

## Analgesic Effect of Transversus Abdominis Plane (TAP) Block in Lower Abdominal Surgeries Like Appendectomy, Hernia Repair, Turp

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### Abstract

Purpose of this study is to relieve postoperative pain as effective pain management is now integral part of surgical management. Effective postoperative pain management has a humanitarian role with additional medical and economic benefits of rapid recovery. *Methods:* The study included 200 patients who are to undergo appendectomy, hernia, and TURP surgery at Punjab Institute of Medical Sciences (PIMS) Jalandhar from April, 2012 to March, 2013. Procedures include Cases (Group A) n= 100 Lower abdominal surgery patients with TAP Block and Controls (Group B) = 100 Lower abdominal surgery patients without TAP block. Patient was made to lie in supine position. Just posterior midaxillary line, cephalad to iliac crest, an epidural needle of 18 gauge was introduced. "Two pops" technique was used *Results:* Pain assessment was done using Visual analogue scale (VAS) and number of pain killer injections at 2, 4, 6, 12 & 24 hours. The block has number of advantages which include technical simplicity, high analgesic effectiveness, long duration of effect and minimal side effects (e.g., hypotension, motor blockade) in comparison to that associated neuroaxial analgesia. Overall, TAP block is relatively safe procedure with minimal complications. *Conclusions:* TAP is a new infiltration technique aimed at reducing post-operative pain. It may be a good alternative strategy for patients who are highly sensitive to opioids. We concluded that TAP is a good

analgesic regimen after lower abdominal surgeries like appendectomy, hernia and TURP.

**Keywords:** Transversus Abdominis Plane (TAP); Visual Analogue Scale (VAS) (Direct trocar insertion (DTI), Postoperative Pain.

### Introduction

The relief of postoperative pain is a subject which is receiving increasing attention in the past few years because effective pain control is essential for optimal care of surgical patients. Despite the advances many patients still experience considerable discomfort.

Effective pain management is now an integral part of modern surgical practice. Post operative pain management not only reduces patients suffering but can also reduce morbidity and facilitate rapid recovery & early discharge.

The arrest of sensory responses of nerve endings at the surgical site by injections of an anaesthetic at that site is called Infiltration Anaesthesia. The Transversus Abdominis Plane (TAP) block is a novel approach for blocking the abdominal wall neural efferents via the bilateral lumbar triangle of Petit. It is a new rapidly expanding regional anaesthesia technique that provides analgesia following abdominal surgery and became increasingly popular worldwide because of its relative simplicity & efficacy. It was first described by Dr Rafi in 2001 [1] & further developed & tested by McDonnell et al [2-5].

The TAP block is a blind technique performed through the triangle of Petit, identified by palpation. This technique has been used in lower abdominal surgeries like appendectomy, hernia repair, Cesarean section [2]. It has also found its use in prostatectomy,

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abdominal hysterectomy, laproscopic hernia repair & hysterectomy [6-8].

Our study evaluated the effect of TAP block on post operative analgesic requirements and patients comfort level evaluated by Visual Analogue Scale (VAS) in lower abdominal surgeries.

*Aims and Objectives*

- Amount of Analgesics to be given with and without TAP block in lower abdominal surgeries.
- VAS evaluation in patients with and without TAP block in lower abdominal surgeries.

**Materials and Methods**

Our study was a case control study undertaken in a tertiary care hospital. The participants were divided into two groups.

Cases (Group A) n =100: Lower abdominal surgery patients with TAP block

Controls (Group B) n =100: Lower abdominal surgery patients without TAP block.

*Inclusion Criteria*

1. Lower abdominal Surgeries
2. Patient without any H/O allergic reaction to the drug
3. Valid Consent from the patient
4. Age >18years & <60 years
5. Abdominal wall skin free from Infections.

