Original Article

Local Anasthesia in Laparoscopic Cholecystectomy

Tap Block VS Port-Site Infiltration of Local Anasthesia in Laparoscopic Cholecystectomy; Our Experience in Qazi Hussain Ahmed Medical Complex, Nowshera

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ABSTRACT

Objective: To compare the efficacy of ultrasound guided bilateral sub-costal transversus abdominis plane (TAP) block versus port infiltration of bupivacaine for treating post operative analgesia.

Study Design: cross sectional study

Place and Duration of Study: This study was conducted at the Qazi Hussain Ahmed Medical Complex Nowshera from February 2017 to November 2021.

Materials and Methods: All the patients undergoing elective laparoscopic cholecystectomy admitted to the surgical unit were included. Patients were divided into two groups, one group received ultrasound guided bilateral sub-costal TAP block (T) while other group had port site infiltration (I) with bupivacaine at the end of the surgery. Tramadol and diclofenac injectable were used as the postoperative analgesics if needed. Numerical Rating Scale (NRS) was used for pain assessment. NRS at 1 hr to 24 hr at different intervals after surgery, time to first analgesic request and total dose of analgesics in 24 h were recorded. Chi- square test and independent *t*-test were used for qualitative and quantitative variables respectively.

Results: A total of 500 patients were included and divided into two groups. Time needed to use first analgesic in Group I and Group T was 312 ± 45.03 and 613 ± 135.25 min and mean tramadol required was125 ± 40.03 mg and 43 ± 16.09 mg, respectively (P = 0.001). Calculated mean NRS at different intervals between 1hr and 24 hr was significantly lower in Group T as compared to group I.

Conclusion: In the management of post Op pain, bilateral subcostal TAP block was found superior in controlling pain after laparoscopic cholecystectomy procedure.

Key Words: Tramadol, Laparoscopic Cholecystectomy, NRS, Transversus Abdominis Plane Block, Port Site Block

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INTRODUCTION

Laparoscopic cholecystectomy is an efficient and safe procedure for symptomatic gall stones. This procedure has its own advantages like quick recovery, less pain resulting in early hospital discharge as compared to open procedure.[1,3] Although this procedure is minimally invasive, patients can still experience pain post-operatively in early hours.[4]

To control this pain, different methods are used. One of the procedures is subcostal transversus abdominis plane (TAP) block which provides sensory block of the thoracic nerves under ultrasound.[5] Another procedure is Port-site infiltration with local anesthetics.[6] This procedure has gained popularity recently for post op pain control. The transversus abdominis plane (TAP) block has shown to reduce perioperative opioid use in elective abdominal surgery.[6] It has also been found to be more efficient in providing analgesia below the umbilicus.[7] In one study it was used for postoperative analgesia following laparoscopic cholecystectomy, the port sites were moved to facilitate the regional distribution of the block.[7]However, literature on their comparison in Pakistani population is scarce.

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MATERIALS AND METHODS

This cross sectional comparative clinical trial done in Qazi Hussain Ahmed Medical Complex form February 2017 to November 2021. The study included patients booked for non-emergency laparoscopic cholecys-tectomy and admitted in the surgical unit. Ethical approval was taken from the hospital ethical committee.

This study included patients with age range of 18 to 70 years, who were scheduled for elective laparoscopic cholecystectomy. Patients were divided into two groups. Group 1 received ultrasound guided bilateral sub-costal TAP block (T) while other group had port site infiltration (I) post operatively. Per protocol informed consent was registered for each patient. Patients with allergy to local anesthetics, infection, dependency on opioid medication and patients receiving analgesic in 24 hr before surgery were excluded.

Patients were guided regarding NRS. During surgery paracetamol 1 g intravenous was given. For Post-operative analgesics were given with either port site infiltration or ultrasound guided bilateral subcostal TAP block. Ultrasound guided subcostal TAP block was done under guidance of experienced anesthesiologist using 0.25% bupivacaine.

Tramadol and diclofenac injectable were given as analgesia after procedure if needed by the patients. NRS for pain was assessed at intervals between 1 hr and 24 hr of surgery. Analgesics were given for NRS ≥4 or to comfort patient from pain. Time noted for the first analgesic request by the patient and NRS was noted at the same time if it was ≥4.

Statistical Package for the Social Sciences for Windows (SPSS Inc., Chicago) version 22 was used for data analysis. Qualitative data such as gender and adverse effects were compared with Chi-square test while quantitative data such as age, BMI, numeric rating scales, time to first analgesic request were compared using *t*-test. $P < 0.05$ was taken as statistically significant.

