

# Comparison of Post-Operative Pain Score with Transversus Abdominis Plane (TAP) Block Versus Placebo in Open Appendectomy

MUZZAMIL ALVI, UMAID HUSSAIN, RIAZ HUSSAIN, YUMNA JAVAID, TAHIR NAZEER, AMNA TAHIR

## ABSTRACT

**Aim:** To compare the efficacy of TAP (Transversus abdominis plane) block regarding pain control in patient undergoing open appendectomy.

**Study design:** Randomized Control Trial.

**Methods:** 200 patients undergoing for open appendectomy were included and divided into two equal groups A and B by using random number table. Each group comprised of 100 patients. In group A unilateral TAP block was applied on the side of surgery and 20 ml .5% bupivacaine given. In group B 20 ml normal saline was given during TAP block in the triangle of petit with 16G Tuohy's needle.

**Results:** Mean age of patients was  $32.29 \pm 9.24$  years with minimum and maximum age of 18 and 50 years respectively. The male to female ratio was 2.4:1. The mean NRS score  $2.64 \pm 1.48$  after 24 hours. The mean NRS score of placebo group patients was  $3.36 \pm 1.41$  and in TAP group it was  $1.93 \pm 1.18$ .

**Keywords:** Pain, Analgesia, NRS (Numeric rating Score) TAP (Transversus abdominis plane) Block.

---

## INTRODUCTION

Transversus abdominis plane (TAP) block provide analgesia to parietal peritoneum, skin, and muscles of anterior abdominal wall by blocking the sensory nerve supply<sup>1</sup>. We apply TAP block in triangle of Petit in lumbar area which is bounded posteriorly by latissimusdorsi muscle, anteriorly external oblique and iliac crest forming base of triangle<sup>2</sup>. With the help of TAP block we kept patient pain free far longer time<sup>3,4</sup>. TAP block is very effective in abdominal procedures<sup>5</sup>. It decreases opioid related side effects<sup>6</sup>. TAP block was described by Rafi in 2001<sup>7</sup>. Now ultrasound guided TAP block are performed by identifying the tissue plane by direct visualization<sup>8,9</sup>. Ultrasound guided technique was first describe by Hebbard et al in 2007<sup>10</sup>. TAP block can be perform during abdominal surgery with the help of surgeon and it was described by Chet wood et al and named as Laproscopic assisted TAP block<sup>11,12</sup>.

Surgical TAP block was describe by Araco et al in it a blunt dissection is carried out through the external and internal oblique muscle leading to injection of local anaesthetic into the TAP under direct visualization<sup>13</sup>. During TAP block systemic toxicity is possible due to direct intravascular injection during procedure<sup>14</sup>. Liver laceration can occur during TAP block<sup>15,16</sup>.

Theoretically local anaesthetic injected into TAP can track along transversalis fascia to the fascia iliaca and it can block femoral nerve<sup>17</sup>.

---

Department of Anaesthesiology, Services Hospital Lahore  
Correspondence to Dr. Tahir Nazeer Email: drtahirnazeer@yahoo.com

## MATERIAL & METHODS

After the approval of study from hospital ethics committee 200 patients undergoing open appendectomy procedure in emergency department of services hospital Lahore were included and divided into two equal groups A and B by using random number table. Patient's bio data was noted. Informed consent was taken. Enrolled patients were explained about the use of NRS scale employed in this study. In operation theater standard II monitoring was used. In all cases Ketorolac 30mg IV and iv paracetamol 15mg/kg given as intra-operative analgesia. All patients received general anaesthesia with endotracheal tube and controlled ventilation with the help of propofol, suxamethonium, atracurium, N<sub>2</sub>O, O<sub>2</sub> and isoflurain.

In group A patients received unilateral TAP block with 16G Tuohy's needle just before recovery in the triangle of petit and 20ml of .5% bupivacaine was injected. In group B patients 20ml of normal saline was injected in block. After complete recovery all patients were shifted to post-operative care unit and patients were observed for next 24 hours for pain. All patients were asked to rate the pain according to NRS and score noted. Whole information was collected on a Performa. This was a Randomized controlled trial and sampling technique was non-probability purposive sampling. The calculated sample size was 200 cases; 100 cases in each group with 95% confidence interval and 80% power of test and taking magnitude of mean pain score i.e.,  $1 \pm 0.25$  with TAP and  $3 \pm 0.25$  with placebo in patients undergoing open appendectomy. All the collected information was entered and analyzed using SPSS

version 12, t-test was applied to compare the mean pain score in two groups and  $P \leq 0.05$  was considered as significant.

