 12(26.1%) were females, while in the group B the males were 31(67.4%) and 15(32.6%) were females. Mean VAS was 3.69±1.21 in group-A (TAP block) and 4.26±1.29 in group-B (periportal local anaesthesia) with p-value of 0.033. It is statistically significant. **Conclusion:** The one of the safest and effective modalities that provide postoperative analgesia with essentially decreased/less postoperative pain when compared to periportal local anaesthesia is named as laparoscopic assisted TAP block.

INTRODUCTION

One of the commonest surgical diseases worldwide (80%) is gallstone disease and gold standard treatment considered for symptomatic cholelithiasis is laparoscopic cholecystectomy [1]. Abdominal pain plays a vital role in recovery after laparoscopic cholecystectomy [2]. Pain after laparoscopic cholecystectomy is usually mild to moderate in intensity. Various methods are used to achieve safe and effective postoperative analgesia, which adds the benefit to early recovery of the patients [3]. During prolong stay in hospital, the patients are more prone to acquire the nosocomial infections. This is the most common adverse events in hospitals [4]. For the optimum control of post-operative pain multidisciplinary efforts have been used like using opioids and non-steroidal anti-inflammatory agents.

Local infiltration at port sites, transverses abdominis plane block and many other modalities are used for postoperative pain [5]. However, timing, method, and the type of agent given plays a vital role in determining its effectiveness [6]. Afferent signals of T12-L2 spinal nerves are blocked following infiltration of local anaesthesia in transversus abdominis plane. The effectiveness of transversus abdominis plane block is between 24-36 hours [7]. The nerves which are blocked by this procedure are the one only supplying the abdominal wall [8]. The transversus abdominis plane block has shown noteworthy lower rest pain score at 8 hours as mean 1.82±0.42 in comparison to periportal local anaesthesia, having mean value of 2.12±0.58 with no additional analgesia given [9]. About the

post-operative pain relief, laparoscopically assisted transverses abdominis plane block has mean 1.97 ± 0.75 in comparison to periportal local anaesthesia with mean of 2.01 ± 0.75 with no additional analgesia given [10]. This study was planned to compare transverses abdominis plane block verses peri-portal local anaesthesia in patient undergoing laparoscopic cholecystectomy to asses which technique provides better post-operative analgesia as no local study is available on this topic. To determine the outcome of laparoscopically assisted transverses abdominis plane block in laparoscopic cholecystectomy in comparison to periportal local anaesthesia in terms of mean pain

METHODS

The review board and ethical committee of the hospital approved the study. The selected patients were informed about the study objective and they signed the consent willingly. The 92 patients were selected for the randomized trial who were undergoing elective laparoscopic cholecystectomy in the Department of General Surgery, Pakistan Atomic Energy Commission Hospital, Islamabad from 1st January till 30th June 30, 2020. Non-probability consecutive sampling technique was adopted. The sample size was taken by using WHO formula. It was 92 patients calculated (46 patients in both groups). Confidence level was 95% with 80% power of test by taking mean VAS (visual analogue pain score) after laparoscopic cholecystectomy. In first group, infiltration of local anaesthesia in transversus abdominis plane & in second group, infiltration of local anaesthesia at port sites as 1.82 ± 0.42 and 2.12 ± 0.58 respectively. Patients of both gender from 18 to 65 years, ASA I & II undergoing laparoscopic cholecystectomy (LC) were selected. Patient with acute cholecystitis, acute pancreatitis, mucocele, emphysematous gallbladder, empyema gallbladder previous abdominal surgery on history, bleeding disorder in past medical record, allergy to local anaesthesia (Bupivacaine) abdominal wall infection, conversion to open procedure or hepatobiliary malignancy diagnosed on ultrasound. The computerized "random number table" was used for the randomization of patients into a group A, that underwent through laparoscopic-assisted transversus abdominis plane block with 40 ml 0.5% bupivacaine, 20 ml in each subcostal region, while group-B received periportal 40 ml 0.5% bupivacaine, 10 ml in each site. All patients received 1gm Paracetamol 8 hourly and 30 mg ketorolac 12 hourly intravenous post-operatively. Additional analgesia with IV Nalbuphine was administered in all patients with pain visual analogue score more than 4 or above. The primary end point of this study was to evaluate pain scores which will be calculated by visual analogue score at 24 hours post-operatively. Data

were entered in SPSS v25.0. The mean standard deviation was used to present quantitative variables such as pain score and age. The t-test was used for the comparison of the pain score of both groups. To deal with the effective modifiers the stratification of data was completed. The data were analysed carefully, result was presented in the form of tables. The conclusion was made according to the data.

RESULTS

Total 92 patients underwent elective laparoscopic cholecystectomy were selected for the study. The two groups were created and patients were categorized into both groups. The Group A was labelled as (TAP block). While Group B was labelled as (Periportal local anaesthesia) as shown in table 1. Mean VAS in the group A was 3.69 ± 1.21 in (TAP block) while it was 4.26 ± 1.29 in group B (periportal local anaesthesia) with p-value of 0.033 as shown in the table 3. It is statistically significant value.

