

# Efficacy of Transversus Abdominis Plane Block After Post Caesarean Section Delivery

Singh G<sup>1</sup>, Banu F<sup>2</sup>, Haque H<sup>3</sup>

## ABSTRACT

**Introduction:** Post operative pain following caesarean section delivery can negatively affect early wound healing, proper breast feeding to the new born baby and therefore impair mother to child bonding. Combination of non steroidal anti inflammatory drugs (NSAIDs) and opioids has most commonly been used in pain management. The combination of regional anesthetic techniques like Transversus Abdominis Plane (TAP) block reduces pain and the dose of total analgesics consumed and therefore helps to prevent opioid related side effects.

**Objective:** To evaluate the analgesic efficacy of Transversus Abdominis Plane block for management of postoperative pain in the first 24 hours after caesarean section.

**Methodology:** It is a prospective randomized controlled single blinded study involving 60 patients of ASA II done in Nepalgunj Medical College Teaching Hospital over a period of 2 months. They are divided into two groups of 30 patients each. Group 1 received 20 ml of 0.25% isobaric bupivacaine in the triangle of Petit bilaterally. Group 2 received IV analgesics (NSAIDs and Tramadol 50 mg with Phenargan 25 mg). VAS score was taken every 6 hourly for 24 hours post operatively.

**Results:** The mean VAS score of the patients in group 2 at 0-6 hours, 6-12 hours, 12-18 hours and 18-24 hours was 6.73(SD±0.69), 6.63(SD±0.610), 6.40(SD±0.56) and 6.43(SD±0.57) respectively. The mean VAS score of the patients who received block is significantly less as compared to those who did not receive the block with a p value of <0.001. The mean time to first analgesic request in group 1 was 10.83(SD±2.95) and in group 2 was 4.87(SD±0.68) with a p value of <0.001. In group 1, 70% patients received single dose of analgesics, 23.3% received two doses and 6.7% received three doses of analgesics. In group 2 all the patients received four doses of analgesics.

**Conclusion:** Transversus Abdominis Plane Block can be used as a part of multimodal analgesic therapy for the management of post operative pain after caesarean section as it is technically less demanding, safe and economical. It reduces the side effects related with opioid analgesics and encourage early mobility, wound healing and proper mother to child bonding.

**Key Words:** Non Steroidal Anti Inflammatory Drugs(NSAIDs), Transversus Abdominis Plane Block(TAP Block), Visual Analogue Scale(VAS score)

## INTRODUCTION

Post operative pain remains the most fearsome situation in patients undergoing surgery. As such the proper treatment of post operative pain remains the greatest challenge to the anesthesiologists. Frequently used analgesic therapy including non-steroidal anti-inflammatory drugs (NSAIDs) and opioids combination is usually inadequate and has some unwanted side effects like gastritis, sedation, nausea vomiting, pruritus and urinary retention<sup>1</sup>.

Transversus abdominis blocks (TAP) are frequently used as a part of multimodal analgesia for post operative pain after abdominal surgeries like caesarean section, hemicolectomy,

appendectomy and various other gynecological surgeries<sup>2</sup>. Pain is moderate to severe after caesarean section and inadequate treatment of the pain will impair mother to child bonding, breast feeding, early mobility which may lead to thromboembolism. The analgesics given should be safe for the breastfeeding baby and effective to the mother<sup>3,4</sup>.

Pain after caesarean section arises from visceral part (uterine contraction) and the abdominal wall muscle incision<sup>3</sup>. TAP block blocks the abdominal wall afferent fibers arising from T6 to L1 and thus prevent pain due to incision of the abdominal wall muscles. It involves deposition of local anesthetic between the internal oblique and the transverses abdominis muscle where the nerve fibers traverse before innervating the abdominal wall muscle.

1. Dr. Grisuna Singh

2. Dr. Farhat Banu

3. Dr. Husneyera Haque

## Address for correspondence:

Dr. Grisuna Singh

Department of Anesthesia

Nepalgunj Medical College & Teaching Hospital

Nepalgunj, Banke

Email: grisuna@gmail.com

## AIMS AND OBJECTIVES

1. To compare the analgesic potency of 0.25% bupivacaine versus routine use of opioid analgesics during first 24hrs in the post operative period.