## RESULTS

In my study the mean age of patient was  $32.59 \pm 9.24$  year. The male to female ratio was 2.4:1. The mean NRS score was  $2.64 \pm 1.48$  after 24 hours. The NRS score of TAP group was  $1.93 \pm 1.18$  and in placebo group it was  $3.36 \pm 1.41$  there was highly significant difference found between NRS Score.

Table 1: Descriptive statistics of age ( years)

Age (Years)	N	200
	Mean	32.59
	SD	9.24
	Minimum	18.00
	Maximum	50.00

Table 2: Descriptive statistics of NRS after 24 hours

NRS	N	200
	Mean	2.64
	SD	1.48
	Minimum	0.00
	Maximum	7.00

Table 3: Descriptive statistics of NRS in accordance with study groups

		Study Groups	
		Placebo	TAP
NRS	N	100	100
	Mean	3.36	1.93
	SD	1.41	1.18

t-value = 7.744

p-value = 0.000 (Significant)

Table 4: Descriptive statistics of NRS of patients below 30 yrs in accordance with study groups

		Study Groups	
		Placebo	TAP
NRS	N	36	49
	Mean	3.30	1.91
	SD	1.23	1.18

Age < 30 years

t-value = 5.22

p-value = 0.000 (Significant)

Table 5: Descriptive statistics of NRS of patients above 30 yrs in accordance with study groups.

		Study Groups	
		Placebo	TAP
NRS	N	64	51
	Mean	3.39	1.94
	SD	1.51	1.19

Age > 30 years

t-value = 5.739

p-value = 0.000 (Significant)

Table 6: Descriptive statistics of NRS of male patients in accordance with study groups.

		Study Groups	
		Placebo	TAP
NRS	N	68	74
	Mean	3.19	1.90
	SD	1.54	1.21

Stratification by males t-value=5.47p-value=0.000 (Significant)

Table 7: Descriptive statistics of NRS of female patients in accordance with study groups.

		Study Groups	
		Placebo	TAP
NRS	N	32	26
	Mean	3.71	2.00
	SD	1.02	1.09

Stratification by females t-value=6.16 p-value=0.000 (Significant)

## DISCUSSION

Appendectomy is most frequently performed surgical procedure and it is causing significant pain<sup>18</sup>. In recent years TAP block has been developed and used for post-operative pain control after abdominal surgery<sup>19,20</sup>.

In the study of John Carney et al they found that TAP block provide superior analgesia in first 48 hours<sup>21</sup>. In the study of Niraj G et al he compared TAP block with epidural analgesia and found that epidural analgesia is better and required less medication as compare to TAP block<sup>22</sup>. In the study of Petersen et al he found minimal benefits of TAP block in patients undergoing laparoscopic cholecystectomy<sup>23</sup>.

Similarly in the two different studies of McDonnell JG et al they found that mean pain score with TAP block was 2 or less in abdominal surgeries and C-section are compared to placebo group<sup>24,25</sup>.

## CONCLUSION

Patients receiving TAP block with bupivacaine were more comfortable, they feel less pain and NRS score was less as compared to placebo group.

## REFERENCES

- Kanazi GE, Aouad MT, Abdallah FW, Khatib MI, Adham AM, Harfoush DW, et al. The analgesic efficacy of subarachnoid morphine in comparison with ultrasound-guided transversus abdominis plane block after cesarean delivery: a randomized controlled trial. *Anesth Analg*. 2010 Aug; 111(2):475-81.
- Pather S, Loadsman JA, Gopalan PD, Rao A, Philp S, Carter J. The role of transversus abdominis plane blocks in women undergoing total laproscopic hysterectomy: a retrospective review. *Aust N Z J Obstet Gynaecol*. 2011;51(6):544-7.
- El-Dawlatly AA, Turkistani A, Kettner SC, Machata AM, Delvi MB, Thallaj A, et al. Ultrasound-guided transversus abdominis plane block: description of a new technique and comparison with conventional systemic analgesia during laparoscopic cholecystectomy. *Br J Anaesth*. 2009;102(6):763-7.
- McMorrow RC, Ni Mhuircheartaigh RJ, Ahmed KA, Aslani A, NgSC, Conrick-Martin I, et al. Comparison of transversus abdominis plane block vs spinal morphine for pain relief after Caesarean section. *Br J Anaesth*. 2011;106(5):706-12.
- Sharma P, Chand T, Saxena A, Bansal R, Mittal A, Shrivastava U. Evaluation of postoperative analgesic efficacy of transversus abdominis plane block after abdominal surgery: A comparative study. *J Nat Sci Biol Med*. 2013;4(1):177-80.