*Exclusion Criteria*

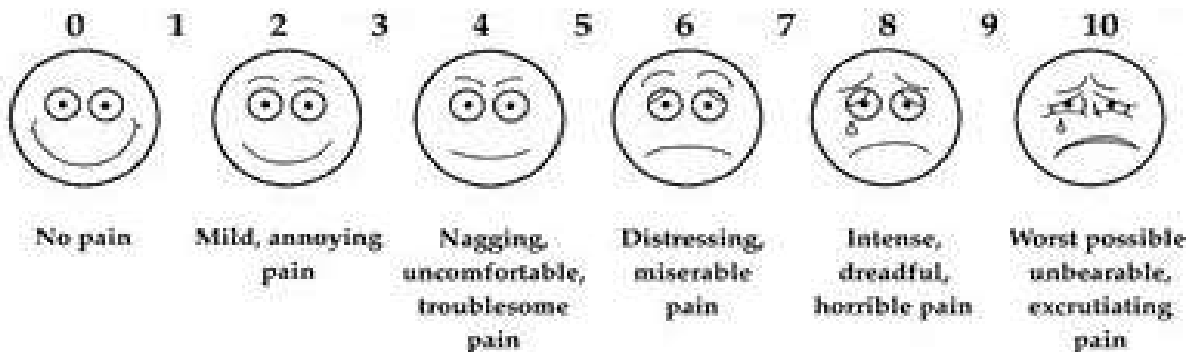
1. H/O intake of NSAIDS/ other analgesics.
2. Drug allergy or hypersensitivity reaction to Bupivacaine.
3. Patient mentally challenged or valid consent not given.
4. Age <18 Years & > 60 years.
5. Patients with deranged liver function tests, unconscious patient or those having any tumour or local pathology involving the area of block.

All the work up prior to surgery was done which included detailed history , clinical examination, abdominal ultrasonography, Haematological investigations, RFTs, LFTs, ECG, Viral markers and Pre-anaesthetic fitness.

*Block Technique & Assessment of Pain*

Patient was made to lie in supine position. Just post to midaxillary line, cephalad to iliac crest, an epidural needle of 18 gauge was introduced. "Two pops" Technique was used. The plane of thoraco abdominal nerves was approached as the nerve travel between the transverses abdominis & Internal Oblique Muscles. The first pop indicated penetration of fascia of External Oblique muscles and second pop indicated penetration of internal oblique muscles and entering the transverses abdominis fascial plane [1,2,4,6].

20ml of .25% bupivacaine solution was used for unilateral block and 40ml was used for bilateral block with 20ml on each side [2]. Pain after 2, 4,6,12 and 24 hours was assessed by VAS and was compared to those who had not received TAP Block. The assessment was also made by number of opioids &



NSAIDS Injection required [9-12]. Nausea & Vomiting was assessed depending upon the number of episodes and the need for anti emetic medication.

**Results & Observations**

The Pain assessment was done using Visual

Analogue scale (VAS) and number of pain killer injections at 2,4,6,12 & 24 hours.

Following were our findings and observations  
Pain assessment was done using Visual analogue

**Table 1:** VAS SCORE AT 2,4,6,12 & 24 HOURS

Parameter	Group A	Group B	P Value
Mean Visual Analogue Scale at 2 Hours	1.50	1.60	0.601
Mean Visual Analogue Scale at 4 Hours	1.64	1.98	0.018
Mean Visual Analogue Scale at 6 Hours	1.60	2.00	0.003
Mean Visual Analogue Scale at 12 Hours	1.61	1.67	0.701
Mean Visual Analogue Scale at 24 Hours	1.30	1.45	0.187

**Table 2:** Number of Injections & Pain Killer Usage AT 2,4,6,12 & 24 HOURS

Variables	Group A	Mean Drug Usage (mg)	Group B	Mean Drug Usage (mg)	Test of significance	P Value
<b>At 2 Hours</b>						
No Injection	85		83		Chi Square Test	0.81
Diclofenac	9	6.4	11	7.8		
Tramadol	6	6	6	6		
Total	100		100			
<b>At 4 Hours</b>						
No Injection	71		51		Chi Square Test	0.001
Diclofenac	25	17.92	42	30.114		
Tramadol	4	4	7	7		
Total	100		100			
<b>At 6 Hours</b>						
No Injection	62		51		Chi Square Test	0.002
Diclofenac	37	26.52	34	24.378		
Tramadol	1	1	15	15		
Total	100		100			
<b>At 12 Hours</b>						
No Injection	49		43		Chi Square Test	0.089
Diclofenac	49	35.13	45	32.26		
Tramadol	2	2	12	12		
Total	100		100			
<b>At 24 Hours</b>						
No Injection	60		58		Chi Square Test	0.075
Diclofenac	34	24.37	32	22.94		
Tramadol	6	6	10	10		
Total						

