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ORIGINAL ARTICLE

Effectiveness of Ultrasound Guided Trans-versus Abdominis Plane (TAP) Block with Landmark Technique Guided TAP Block for Open Appendectomy

MUHAMMAD AATIR FAYYAZ[1], ASIF MEHMOOD[2], HINA BASHIR[3], RANNA MUSARRAT[4], NISAR AHMAD[5], SYED AFTAB HAIDER[6]

[1]*Assistant Professor Anesthesia, Nishtar Medical University Multan.*
[2]*Assistant Professor Pediatric Anesthesia, the children's hospital & the institute of child health, Multan.*
[3]*Senior Registrar Anesthesia, Nishtar Medical University Multan.*
[4]*Assistant Professor Anesthesia, Nishtar Medical University Multan.*
[5]*SR Anesthesia, Nishtar Medical University Multan.*
[6]*Professor of Anesthesia, Intensive Care Unit and Pain Management. Nishtar Medical University/Hospital Multan.*
Correspondence to: Dr. Muhammad Aatir Fayyaz, E-mail: draatirfayyaz@gmail.com.

ABSTRACT

Objective: To compare the analgesic efficacy of ultrasound (US) guided TAP block with landmark technique guided TAP block for management of post-op pain after open appendectomy in patients of acute appendicitis.

Methods: In this study, we include 80 patients of acute appendicitis who were planned for open appendectomy were included. The study was conducted from June-2021 to Jan-2022 in Nishtar Hospital Multan. *In Landmark TAP group;* TAP block was given using bupivacaine (0.25%) after completion of surgical procedure using blind landmark technique. *In US TAP group;* TAP block was administered under US supervision. VAS Score and time of first rescue analgesia were main study outcomes.

Results: Mean age was 33.5±9.9 years in landmark TAP group and 32.8±10.4 years in US TAP group (p-value 0.75). There was no significant difference in mean VAS score at 1, 6, 12 and 18 hours after surgery between the groups, However, after 24 hours of surgery mean VAS score was higher in landmark TAP group; 3.5±1.2 versus 2.9±1.0 in TAP group (p-value 0.02). Time of first rescue analgesia was significantly prolonged in US TAP group; 1320.7±275.9 minutes versus 1180.4±320.7 minutes in landmark TAP group (p-value 0.04).

Conclusion: Ultrasound guided TAP block is superior to landmark guided TAP block, as it provides better analgesic outcomes in comparison of landmark guided TAP block.

Keywords: Ultrasonography, landmark technique, transversus abdominus plane block.

INTRODUCTION

The most prevalent reason for an emergency appendectomy is acute appendicitis (AP).[1] To avoid perforation, abscess formation, and possibly death as a result of AP, the disease must be diagnosed and treated promptly.[2,3] This condition can only be treated surgically, and that is through appendectomy. Open and laparoscopic methods can both be used to perform an appendectomy. Using open technique rather than laparoscopic technique is preferable since it is easier to do and can even be done by trainee surgeons with high success.[4]

One of the most common side effects of surgery is pain, which causes both the patient and the surgical team great distress. These are some of the primary causes of homeostatic dysfunction. Increased hospital stay and overall procedure costs are also linked to it.[5,6] So post-operative pain treatment is critical for surgery patients. Improved patient satisfaction and lower procedural costs are all benefits of effective post-operative pain treatment.[7,8]

Transversus abdominis plan (TAP) block is a regional anesthetic treatment that uses local anesthetic between the internal oblique and transvers muscles to target the anterolateral portion of the abdominal field.[9,10] It is achievable to block the sensory nerves of the anterior abdominal wall earlier they leave this plane and impale the musculature to innervate the entire anterior-abdominal wall by injecting local anesthetics into the transversus abdominis plane via the triangle of Petit (T7 to L1).[11]

For a wide range of abdominal surgeries, TAP blocks have been found to be a beneficial component of multimodal postoperative analgesia. TAP blocks have been shown to minimize postoperative opioid use, decrease pain scores, and diminish opioid-related side effects in most studies. In this study, we compared the analgesic efficacy of US guided TAP block with landmark technique guided TAP block for management of post-op pain after open appendectomy in patients of acute appendicitis.

METHODS

In this study, we include 80 patients of acute appendicitis who were planned for open appendectomy were included. The study was conducted from June-2021 to Jan-2022 in Nishtar Hospital Multan. Patients allergic to study drugs, having bleeding disorders and those with perforated appendicitis were excluded.

Patients will be divided into two groups using draw randomization.