2. To reduce the total number of opioid analgesics consumed.

## MATERIALS AND METHODS

This is a randomized controlled single blind study done in Nepalgunj Medical College Teaching Hospital between 1<sup>st</sup> June 2017 to 31<sup>st</sup> July 2017 (two months) involving 60 patients. 30 patients received TAP block (group 1) whereas other 30 patients had NSAIDs and opioid analgesics in the post operative period for the pain relief (group 2). This study was approved by the ethical research committee of Nepalgunj Medical College Teaching Hospital. All patients coming for caesarean section belonging to ASA II were enrolled in the study after taking written informed consent. Patients were shifted to the OT. IV line was opened with 18 gauze IV canulae. Intravenous infusion of normal saline / ringer's lactate one liter was given as preloading. Vitals were recorded including pulse, blood pressure, respiratory rate, and temperature and oxygen saturation. Patients were divided into two groups using lottery system. Study group 1 received spinal anesthesia for surgery with bilateral TAP Block at the end of surgery whereas the control group (group 2) received just spinal anesthesia for surgery. Spinal anesthesia was given in a sitting position using 2.5 ml of 0.5% heavy bupivacaine at L4-L5 interspace in the sitting position. Immediately after spinal anesthesia patient was made to lie in the supine position. Caesarean section was performed by giving pfannenstiel incision. After completion of caesarean section, bilateral TAP block was given in petit triangle using 40 ml of 0.25% bupivacaine. It was given by using a blunt tipped 22 gauze needle in the study group. Drug was injected after negative aspiration for blood and fluid. For post operative analgesia patients in the control group (group 2) received Tramadol 50 mg. plus Phenargan 25 mg every 6 hourly and while in the study group patients received Tramadol plus phenargan only when required for 24 hrs. The analgesic potency of 40 ml 0.25% bupivacaine was compared with the routine use analgesics (NSAIDs + Tramadol 50 mg plus Phenargan 25 mg) in the first 24 hrs. post operative period. The pain score was measured by using VAS score in the post operative period after 6 hrs. of surgery till 24 hrs. in the postoperative ward.

### Technique of Block:

Transversus abdominis block is given in the triangle of Petit. The landmarks for the petit triangle are: anteriorly posterior boarder of external oblique muscle, posteriorly anterior boarder of latissimus dorsi muscle and the base is formed by the upper boarder of iliac creast. The triangle is identified by palpating the iliac creast anterior to posterior, the posterior

boarder of external oblique and the anterior boarder of latissimus dorsi muscle is palpated. Then by using 4 inches long blunt tipped needle attached to the catheter double pop is appreciated. (19) First, one of the external oblique and the second of the internal oblique. The drug (0.25%) isobaric bupivacaine 20 ml. is injected in the plane between the internal oblique and the transverses abdominis muscle on each side.

Data analysis was done by using SPSS 17. For categorical variables cross tabulation is done and mean and standard deviation is calculated using t- test and for improvement in VAS score independent t test is applied for calculation of mean and standard deviation. P value <0.05 was considered significant.

## RESULTS

Sixty patients were enrolled for the study and data from all of them were analyzed. The two groups were comparable in terms of baseline demographic parameters as shown in the table I, table II and table III.

Group					
Age	TAP Block	Percentage	Without TAP Block	Percentage	Total
20-25	15	50	15	50	30
26-30	8	26.7	3	10.0	11
>30	7	23.3	12	40.0	19
Total	30	100.0	30	100.0	60

Table I: Age distribution of patients in both the groups.

Most of the patients belong to 20-25 age groups and majority of the patients were above 60 kgs as shown in table I and II. The mean of age, weight, BMI and the height were comparable in both the groups (Table III).

Group					
Weight in kilogram(kg)	TAP Block	Percentage	Without TAP Block	Percentage	Total
50-55	4	13.3	0	0	4
56-60	9	30.0	11	36.7	20
>60	17	56.7	19	63.3	36
	30	100.0	30	100.0	60

Table II: Weight distribution of the patients in both the groups.

