

Original Research Article

## **Transversus Abdominis Plane block using L-Bupivacaine for postoperative analgesia in infraumbilical surgeries- A comparative study**

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**Abstract:** Patients who undergo infraumbilical surgeries may feel significant postoperative pain after surgery. Recently the transversus abdominis plane (TAP) block is ideal and widely used approach to provide adequate post-operative analgesia to the anterior abdominal wall. We evaluated the analgesic efficacy of the transversus abdominis plane block using L- bupivacaine in patients undergoing infraumbilical surgery. Sixty patients posted for elective infraumbilical surgeries were randomized to undergo TAP block with L-bupivacaine (n=30) versus placebo (n=30). All patients received spinal subarachnoid block. After completion of surgery bilateral TAP block (ultrasound guided) was performed using 1 mg/kg L-bupivacaine (to a maximal dose of 100 mg) or saline on each side. Each patient in both groups was assessed postoperatively by a blinded investigator in the postanesthesia care unit at 2, 4, 6, 12, 24, 36, 48 h postoperatively. The transversus abdominis plane block using L-bupivacaine decreased the postoperative visual analog scale pain scores in comparison to placebo block. The incidence of sedation was less in patients undergoing transversus abdominis plane block. Amount of rescue analgesia required and incidence of postoperative nausea and vomiting was found less with transversus abdominis plane block. Post operative transversus abdominis plane block decreased post-operative tramadol requirements and provided effective postoperative analgesia.

**Keywords:** infraumbilical surgery, perioperative analgesia, and transversus abdominis plane block.

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### **INTRODUCTION**

Postoperative pain can produce a range of acute and chronic psychological effects which must be prevented at the earliest. So optimization of postoperative analgesia through different regional blocks and pharmacological agents can decrease complications and facilitate recovery [1]. Reduction of pain in post-operative period is important to provide early ambulation, decrease the chance of paralytic ileus, and increase enteral motility, decrease hospital stay. Inadequate postoperative pain relief in infraumbilical surgery can negatively impact ambulation thereby increasing chances of DVT and aggravating other co morbidities [2]. The efficiency of transversus abdominis plane block in several abdominal surgeries has been confirmed [3, 4]. Transversus abdominis plane block is ideal for postoperative analgesia in patients undergoing lower abdominal surgery under subarachnoid block [5-7]. The aim of the present study was to find out the efficacy of levobupivacaine in transversus abdominis plane block for providing postoperative analgesia after infraumbilical surgery under spinal subarachnoid bupivacaine.

### **MATERIALS AND METHODS**

After approval of the institutional ethics committees, the study was conducted from March 2015 to Dec 2015 at SCB Medical College, Cuttack, and Odisha. Informed consent was given by all patients with ASA status I and II of age 30- 70 years patients scheduled for infra umbilical surgeries under spinal subarachnoid block with bupivacaine, were included in the study. Patient with history of cardiovascular diseases, drug allergy and body mass index more than 30 were not included in this study.

60 patients were divided randomly into two groups. All patients received inj. Ranitidine 50 mg IV and Inj. Metoclopramide 0.15 mg / kg. Blood pressure, heart rate, ECG and oxygen saturation were monitored. Subarachnoid block was given using a 25G Quincke type spinal needle in the L3-L4 intervertebral space in midline with 3.5 mL of 0.5% bupivacaine heavy. After the surgery was over and dressing kept, all patients in the study group received bilateral TAP blocks with 1mg/kg of 0.25% Levobupivacaine(added with distilled water to

make it 10 ml), on each side. The control group received 10 ml of distilled water on each side.

**PERFORMING THE BLOCK**

Transversus abdominis plane block done by help of ultrasound as explained by Borglum *et al.*; [8] as new four point approach using a 1.5-inch, 22-gauge needle. After careful aspiration 1 mL of local anaesthetic was injected to confirm placement of needle. 0.25% Levobupivacaine was administered in a dose of 1 mg/kg with close observation for any signs of toxicity. The same procedure was followed in the other side also. The control group received 10 ml of distilled water on each side.