In Landmark TAP group; TAP block was given using bupivacaine (0.25%) after completion of surgical procedure. A total of 20 ml bupivacaine wase given. TAP block was performed unilaterally on the same surgery side by landmark technique. First, the mid-axillary line immediately above the pelvic rim was palpated to execute the landmark procedure. In the triangle of petit, the needle was placed just above the iliac crest. TAP block was administered with a 23G 1.5-inch blunt-tipped needle. When the needle travels through the facial extension of the

external oblique muscle, it makes a popping sound. As soon as the needle enters the internal oblique muscle, a second pop is heard, indicating that the needle has entered the fascial plane. Bupivacaine was then administered.

In US TAP group; TAP block was administered under US supervision to these individuals. TAP block was administered to these individuals using a 23G blunt pointed 1.5-inch needle. Perpendicular to the skin, the anesthetic agent was injected, and the needle was advanced into the fascial plane between the internal oblique muscle and the transversus abdominis muscle.

All procedures were performed under general anesthesia. Post-operative pain score were calculated at 1, 6, 12, 18 and 24 hours after surgery. Need for 1st rescue analgesia was also noted for each patient.

Data analysis was done SPSS v23. Independent sample t-test was used for comparison of study outcomes such as, post-op pain scores at different time intervals, time of rescue analgesia and total dose of diclofenac between the groups. P-value ≤0.05 was taken as a cutoff value to rule out significant difference.

RESULTS

The baseline patient's characteristics are given in Table 1. Mean age was 33.5±9.9 years in landmark TAP group and 32.8±10.4 years in US TAP group (p-value 0.75). There were 28 male patients in landmark TAP group and 26 in US TAP group (p-value 0.22) [Table 1].

There was no significant difference in mean VAS score at 1, 6, 12 and 18 hours after surgery between the groups, However, after 24 hours of surgery mean VAS score was higher in landmark TAP group; 3.5±1.2 versus 2.9±1.0 in TAP group (p-value 0.02). Time of first rescue analgesia was significantly prolonged in US TAP group; 1320.7±275.9 minutes versus 1180.4±320.7 minutes in landmark TAP group (p-value 0.04) [Table 2].

Table 1. Baseline Patient's Characteristics.

	Landmark TAP Group (N=40)	US TAP Group (N=40)	P-value
Age	33.5±9.9	32.8±10.4	0.75
Male/Female Gender	28/12	26/14	0.22
BMI (Kg/m^2)	26.5±2.1	27.1±2.3	0.22
ASA I/II	13/27	16/24	0.48

Table 2. Comparison of Study Outcomes.

	Landmark Group (N=40)	US Group (N=40)	P-value
VAS Score			
1 hour	0.34±0.32	0.35±0.4	0.90
6 hours	1.7±0.8	1.6±0.6	0.53
12 hours	2.4±0.9	2.2±0.7	0.27
18 hours	2.9±1.0	2.7±0.9	0.35
24 Hours	3.5±1.2	2.9±1.0	0.02
Time of First Rescue Analgesia (mins)	1180.4±320.7	1320.7±275.9	0.04

DISCUSSION

Strong analgesics are used to manage post-operative discomfort. opiates have a number of side effects, including a decrease in bowel function following surgery, and a higher risk of post-surgical nausea and vomiting that delays patient discharge. Afferent neural blocking using local anesthetics appears to be the most effective analgesic approach, followed by nonsteroidal anti-inflammatory medications and opioids, in terms of effectiveness.[12] Somatosensory pain from the surgical incision on the anterior abdominal wall and viscero-peritoneal discomfort caused by appendix inflammation and infection are the two main causes of postoperative discomfort following appendicitis surgery.

The landmark technique via the Petit triangle appears to offer substantial potential for patients having surgical procedures involving abdominal wall incisions, among other TAP block methods available.[13] The use of ultrasound (US) in anaesthetic practice has expanded significantly as a result of developments in ultrasound methods. Many anesthetic techniques have become more accurate because to the use of ultrasound. Currently, the United States is directing the blocking of the TAP.[14-16]

In a study conducted by Patel et al. compared the analgesic efficacy of TAP block using landmark technique with standard pain management protocol using inj. Diclofenac on demand for management of pain. The authors found significantly lower post-op pain score in TAP group; with pain score 1.6 ± 0.81 in TAP group and 2.7 ± 0.98 in control group after 06 hours of surgery and 3.1±1.09 in TAP group versus 3.8±0.75 in control group after 24 hours of surgery in control group. The time of 1st rescue analgesia requirement was 1140.66 ± 294.89 minute in TAP group and 210.33 ± 92.45 min in control group.[17]

Another study by Cho et al. compared US guided TAP block with standard pain management protocol in patients undergoing open appendectomy and reported significantly lower VAS score of 2 (1.5-3.2) in US guided TAP block in comparison to 5 (3.5-8) in control group at 30 minutes and 2 (1-2.8) in US guided TAP versus 4 (2.5-6) in control group after 24 hours of surgery. And reported that US guided TAP block is superior to conventional management of post-operative pain in patients undergoing open appendectomy.[18]

Appendectomy is a very commonly performed general surgical procedure. TAP block provides significant relief of post-operative pain. The conventional technique of TAP block (landmark) is a blind procedure and therefore may result in inappropriate block. US provide direct visualization of the structures and therefore seems to be beneficial in determining the adequate location of block.