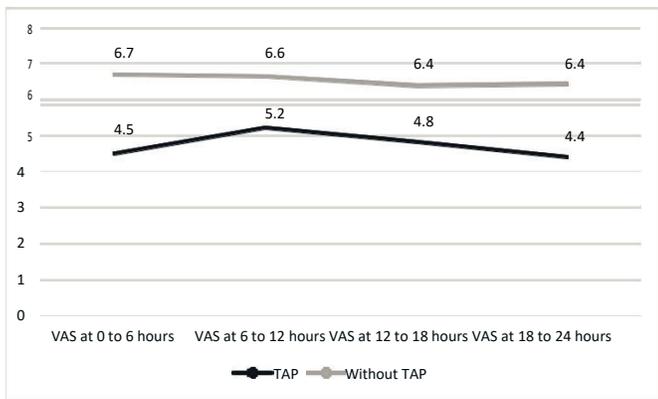
	TAP Block		Without TAP Block		T test	P value
	Mean	Standard Deviation	Mean	Standard Deviation		
Age	27.20	4.79	26.93	5.46	0.201	0.841
Weight	62.70	5.50	64.53	6.30	-1.2	0.235
BMI	26.73	2.34	27.54	2.77	-1.217	0.229
Height	1.53	0.03	1.53	0.02	0.11	0.913

Table III: Mean and standard deviation of age, weight, BMI and Height.

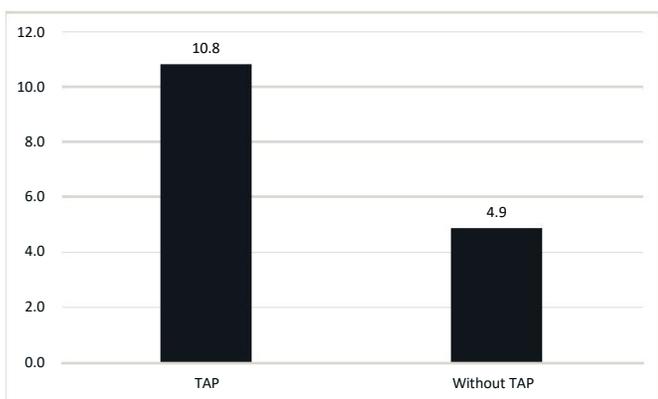
VAS Score in hours(hrs)	TAP Block		Without TAP Block		P value
	Mean	Standard Deviation	Mean	Standard Deviation	
0-6 hrs	4.53	0.78	6.73	0.69	<0.001
6-12hrs	5.23	1.14	6.63	0.61	<0.001
12-18hrs	4.80	0.76	6.40	0.56	<0.001
18-24hrs	4.40	0.67	6.43	0.57	<0.001

**Table No. IV: The mean VAS score of patients in both the groups.**

The mean VAS score of the patients receiving TAP block at 0-6 hrs. was 4.53 (SD±0.78), 6-12 hrs. was 5.25(SD ±1.14), 12-18 hrs. was 4.80(SD ±0.76) and at 18-24 hrs. was 4.40(SD ±0.67). Similarly, the mean VAS score of the patients who did not receive TAP block were 6.73(SD±0.69), 6.63(SD±0.61), 6.40(SD±0.56) and 6.43(SD±0.57) at 0-6 hrs, 6-12 hrs, 12-18hrs and 18-24 hrs. respectively. The mean VAS score of the patients who received TAP block is significantly less than that of the patients who did not receive TAP block with a p value of <0.001.

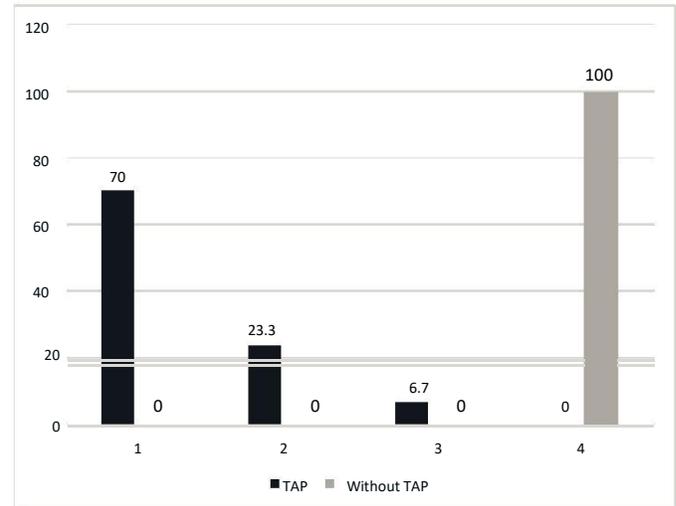


**Figure 1: Comparison of VAS score at 6 hrs interval in both the groups.**



**Figure 2: Mean time to first analgesic request in both the groups.**

The mean time to first analgesic request in group 1 was 10.8 hours (SD±2.95) and in group 2 was 4.9 hours (SD±0.68) with a p value of <0.001.