Visual Analogue Score (VAS)	Groups	n	Mean \pm SD	P-Value
	TAP block	46	3.69 ± 1.21	0.033
	Periportal local anaesthesia	46	4.26 ± 1.29	

Table 1: Comparison of VAS in groups

In group A the 34 subjects were males while other 12 were females. In group B the 31 patients were males while other 15 were females. The age range of the patients were calculated and it was reported to be vary between 18-65 years. The 44.3 ± 11.5 year was the reported mean age of the patients. The 2.5 ± 10.5 years is the reported mean age of the patients in the group A. While the reported mean age of the patients included in the group B was observed to be 44.6 ± 12.4 years as shown in table 2.

Visual Analogue Score (VAS)	Gender	Groups	n	Mean \pm SD	P-Value
	Male	TAP block	34	3.76 ± 1.26	0.084
		Periportal local anaesthesia	31	4.32 ± 1.30	
	Female	TAP block	12	3.50 ± 1.08	
		Periportal local anaesthesia	15	4.13 ± 1.30	

Table 2: Stratification of VAS according to gender

In group-A, 23(50.0%) had normal BMI, while 21(45.7%) and 2(4.3%) were overweight and obese respectively. The 21(45.7%) patients in the group B had body mass index in the normal range, while 22(47.8%) and 3(6.5%) were overweight and obese respectively. The data was stratified according to the age and the p-value was calculated. The age groups were created and mean and standard deviation of every group was calculated as shown in the table 3.

	Age	Groups	n	Mean \pm SD	P-Value
Visual Analogue Score (VAS)	18-30 years	TAP block	34	3.76 \pm 1.26	0.084
		Periportal local anaesthesia	31	4.32 \pm 1.30	
	31-45 years	TAP block	12	3.50 \pm 1.08	0.189
		Periportal local anaesthesia	15	4.13 \pm 1.30	
>45 years	TAP block	12	3.50 \pm 1.08	0.189	
	Periportal local anaesthesia	15	4.13 \pm 1.30		

Table 3: Stratification of VAS according to age

DISCUSSION

The one of the main concerns for the patients and surgeon now a days is post-operative analgesia. To achieve this goal the multiple methods such as epidural analgesia, anaesthesia infiltration, and patient-controlled analgesia are in use now a days [11]. It is reported by the previous studies that within the 24 hours the effective postoperative analgesia is provided by TAP. It is effective for the lower abdominal surgical procedures [12]. The one of the most effective means for managing postoperative pain in the lower abdominal surgeries is TAP block. It also decreases requirements of postoperative opioid [13]. One of the main concerns for all the surgeons is pain associated with these surgeries. This pain ultimately leads to the increase in the length of stay of admitted patient in hospital it also leads to increase in the cases of morbidity and mortality. The other complication associated with this pain are the psychological effects and it also add to financial burden of the healthcare system [14]. The different modalities that can manage pain are used excessively to lower the pain score associated with the surgeries these includes epidural analgesia, LAI, TAP block peripheral nerve block and intravenous patient-controlled analgesia. The sophistication is brought in the conventional TAP block by the implication of versatile imaging modalities to manage pain. The lower abdominal surgeries usually used TAP block. For the reduction of postoperative pain, the TAP block is considered as effective technique. The usage of morphine consumption is also reduced by using TAP block in the lower abdominal surgery [15]. The most convenient and widely performed procedure is LAI. It is the most common postoperative analgesic method [16]. Postoperative pain alleviation in terms of mean visual analogue scale (VAS) pain score was observed in our study. It was also observed that there is a significant decrease in mean opioid dose requirements after using TAP block. The significantly decrease in the pain score was noticed after usage of TAP block in first 24 hours postoperatively [17]. The results of our study obtained in context of analgesia performed after the inguinal hernia repair with TAP block are consistent with the results of the other studies. Previous studies have reported that the usage of TAP block leads to reduction in pain score, it is also observed in our study. The direct comparison with local anaesthetic

infiltration, adjunct to local anaesthesia, IIN / IHN block or used with conscious sedation for ambulatory inguinal hernia repair [18]. It is observed that the TAP blocker not only helps to reduce the requirement associated with the postoperative morphine but also reduce the side effects associated with the abdominal surgeries that can lead to detrimental effects on the patient health. When compared to LAI group, the reduction in the vomiting and postoperative nausea was also observed when, may be due to decrease opiates consumption. Similar results are seen in other studies reducing both 24 hours postoperative morphine requirements and PONV [19, 20]. In this study, Mean VAS was 3.69 \pm 1.21 in group-A (TAP block) and 4.26 \pm 1.29 in group-B (periportal local anaesthesia) with p-value of 0.033 which is statistically significant. Few studies have shown to be less effective whereas some have shown to be very beneficial about this technique [21, 22]. The transversus abdominis plane block has shown significant lower rest pain scores at 8 hours as mean 1.82 \pm 0.42 in comparison to local infiltration of anaesthetic agent at port sites having mean value of 2.12 \pm 0.58. No additional analgesia was given [18]. Regarding the post-operative pain score, laparoscopically assisted TAP block has mean pain score of 1.97 \pm 0.75 in comparison to port site infiltration of local anaesthetic agent with mean of 2.01 \pm 0.75. No additional analgesia was given [23, 24].

CONCLUSION

The one of the safest and effective modalities that provide postoperative analgesia with essentially decreased/ less postoperative pain when compared to periportal local anaesthesia is named as laparoscopic assisted TAP block.

Conflicts of Interest

The authors declare no conflict of interest

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