CONCLUSION

Ultrasound guided TAP block is superior to landmark guided TAP block, as it provides better analgesic outcomes in comparison of landmark guided TAP block.

REFERENCES

1. Ferris M, Quan S, Kaplan BS, Molodecky N, Ball CG, Chernoff GW, et al. The global incidence of appendicitis: a systematic review of population-based studies. Ann Surg. 2017;266(2):237-41.
2. Wysocki AP, Allen J, Rey-Conde T, North JB. Mortality from acute appendicitis is associated with complex disease and co-morbidity. ANZ J Surg. 2015;85(7-8):521-4.

3. Erdem H, Çetinkünar S, Daş K, Reyhan E, Değer C, Aziret M, et al. Alvarado, Eskelinen, Ohhmann and Raja Isteri Pengiran Anak Saleha appendicitis scores for diagnosis of acute appendicitis. World J Gastroenterol. 2013;19(47):9057.
4. Siam B, Al-Kurd A, Simanovsky N, Awesat H, Cohn Y, Helou B, et al. Comparison of Appendectomy Outcomes Between Senior General Surgeons and General Surgery Residents. JAMA Surg. 2017;152(7):679-85.
5. Chou R, Gordon DB, de Leon-Casasola OA, Rosenberg JM, Bickler S, Brennan T, et al. Management of postoperative pain: a clinical practice guideline from the american pain society, the american society of regional anesthesia and pain medicine, and the american society of anesthesiologists' committee on regional anesthesia, executive committee, and administrative council. J Pain. 2016;17(2):131-57.
6. Abdallah FW, Chan VW, Brull R. Transversus abdominis plane block: a systematic review. Region Anesth Pain Med. 2012;37(2):193-209.
7. Crews JC. Multimodal pain management strategies for office-based and ambulatory procedures. JAMA. 2002;288(5):629-32.
8. Glowacki D. Effective pain management and improvements in patients' outcomes and satisfaction. Critical Care Nurse. 2015;35(3):33-41.
9. Petersen PL, Mathiesen O, Torup H, Dahl JB. The transversus abdominis plane block: a valuable option for postoperative analgesia? A topical review. Acta Anaesthesiol Scand. 2010;54(5):529-35.
10. Rafi AN. Abdominal field block: a new approach via the lumbar triangle. Anaesthesia. 2001;56(10):1024-6.
11. Bayindir S, Ozcan S, Kocyigit F, Bozan M. Ultrasound-guided transversus abdominis block vs wound infiltration in patients undergoing open appendectomies. Med Sci. 2018;7(3):634-8
12. Vadivelu N, Kai AM, Kodumudi V, Berger JM. Challenges of pain control and the role of the ambulatory pain specialist in the outpatient surgery setting. J Pain Res. 2016;9:425-35.
13. McDonnell JG, O'Donnell B, Curley G, Heffernan A, Power C, Laffey JG. The analgesic efficacy of transversus abdominis plane block after abdominal surgery: a prospective randomized controlled trial. Anesth Analg. 2007;104(1):193-7.
14. Belavy D, Cowlishaw P, Howes M, Phillips F. Ultrasound-guided transversus abdominis plane block for analgesia after Caesarean delivery. Br J Anaesth. 2009;103(5):726-30.
15. O'Donnell BD. The transversus abdominis plane (TAP) block in open retropubic prostatectomy. Region Anesth Pain Med. 2006;31(1):91.
16. Hain E, Maggiori L, Prost à la Denise J, Panis Y. Transversus abdominis plane (TAP) block in laparoscopic colorectal surgery improves postoperative pain management: a meta-analysis. Colorect Dis. 2018;20(4):279-87.
17. Patel I, Gandhi R, Shah A, Kumar P. Study to evaluate transversus abdominis plane (TAP) block with ropivacaine in appendectomy patients by total requirement of diclofenac as a postoperative analgesia drug. Anaesth Pain Intens Care. 2018:33-7.
18. Cho S, Kim Y-J, Kim D-Y, Chung S-S. Postoperative analgesic effects of ultrasound-guided transversus abdominis plane block for open appendectomy. J Korean Surg Soc. 2013;85(3):128-33.