**Table 3:** Incidence of Nausea & Vomiting

Variable	Group A	Group B	Test of Significance	P value
Nausea present	2	2	Chi Square test	.689
Vomiting present	3	2		.651

scale (VAS) and number of pain killer injections at 2,4,6,12 & 24 hours. The block has number of advantages which include technical simplicity, high analgesic effectiveness, long duration of effect and minimal side effects (e.g., hypotension, motor blockade) in comparison to that associated neuroaxial analgesia. Overall, TAP block is relatively safe procedure with minimal complications.

**Discussion**

The benefits of postoperative analgesia are clear and include a reduction in postoperative stress response [13], reduction in postoperative morbidity [14], improved surgical outcome [15] and improved patient comfort [16]. Effective pain control also facilitates rehabilitation and accelerates recovery from surgery [14,16].

The transversus abdominis plane thus provides a space into which local anaesthetic can be deposited to achieve myocutaneous sensory blockade. The lumbar triangle of Petit offers an easily identifiable, fixed & palpable landmark & is located dorsal to mid-axillary line [17].

In our study, we evaluated the analgesic efficacy of TAP block using 25% bupivacaine in lower abdominal surgeries. We found that there was a significant decrease in VAS scores and analgesic requirements at 4 and 6 hours. Although there was decrease in VAS scores and usage of analgesics at 2,12 and 24 hours, they were not statistically significant.

The mean requirement of Injection Diclofenac in patients with TAP block was 90.06mg/24hrs & that of control group patients was 114.18mg/24hrs. Similarly mean requirement of injection tramadol was reduced to 15mg/24 hour in patients with TAP block as compared to 50mg/24hour in patients without TAP block.

Our results show that TAP block is an effective technique and our results were in concordance to the studies done by McDonnell et al [2], Carney et al [7] and also by Niraj et al, Balavy et al and Costello et al [18-20].

It was seen that TAP block offered a new alternative to epidural analgesia. The TAP block was easy to perform & provided reliable and effective analgesia in this study. Also the unwanted motor blockade often accompanied by an effective epidural technique was not found in TAP block. Also people with coagulation disorders that preclude the use of central neuraxial block might be amenable to an efficient alternative for postoperative pain treatment with the TAP block. Ultrasound guidance reduces the block time & also accidental puncture of internal organs reported with TAP block [21] may be avoided.

There are some limitations to our study. The blocks in this study are liable to peritoneal puncture though we did not report any peritoneal puncture. Secondly measurement of sensory blockade in the post operative period was not performed and would have contributed to our understanding of the potential duration of analgesia & recession of sensory blockade.

TAP block is gaining popularity worldwide & some newer methods are being reported. Laproscopic approach is described by Chestwood et al in 2011 where the injection area is observed with an intra-abdominal laproscopic camera [22]. Such direct visualisation may help to avoid intraperitoneal injection, one of the major risks of the TAP block.

There have been case reports of complications due to blind technique like liver laceration [21], bowel haematoma, transient femoral nerve palsy, pain [23], anterior abdominal wall necrosis [24]. So the actual effectiveness using TAP block done using landmark method cannot be commented.

## Conclusion

To summarise this block has a number of advantages which include technical simplicity, high analgesic effectiveness, long duration effect & minimal side effects in comparison to that associated with neuraxial analgesia.

Multiple studies have demonstrated its superiority over the standard medical therapy for postoperative pain control. It may be a good alternative strategy for patients who are highly sensitive to opioids. Ultrasound guided technique has now become the standard approach for TAP block. Thus TAP block holds considerable promise as part of a multimodal analgesic regimen after lower abdominal surgeries.

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