Rescue analgesic was given as inj. Tramadol 100 mg IV when there was VAS score more than 4. Rescue antiemetic was given as inj. Ondansetron 4 mg IV if there was complain of nausea or vomiting.

The patients were assessed in the post-operative recovery room and later in the post-operative ward at 6,

12, 24 and 48 hours after infra umbilical surgery. Pain, requirement of rescue analgesics, nausea and vomiting and sedation were monitored. All patients were asked to assess pain and post-operative nausea and vomiting using the following scales and scores.

**SCALES AND SCORES: [9]**

1. Visual Analog Scale (VAS): 10 cm line in which 0=no pain and 10=worst pain
2. Categorical pain scoring system: no pain=0; mild pain=1; moderate pain=2; severe pain=3.
3. Categorical nausea scoring system: 0=none; 1=mild; 2=moderate; 3=severe.

**OBSERVATIONS AND ANALYSIS**

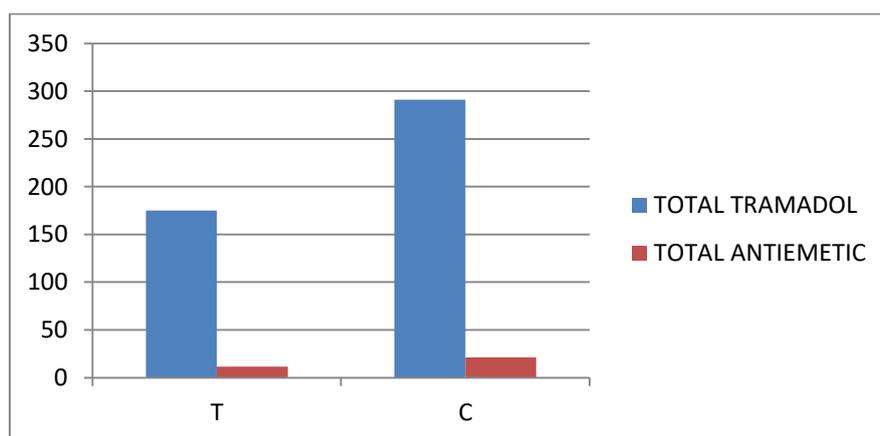
The study was conducted in a total of 60 patients. 30 were enrolled as study subjects and 30 were enrolled as controls. The data was recorded in a master chart and analysis was completed using the SPSS version 21 software.

**Table 1: Requirement of analgesics and antiemetics**

Parameter	Study group(T)	Control group(C)	P Value
Total tramadol requirement (mg)	170.00±22.2	290.00±21.1	0.001
Mean time to request first dose of tramadol (hrs)	10.9±3.22	3.45±0.45	0.001
Total antiemetic (Ondansetron) requirement (mg)	11.53±2.87	21.28±2.85	0.001

The total amount of rescue analgesic requirement was measured as total milligrams of tramadol (rescue analgesic) received. Mean values of total tramadol required were 170 mg for study group and

290 mg for control group (table 1) (fig 1). The difference was statistically significant (p value. 001) when analyzed using independent samples t test (table 1).



**Fig 1: Requirement of analgesics and antiemetics (S- Study group, C- control group)**

Average time taken for administration of the first dose of rescue analgesic was 10.9 hours in the study group and 3.45 hours in the other group (Table 1). This difference was also found to be statistically significant (P