**Figure 3: Number of doses of analgesics taken in both the groups.**

In group 1, 70% of the patients received single dose of analgesics, 23.3% had double doses and 6.7% had three doses of analgesia. In group 2 all the patients received four doses of analgesics. The mean of total number of analgesia required in group 1 is 1.37±0.61 and in group 2 it is 4.0 which is statistically significant with a p value of <0.001.

## DISCUSSION

There has been a growing interest in the field of regional anesthesia for pain control as they reduce the dose of opioid analgesic<sup>5,6</sup>. As such transverses abdominis block is used for management of post-operative pain after various kind of abdominal

surgeries<sup>7,8,9,10,11</sup>.

In our study, the mean age of the patients in both the groups were comparable. The mean age of the patients in group 1 was 27.20(SD±4.97) and in group 2 it was 26.93(SD±5.46). Similarly, the weight of the patients in both the groups was also comparable. The mean weight of the patients in group 1 was 62.70(SD±5.50) and in group 2 it was 64.53(SD±6.30) with a p value of 0.235. BMI of the patients in group 1 was 26.73(SD±2.34) and BMI of the patients in group 2 was 27.54(SD±2.77) with a p value of 0.229 which is clinically comparable. The mean height of the patients in group 1 was 1.53(SD±0.03) and the mean height of the patient in group 2 was 1.53(SD±0.02) (p=0.913) which is comparable. Thus two groups were comparable demographically.

Intensity of pain was accessed by using VAS score. In the group who received TAP block additional analgesic was given on request when the VAS>4. In the group which did not receive

TAP block analgesic was given 6hrsly. The mean VAS score was significantly less in group 1 than in group 2 with a p value <0.001. This result is comparable to the study conducted by McDonnell et al (2007) where the mean VAS score was significantly less in patients who had TAP block with ropivacaine as compared to placebo in caesarean section ( $p < 0.05$ )<sup>12</sup>. This study is also comparable to the study conducted by Carney et al who also gave TAP block using ropivacaine in patients with abdominal hysterectomy ( $p < 0.05$ ). Similarly, our result is comparable to the study conducted by Eslamian et al.<sup>13</sup> and Tan et al.<sup>4</sup> who also had similar results. They evaluated efficacy of TAP block versus no block in patients undergoing cesarean delivery under general anesthesia. Patients in TAP group had lower VAS pain scores at rest and during coughing, utilized less PCA tramadol and had a longer time to ask for first analgesia, than the patients who did not receive block. In our study the mean time to first request of analgesia is significantly prolonged in group 1 (10.83 hrs.  $\pm 2.95$ ) as compared to group 2 (4.87 hrs.  $\pm 0.68$ ). Belavy et al. also concluded that the post operative analgesic efficacy after caesarean section was significantly high with patients receiving TAP block with bupivacaine than in patients without any block<sup>14,15</sup>. Niraj et al also concluded the significant analgesic benefit of TAP block with bupivacaine in post appendectomy patients ( $p < 0.01$ ). In group 1, 70% of the patients had single dose of rescue analgesia, 23.3 % of the patients had two doses of rescue analgesia and only 6.7% of the patients had 3 doses of rescue analgesia whereas in group 2 all the patients had 4 doses of analgesia. The mean of total number of analgesia required in group 1 is  $1.37 \pm 0.61$  and in group 2 it is 4.0 which is statistically significant with a p value of <0.001. This result is similar to that of McDonnell JG et al and Carney J et al who found that the total analgesic required was significantly less in patients with TAP block than in placebo<sup>7</sup>.

However, our results are incongruent with the observation of Costello et al who evaluated the efficacy of TAP block post caesarean section and Griffiths JD et al who evaluated the efficacy of TAP block in post-operative patients undergoing laparotomy with midline incision in gynecological malignancies<sup>15, 16</sup>. They found that there was no significant difference in the mean VAS score of patients receiving TAP block as compared to placebo. Peterson et al and Cochrane review failed to demonstrate any analgesic benefit of TAP block using local anesthetics as compared to placebo<sup>17,18</sup>.

## CONCLUSION

Our study clearly demonstrates the analgesic benefit of TAP block using 0.25% bupivacaine in caesarean section during the

post operative period. Reduced pain means early mobility, faster wound healing, helps in breast feeding and thus aids in effective mother child bonding. Further it reduces the need of opioid analgesic thereby preventing the side effects of opioid like drowsiness, nausea, vomiting, respiratory depression and urinary retention. TAP block gives promising results as post operative analgesic when used in combination with NSAIDs.

