

COMPARISON OF TRANSVERSUS ABDOMINIS PLANE BLOCK VERSUS LOCAL INFILTRATION OF WOUND WITH BUPIVACINE AFTER APPENDISECTOMY

Rao Ali Shan Khan, Usman Ejaz Malik*, Amanat Khan**, Muhammad Saeed

Combined Military Hospital Peshawar Pakistan, *Combined Military Hospital Skardu Pakistan, **Combined Military Hospital/ National University of Medical Sciences (NUMS) Rawalpindi Pakistan

ABSTRACT

Objective: To compare the effect of transverses abdominis plane block verses local infiltration of wound with Bupivacaine to assess frequency of analgesic requirement for pain relieve during 15 hours after appendectomy.

Study Design: Randomized controlled trial.

Place and Duration of Study: Combined Military Hospital Peshawar, from Apr 2016 to Oct 2016.

Material and Methods: Ninety two patients fulfilling the inclusion criteria were included by consecutive sampling technique for this study and divided into two groups of 46 each. Patients of group A were administered transverse abdominis plane (TAP) block via ultrasound guide. Patients in group B received local infiltration with Bupivacaine. Frequency of analgesic requirement for pain relieve were assessed by anaesthetist during 15 hours after appendectomy.

Results: Both the groups were comparable with to assess frequency of analgesic for pain relieve after TAP Block Vs local infiltration with bupivacaine. In group A the frequency of analgesic requirement was less as compared to group B ($p<0.05$).

Conclusion: Frequency of analgesic requirement was less in TAP block as compared to local infiltration of wound with bupivacaine during 15 hours after appendectomy.

Keywords: Anaesthesia, Analgesics, Local, Nerve Block, Pain Postoperative.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Appendectomy is one of the most frequent abdominal surgeries. After surgery pain is controlled by a variety of methods. There has been gaining interest in the Transversus abdominis plane block during the past many years because TAP block is a safe procedure and no significant side effect reported and it also suggested as part of the multimodal anaesthetic approach to boost revitalization following lower abdominal surgeries¹. Local anaesthetic infiltration at incision wound is simple, safe, effective and good substitute to reduce the post operative pain scores and also reduce the frequency of analgesic necessity after surgery up to 12 hours².

Acute postoperative pain is a common dilemma come across not only by pain specialist but also by all medical professional on a daily basis routine. Pain management is an important

feature of perioperative anaesthetic care. Postoperative pain is one of the most important reasons for prolonged hospital stay and patient dissatisfaction³.

The use of numerous medicines (NSAID, Paracetamol, Opioids etc) and technique (Epidural, Nerve blocks, Local infiltration etc) are essential characteristic to achieve good pain control but which medicine/technique is superior is uncertain⁴.

Post operative pain following surgery has been managed by way of infiltration of incision wound with local anaesthetic agent, nevertheless transversus abdominis block has gaining popularity among surgeons for postoperative pain relieve, Although its superiority over local infiltration remain undecided⁵.

This study was designed to study frequency of analgesic requirement for pain relieve after TAP Block Vs local infiltration with bupivacaine after appendectomy. The purported significance of this study was that if it proves that

Correspondence: Dr Usman Ejaz Malik, Anaesthesia Department, CMH Peshawar Pakistan (Email: uiam76@gmail.com)

Received: 29 Nov 2016; **revised received:** 26 Feb 2017; **accepted:** 04 Jun 2018

administration of TAP block was better than local infiltration after appendicectomy. It will enable us to prevent prolonged hospital stays as well as avoid unnecessary economic burden to patient and better satisfaction of the patient.

MATERIAL AND METHODS

This Randomized controlled trial study was carried out at Anesthesia department of Combined Military Hospital (CMH) Peshawar from Apr 2016 to Oct 2016, after seeking permission from Hospital Ethics Committee. CMH is a tertiary care hospital. Consecutive sampling was adopted. Inclusion criteria included patients having American Society of Anaesthesiology (ASA) status-1, patient's age between 20-35 years. Exclusion criteria included patient's who were unwilling for the study, patient with cardiovascular, pulmonary, renal or liver disease, Cerebro vascular accident and patient having history of drug allergy.

The sample size has been calculated by using WHO sample size calculator. Keeping level of significance 5% and Power of the test 80%. Anticipated population proportion 1 (P1) is 32.4% and population proportion 2 (P2) is 9.1%. The sample size is 46 in each group. The total sample size of study is 92.

Ninety two patients fulfilling the inclusion/exclusion criteria were included in this study and they were indiscriminately divided in to two groups of 46 each by random number table. The purpose and procedure of the study and risk benefit.