RESULTS

About 500 patients were involved in the study divided in two groups of 250 each. Time of request for analgesic in Group I and Group T was 312 ± 45.03 and 613 ± 135.25 min and mean tramadol required was 125 ± 40.03 mg and 43 ± 16.09 mg, respectively (P = 0.001). Mean NRS recorded between 1 hr and 24 hr at intervals was significantly lower in Group T as compared to I. Groups were comparable in demographic variables (Table 1).Mean age of patients in group T was 56+2.03 years while in group I was 54+3.01 years. Regarding use of analgesics, the mean dose of first analgesic (tramadol) was 125 ± 40.03 mg in Group I and 43 ± 16.09 mg in Group T ($P<0.05$). About 25 patients in in Group I were given another dose of analgesic diclofenac but only 5 patients required it in Group T. The time to requirement of analgesia was 312 ± 45.03 min in Group I and 613 ± 135.25 min in Group T ($P<0.05$). The mean NRS at first analgesic request was 7.16 ± 0.58 in Group I and 3.12 ± 0.59 in Group T ($P <0.05$). There was no significant difference in NRS for pain at 1 h between groups. The mean NRS at different intervals in Group I and Group T are presented in Table 2. The results are consistent with lower NSR for Group T as compared to Group T excluding NSR at 1 Hr ($P < 0.05$).

Table No.1: Demographic variable of study populations (n=500)

Variable	Groups	Mean ± SD	P Value
Age	Group I	56+2.03 years	0.72
	Group T	54+3.01 years	
Weight	Group I	70.50±2.29	0.62
	Group T	72.84±3.06	
Height	Group I	162.85±5.48	0.49
	Group T	160.13±6.69	
BMI	Group I	23.09±3.20	0.23
	Group T	25.33±3.23	

Table No.2: Comparison of numerical rating scale in study population (n= 500)

NRS (Time)	Groups	Mean ± SD	P Value
NRS 1	Group I	0.00±0.00	-
	Group T	0.00±0.00	
NRS 2	Group I	0.20±0.46	0.004
	Group T	0.02±0.10	
NRS 3	Group I	3.05±0.76	0.001
	Group T	0.32±0.45	
NRS 6	Group I	2.10±1.00	0.002
	Group T	1.54±0.60	
NRS 12	Group I	3.48±0.72	0.001
	Group T	0.73±0.66	
NRS 24	Group I	2.55±0.39	0.001
	Group T	1.02±0.32	

DISCUSSION

Cholecystectomy is one of the most common surgical procedure done for various types of gall bladder conditions, mostly gall stones. Patients usually feel post-surgical pain which not only affects the physiology but also causes chronic pain.[8] For this very reason effective pain control with the help of local anesthetics is recommended. Different analgesic techniques are used but the most popular ones are "port site infiltration" and "TAP block".[9,11] In this study, we compared these two methods for pain control post operatively. The classic approach was through the lumbar triangle of petit.[12, 13] TAP block is a popular way but it causes some complications which resulted in introduction of ultrasound usage in regional anesthesia for clear demarcation of the anatomy and safety with effective infiltration of local anesthesia .[14,15]

In our study we used subcostal TAP block with ultrasound use for post operative pain control. 0.5% bupivacaine was used. A smaller concentration (0.25%) of bupivacaine was used in our study to avoid adverse effects.[16]

Our study had 500 subjects with 250 received port site infiltration (Group I) and 250 received USG guided bilateral sub costal TAP block (Group T). We observed not significant NRS after 1 hr of surgery in both groups, advocating equal efficacy of port site infiltration and TAP block but it was significantly lower for Group T as compared to Group I after 1 hr. The NRS at first analgesic request was more in Group I as compared to Group T. The same results were shown in two studies with mean pain scores at 1 h and 4 h less in TAP block as compared to port site infiltration after laparoscopic cholecystectomy.[9,17]

The duration of effect of analgesia was 312 ± 45.03 min in Group I and 613 ± 135.25 min in Group T. The slow absorption of the drug may be due to low vascularity of the site. "Mean tramadol requirement was higher in Group I than in Group T suggesting a good pain control with TAP as compare to infiltrative technique." This fact is also proved by other studies as well.[9,17] In one of the retrospective study, 51 patients underwent laparoscopic cholecystectomy, were analyzed for post operative pain scores and post operative fentanyl requirement influencing the cost for the post operative technique.[17] But no significant difference in pain scores was observed. However in this study ropivacaine was used without using ultrasound guidance, which may be the cause of such results. Similar contradictory results were found in another study, but in this study severity of the pain was not assessed.[18] This study also used 0.5% ropivacaine without ultrasound use for the block.

CONCLUSION

It is clear that USG guided TAP block is more effective as compared to conventional approach for post-operative analgesia post laparoscopic procedures, complimented by low pain scores and longer analgesic duration with reduced medication dose.