The limitations of the study are that it has limited number cases and analgesic effect is compared only for 24 hrs. TAP block is given by using the anatomical landmarks instead of using ultrasound guided block which would increase the efficacy of the block.

## REFERENCES

1. Hamilton T W, Athanassoglou V, Trivella M, Strickland LHH, Mellon S, Murray D, et al. Liposomal Bupivacaine Peripheral Nerve Block for the management of post operative pain. Cochrane Database of systematic reviews. 2016; 8: Art No: CD011476. DOI: 10:1002/14651858.CD011476-pub2.
2. McMarrow RC, Ni Mhuircheartaigh RJ, Ahmed KA, Aslani A, Ng SC, Conrick-Martin I, Dowling JJ, Gaffney A, Loughrey JP, McCaul CL. Comparison of transversus abdominis plane block vs spinal morphine for pain relief after Caesarean section. *Br J Anaesth.* 2011; 106(5):706-12.doi:10.1093/bja/aer061
3. Belavy D, Cowlishaw PJ, Howes M, Phillips F. Ultrasound-guided transversus abdominis plane block for analgesia after Caesarean delivery. *Br J Anaesth.* 2009; 103:726–30.
4. Tan TT, Teoh WH, Woo DC, Ocampo CE, Shah MK, Sia AT. A randomised trial of the analgesic efficacy of ultrasound-guided transversus abdominis plane block after caesarean delivery under general anesthesia. *Eur J Anaesthesiol.* 2012; 29:88–94.
5. 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; 54:529–35.
6. White PF. The changing role of non-opioid analgesic techniques in the management of postoperative pain. *Anesth Analg.* 2005; 101:S5–22.
7. 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; 106:186–91.
8. Niraj G, Searle A, Mathews M, Misra V, Baban M, Kiani S, et al. Analgesic efficacy of ultrasound-guided transversus

- abdominis plane block in patients undergoing open appendicectomy. *Br J Anaesth.* 2009; 103:601–5.
9. 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; 102:763–7.
  10. Baaj JM, Alsatli RA, Majaj HA, Babay ZA, Thallaj AK. Efficacy of ultrasound-guided transversus abdominis plane (TAP) block for postcesarean section delivery analgesia – A double-blind, placebo-controlled, randomized study. *Middle East J Anaesthesiol.* 2010; 20:821–6.
  11. Sriramkes B, Sahoo N, Panigrahi S. Analgesic efficacy of ultrasound guided transverse abdominis plane block following cesarean section. *Int J Perioper Ultrasound Appl Technol.* 2012; 1:5–8.
  12. 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; 104:193–7.
  13. Eslamian L, Jalili Z, Jamal A, Marsoosi V, Movafegh A. Transversus abdominis plane block reduces postoperative pain intensity and analgesic consumption in elective cesarean delivery under general anesthesia. *J Anesth.* 2012; 26:334–8.
  14. Belavy D, Cowlshaw PJ, Howes M, Phillips F. Ultrasound guided transverses Abdominis Plane Block for analgesia after caesarean section. *Br J Anaesth* 2009; 103:726-730.
  15. Costello JF, Moore AR, Weiczorek PM, Macarthur AJ, Balki M, Carvalho JC. The Transversus Abdominis Plane Block, when used as a part of multimodal regimen inclusive of intrathecal morphine, does not improve analgesia after caesarean delivery. *Reg Anaesth Pain Med.* 2009; 34:586-89.
  16. Griffiths JD, Middle JV, Barron FA, Grant SJ, Popham PA, Poyse CF. transeversus Abdominis Plane Block does not support additional benefit to multimodal analgesia in gyanecological cancer surgery. *Anaesth Analg.* 2010.111:797-801.
  17. Charlton S, Cyne AM, Middleton P, Griffiths JD. Peripheral Transversus Abdominis Plane (TAP) Blocks for analgesia after abdominal surgery. *Cochrane Database Syst Rev.* 2010; 12:CD007705.
  18. Johns N, O Neill S, Ventham NT, Barron F, Brady RR, Daniel T. Clinical Effectiveness of Transversus Abdominis Plane (TAP) block in abdominal surgery: a systematic review and meta-analysis. *Colorectal Dis* 2012; 14:635-42.