Ratio of administering TAP block as well as that of local infiltration of wound with Bupivacaine were explained to the patient and informed consent was obtained. Those who were willing and were eligible for the study were randomly divided into two groups (A and B) by consecutive sampling technique. All patients received general anaesthesia. Patients assigned to group A administered 0.25% bupivacaine (15ml) in transversus abdominis plane via ultrasound guide technique after induction. Patients in group B received local anaesthetic infiltration at incision

wound with 0.25% bupivacaine (10ml) at the end of surgery and frequency of analgesic requirement (Inj. Ketorolac 30 mg) in 15 hours after appendicectomy patient was assessed by anaesthetist and all data was entered in research proforma.

All the data collected through proforma (attached as annex A) was entered in the Statistical Package for Social Sciences (SPSS) Version 13.0. Descriptive statistics were calculated. Mean and standard deviation were calculated for quantitative variables. Frequencies and percentages were calculated for qualitative variables. Independent sample t-test was applied to compare age between the groups. Chi square test was applied to determine the significance of the difference in frequency of analgesic requirement and gender between the two groups. A *p*-value <0.05 was considered as significant.

RESULTS

Total of 92 patients were incorporated in this study and alienated into two groups of 46 each. Out of 92 patients 35 (38%) were female patients and 57 (62%) were male patients. In group-A there were 16 (35%) female patients and 30 (65%) male patients while in group-B 19 (41%) female patients and 27 (59%) male patients (*p*=0.517).

The mean age of patient in group A was 27 ± 3.55 yrs while the mean age in group B 27.32 ± 3.66. Both the groups are comparable with respect to age (*p*=0.671).

Before appendicectomy patient received Bupivacaine in TAP block via ultrasound guidance technique while in group B at the end of surgery incision wound infiltrated with bupivacaine.

In group-A, 22 (47.8%) patients had no analgesic requirement, 9 (19.6%) patients had only one time analgesic required and 15 (32.6%) patients had two time analgesic requirement after appendicectomy. In group-B, 5 (10.9%) patients had no analgesic requirement, 12 (26.1%) patients had only one time analgesic required and 29 (63%) patients had required two time analgesic

requirement after appendicectomy in 15 hours. Frequency of analgesic requirement was significantly lower in group A as compared to group B ($p<0.001$) (table).

Therefore, transversus abdominis plane block was more beneficial for postoperative pain relieve after appendicectomy as compared to local wound infiltration with Bupivacaine.

DISCUSSION

Post operative pain management is one of the most important concerns of among surgeon, anaesthetist and patient. Various methods have been put into use to attain the ideal pain free recovery such as local infiltration, epidural analgesia; intravenous analgesic and peripheral nerve block. The introduction of ultrasound guided technique revolutionized TAP block as a

analgesic after C-section⁷. Thus we designed to demonstrate the effectiveness of TAP block following local anaesthetic infiltration of incision wound after appendicectomy. In our study patients before appendicectomy received TAP block via ultrasound guidance technique while in group-B at the end of surgery incision wound infiltrated with bupivacaine (0.25%).

In group-A, 22 (47%) patients had no analgesic requirement, 9 (20%) patients had only one time analgesic required and 15 (33%) patients had two time analgesic requirement after appendicectomy. In group-B, 5 (10%) patients had no analgesic requirement, 12 (26%) patients had only one time analgesic required and 29 (64%) patients had required two time analgesic requirement after appendicectomy in 15 hours. Frequency of analgesic requirement was

Table: Frequency of analgesic requirements among study groups.

Analgesic Requirement	Group-A (n=46)	Group-B (n=46)
	Frequency (%)	Frequency (%)
No Analgesic Requirement	22 (47.8)	5 (10.9)
One time Analgesic Requirement	9 (19.6)	12 (26.1)
Two time Analgesic Requirement	15 (32.6)	29 (63)
Total	46 (100.0)	46 (100.0)

p-value<0.001

remarkable option as part of multimodal post operative pain management³.

Single shot local anesthetic incision wound infiltration is also a commonly employ procedure designed for decreasing postoperative pain. Pain relief can be acquired by single injection of local anesthesia into skin and subcutaneous tissue layer at surgical incision locations, which may possibly lower the pain scores until 24 hours postoperatively. There have been a number of randomized controlled trials comparing the effectiveness of Transversus Abdominis plane block to that of LAI, but the results are unpredictable⁹⁻¹¹.

In contrast, Klasen et al⁷ showed that as component of a multimodal analgesic regimen there is no considerable disparity between the TAP block and continuous local anaesthetic infiltration wound catheter for postoperative

significantly lower in group-A as compared to group-B ($p=0.0004$).