Author's Contribution:

Concept & Design of Study:	Kamran Hakeem Khan
Drafting:	Fazal Ghani, Muddasar Shahzad
Data Analysis:	Shahid Khan, Waseem Yar Khan, Zahid Khan
Revisiting Critically:	Kamran Hakeem Khan, Fazal Ghani
Final Approval of version:	Kamran Hakeem Khan

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Wiggins T, Markar SR, MacKenzie H, et al. Optimum timing of emergency cholecystectomy for acute cholecystitis in England: population-based cohort study. Surg Endosc 2019;33: 2495–502.
2. Xiong W, Li M, Wang M, Zhang S, Yang Q. The Safety of Laparoscopic Cholecystectomy in the Day Surgery Unit Comparing with That in the Inpatient Unit: A Systematic Review and Meta-Analysis. Bio Med Research Int 2020;11.
3. Vaughan J, Gurusamy KS, Davidson BR. Day-surgery versus overnight stay surgery for laparoscopic cholecystectomy. Cochrane Database Syst Rev 2013;7:CD006798.
4. Vijayaraghavalu S, Bharthi Sekar E. A Comparative Study on the Postoperative Analgesic Effects of the Intraperitoneal Instillation of Bupivacaine Versus Normal Saline Following Laparoscopic Cholecystectomy. Cureus 2021; 13(3): e14151.
5. Alessandro Mirra, Alois von Rotz, Marta Schmidhalter, Lara Moser, Daniela Casoni, Claudia Spadavecchia, Ultrasound-guided lateral and subcostal transversus abdominis plane block in calves: a cadaveric study, Vet Ana and Anal 2018;45(3): 384-91.
6. Altuntaş G, Akkaya ÖT, Özkan D, Sayın MM, Balas Ş, Özlü E, et al. Comparison of intraabdominal and trocar site local anaesthetic infiltration on postoperative analgesia after laparoscopic cholecystectomy. Turk J Anaesthesiol Reanim 2016;44:306-11.
7. Kadam VR, Howell S, Kadam V. Evaluation of postoperative pain scores following ultrasound guided transversus abdominis plane block versus local infiltration following day surgery laparoscopic cholecystectomy-retrospective study. J Anaesthesiol Clin Pharmacol 2016;32:80-3.
8. Jensen SAMS, Fonnes S, Hanssen AG, Andresen K, Rosenberg J. Low long-term incidence of incisional hernia after cholecystectomy: A systematic review with meta-analysis. Surg 2021;169(6):1268-77.
9. Tolchard S, Davies R, Martindale S. Efficacy of the subcostal transversus abdominis plane block in laparoscopic cholecystectomy: Comparison with conventional port-site infiltration. J Anaesthesiol Clin Pharmacol 2012;28:339-43.
10. Sinha S, Palta S, Saroa R, Prasad A. Comparison of ultrasound-guided transversus abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laparoscopic cholecystectomies. Indian J Anaesth 2016;60: 264-9.
11. Molfino S, Botteri E, Baggi P, et al. Pain control in laparoscopic surgery: a case–control study between transversus abdominis plane-block and trocar-site anesthesia. Updates Surg 2019; 71:717–22.
12. Liu DX, Zhu ZQ. Ultrasound-guided peripheral trunk block technique: A new approach gradually stepping onto the stage of clinical anesthesia. Ibrain 2021;7:211-26.

13. Carney J, Finnerty O, Rauf J, Bergin D, Laffey JG, Mc Donnell JG, et al. Studies on the spread of local anaesthetic solution in transversus abdominis plane blocks. Anaesthesia 2011;66:1023-30.
14. Dal Moro F, Aiello L, Pavarin P, et al. Ultrasound-guided transversus abdominis plane block (US-TAPb) for robot-assisted radical prostatectomy: a novel '4-point' technique—results of a prospective, randomized study. J Robotic Surg 2019;13:147–51.
15. Tulgar S, Kapakli MS, Kose HC, et al. Evaluation of Ultrasound-Guided Erector Spinae Plane Block and Oblique Subcostal Transversus Abdominis Plane Block in Laparoscopic Cholecystectomy: Randomized, Controlled, Prospective Study [retracted in: Anesth Essays Res 2020;14(3):544.
16. Mahmoud S, Miraflor E, Martin D, Mantuani D, Luftig J, et al. Ultrasound-guided transverse abdominis plane block for ED appendicitis pain control. Am J Emer Med 2019;37(4):740-3.
17. Saxena R, Joshi S, Srivastava K, Tiwari S, Sharma N, Valecha UK, et al. Comparative study of ultrasound-guided abdominal field blocks versus port infiltration in laparoscopic cholecystectomies for post-operative pain relief. Indian J Anaesth 2016;60:578-83.
18. Bava EP, Ramachandran R, Rewari V, Chandralekha, Bansal VK, Trikha A, et al. Analgesic efficacy of ultrasound guided transversus abdominis plane block versus local anesthetic infiltration in adult patients undergoing single incision laparoscopic cholecystectomy: A randomized controlled trial. Anesth Essays Res 2016;10:561-7.