6. Siddiqui MRS, Sajid MS, Uncles DR, Check L, Baig MK. A meta-analysis on the clinical effectiveness of transversus abdominis plane block. *Journal of clinical anesthesia*. 2011;23(1):7-14.
7. Rafi A. Abdominal field block: a new approach via the lumbar triangle. *Anaesthesia* 2001;56(10):1024-6.
8. 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. *Anesthesia & Analgesia*. 2007;104(1):193-7.
9. Aveline C, Le Hetet H, Le Roux A, Vautier P, Cognet F, Vinet E, et al. Comparison between ultrasound-guided transversus abdominis plane and conventional ilioinguinal/iliohypogastric nerve blocks for day-case open inguinal hernia repair. *Br J Anaesth*. 2011 Mar; 106(3):380-6.
10. Hebbard P, Fujiwara Y, Shibata Y, Shibata Y, Royse C. Ultrasound-guided transversus abdominis plane (TAP) block. *Anaesthesia and intensive care*. 2007;35(4):616-7.
11. Chetwood A, Agrawal S, Hrouda D, Doyle P. Laparoscopic assisted transversus abdominis plane block: a novel insertion technique during laparoscopic nephrectomy. *Anaesthesia*. 2011;66(4):317-8.
12. Bharti N, Kumar P, Bala I, Gupta V. The efficacy of a novel approach to transversus abdominis plane block for postoperative analgesia after colorectal surgery. *Anesthesia & Analgesia*. 2011; 112(6):1504-8.
13. Araco A, Pooney J, Araco F, Gravante G. Transversus abdominis plane block reduces the analgesic requirements after abdominoplasty with flank liposuction. *Annals of plastic surgery*. 2010;65(4):385-8.
14. Kato N, Fujiwara Y, Harato M, Kurokawa S, Shibata Y, Harada J, et al. Serum concentration of lidocaine after transversus abdominis plane block. *Journal of anesthesia*. 2009;23(2):298-300.
15. Farooq M, Carey M. A case of liver trauma with a blunt regional anesthesia needle while performing transversus abdominis plane block. *Regional anesthesia and pain medicine*. 2008;33(3):274-5.
16. Lancaster P, Chadwick M. Liver trauma secondary to ultrasound-guided transversus abdominis plane block. *British journal of anaesthesia*. 2010;104(4):509-10.
17. Jankovic Z, Ahmad N, Ravishankar N, Archer F. Transversus abdominis plane block: how safe is it? *Anesthesia & Analgesia*. 2008;107(5):1758-9.
18. Hale DA, Molloy M, Pearl RH, Schutt DC, Jaques DP. Appendectomy: a contemporary appraisal. *Annals of surgery*. 1997;225(3):252.
19. McDonnell JG, Curley G, Carney J, Benton A, Costello J, Maharaj CH, et al. The analgesic efficacy of transversus abdominis plane block after cesarean delivery: a randomized controlled trial. *Anesthesia & Analgesia*. 2008;106(10):186-91.
20. Ra YS, Kim CH, Lee GY, Han JI. The analgesic effect of the ultrasound-guided transverse abdominis plane block after laparoscopic cholecystectomy. *Korean journal of anesthesiology*. 2010;58(4):362-8.
21. Carney J, Finnerty O, rauf J, Curley G, McDonnell JG, Laffey JG. Ipsilateral transversus abdominis plane block provides effective analgesia after appendectomy in children: a randomized controlled trial. *Anesthesia & Analgesia*. 2010;111(4):998-1003.
22. Niraj G, Kelkar A, Jeyapalan I, Graff-Baker P, Williams O, Darbar A, et al. Comparison of analgesic efficacy of subcostal transversus abdominis plane blocks with epidural analgesia following upper abdominal surgery. *Anaesthesia*. 2011; 66(6):465-71.
23. Petersen PL, Stjernholm P, Kristiansen VB, Torup H, Hansen EG, Mitchell AU, et al. The beneficial effect of transversus abdominis plane block after laparoscopic cholecystectomy in day-case surgery: a randomized clinical trial. *Anesthesia & Analgesia*. 2012;115(3):527-33.
24. 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.
25. McDonnell JG, Curley G, Carney J, Benton A, Costello J, Maharaj CH, et al. The analgesic efficacy of transversus abdominis plane block after cesarean delivery: a randomized controlled trial. *Anesth Analg*. 2008 Jan; 106(1): 186-91.