Pedrazzani et al⁶ concluded that Transversus Abdominis plane block plus local incision wound infiltration in the setting of laproscopic colorectal surgery and Enhanced recovery after surgery (ERAS) program guarantees a decrease Use of opioid analgesics and better pain control allowing the improvement of essential items of enhanced recovery pathways⁶.

The 24 hrs morphine requirement was 34.57 ± 14.64 mg in Transversus Abdominis plane block group and 32.76 ± 14.34 mg in local anaesthetic infiltration group ($p=0.688$). The number of patients have need of intraoperative supplemental fentanyl in TAP group was 8 and in local infiltration group was 16 ($p=0.028$). The visual analog scale scores at rest and on coughing were considerably higher in the local infiltration

group in the immediate postoperative period ($p=0.034$ and $p=0.007$, respectively)¹².

In another study Seventy-two patients received local infiltration with bupivacaine after wound suture and 67 patients did not. There were no significant variations between the two patient groups in age, body weight and height, duration of general anaesthesia and operative time. Hospital stay was significantly shorter for patients receiving local infiltration of bupivacaine. The VAS score was higher up to 16 hours post-surgery for patients who did not receive local infiltration. Meperidine and acetaminophen utilization was less for patients who received local infiltration ($p=0.010$)⁸. The limitation of the study is that there are difference in technique, timing and cost effectiveness of TAP Block vs local infiltration of incision wound, so in future research is required to demonstrate such difference and lead to more robust results.

CONCLUSION

It was concluded from our study that transversus abdominis plane (TAP) block is beneficial than local infiltration of incision wound after appendectomy in terms of a lesser amount of analgesic requirement, short hospital stay and better satisfaction of patients.

CONFLICT OF INTEREST

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

REFERENCES

- Jakobsson J, Wickerts L, Forsberg S, Ledin G. Transversus abdominal plane block for post operative pain management a review 2015; 4.
- Kim MG, Kim SI, Ok SY, Kim SH, Lee SJ, Park SY et al. Is transverses abdominis plane block following local anaesthetic infiltration in laproscopic totally extraperitoneal hernia repair. Korean J Anesthesiol 2014; 67(6): 398-403.
- Yu N, Long X, Lujan-Hernandez JR, Succar J, Xin X, Wang X. Transverses abdominis plane block versus local anaesthetic wound infiltration in lower Abdominal surgery a systemic review meta analysis of RCT. BMC anesthesiol 2014; 14: 121.
- Fredheim OM, Borchgrevink PC, Kvarslein G. post operative pain management in hospitals. Tidsskr nor laegetoren 2011; 131(18): 1772-6.
- Kadam VR, Howell S, Kadam V. Evaluation of post operative pain score following ultrasound guided transverses abdominis plane block versus local infiltration following day surgery laproscopic cholecystectomy retrospective study. J anesthetol Clin pharmacol 2016 32(1): 80-3.
- Pedrazzani C, Menestrina N, Moro M, Brazzo G, Mantovani G, Polati E et al. local wound infiltration plus transverses abdominis plane block versus local wound infiltration in laproscopic colorectal surgery and ERAS program. Surg Endosc 2016; 30(11): 5117-25.
- Klasen F, Bourgoign A, Antonini F, Dazeas E, Bretelle F, Martin C et al. Post operative analgesic after C-section with TAP block or continuous infiltration wound catheter. A randomized clinical trial. Anaesth Crit Care Pain Med 2016.
- Lu TJ, Chen JH, Hsu HM, Wu CT, Yu JC. Efficiency of infiltration with bupivacaine after modified radical mastectomy. Acta chir belg 2011; 111(6): 360-3.
- Coughlin SM, Karanicolas PJ, Emmerton CHM, Kanbur B, Kanbur S, Colquhoun PH. Better late than never? Impact of local analgesia timing on postoperative pain in laparoscopic surgery a systematic review and metaanalysis. Surg Endosc 2010; 24(12): 3167-76.
- Einarsson JL, Sun J, Orav J, Young AE. Local analgesia in laparoscopy: A randomized trial. Obstet Gynecol 2004; 104(6): 1335-39.
- Gupta A. Local anaesthesia for pain relief after laparoscopic cholecystectomy - A systematic review. Best Pract Res Clin Anaesthesiol 2005; 19(2): 275-92.
- Bava EP, Ramachandran R, Rewari V, Chandrakha, Bansal V K, Trikha A. Analgesic efficacy of ultrasound guided transverses abdominis plane block versus local anaesthetic infiltration in adult patients undergoing single incision laparoscopic cholecystectomy. A randomized controlled trial. Anesth Essays Res 2016; 10(3): 561-67.