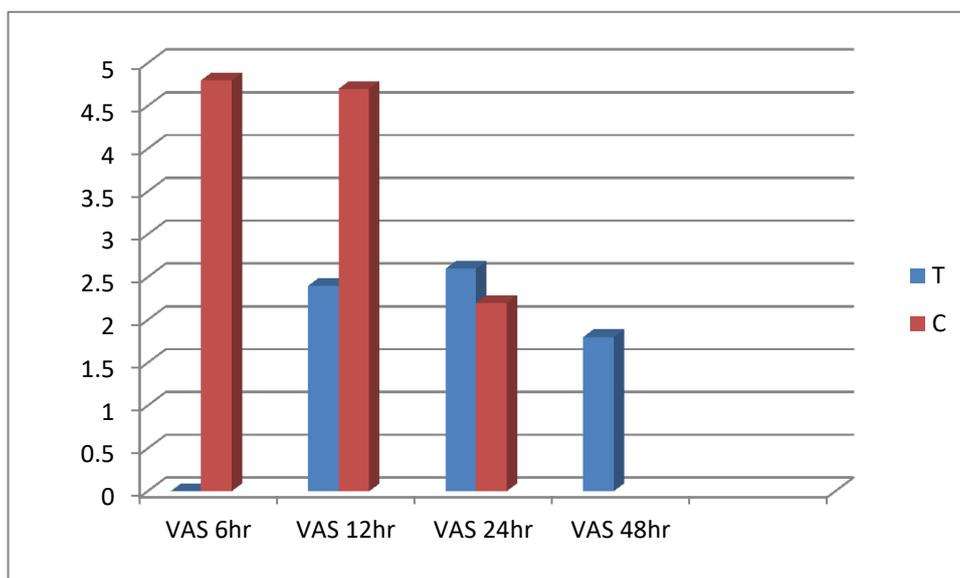
< 0.001) (Table 1). Average amount of antiemetic (ondansetron) was also found to be significantly decreased in the study group (Table 1; figure1)

**Table 2: The VAS scores at different time intervals**

Parameter	Group	No.	Mean	P value (2 tailed)
VAS 6 hr	Study	30	0.0	0.0001
	Control	30	4.9	
VAS 12 hr	Study	30	2.4	0.0001
	Control	30	4.8	
VAS 24 hr	Study	30	2.6	0.0001
	Control	30	4.7	
VAS 48 hr	Study	30	1.8	0.009
	Control	30	2.2	
Sedation Score 6 hr	Study	30	1.1	0.001
	Control	30	2.4	

The VAS scores at different time interval was compared using independent t test. There was a

significant decrease in the scores in the study group. (tables2, fig 2).



**Fig 2: Post-operative Visual Analogue Scale (VAS) score comparison (T- study group, C- control group)**

Sedation scores at 6 hours were also compared. Significant difference was found between the two groups (table 2).

**DISCUSSION**

This study concluded that transversus abdominis plane block after any infraumbilical surgery under subarachnoid anaesthesia has shown reduced 48 hour rescue analgesic requirements and VAS scores. It also delayed the time to request for rescue analgesia and decreased postoperative nausea and vomiting.

A multimodal analgesic regimen will result in excellent analgesia, and helps to minimize the side effects of single drug administration. No optimum regimen is available, and different techniques continue to evolve. Intrathecal opioids along with single shot subarachnoid block, Patient controlled epidural or intravenous opioid analgesic regimens has been found to provide effective analgesia. But these are usually associated with untoward effects like nausea, vomiting,

pruritus, respiratory depression and reduce overall patient satisfaction.

This study demonstrated that total postoperative rescue analgesic consumption was significantly reduced in the study group. The incidence of nausea and vomiting and hence the requirement of antiemetic was significantly reduced in the patients who received the block. This may be secondary to the tramadol sparing effect of the block.

According to sharkey *et al.*; [10] transversus abdominis plane block significantly improved the quality of postoperative analgesia and reduced total opioid requirement and thereby reducing opioid related side effects in women undergoing caesarean delivery without intrathecal morphine. Bhattacharjee *et al.*; [11] concluded that preincisional transversus abdominis plane block decreased intraoperative fentanyl requirements and provide effective postoperative analgesia. Sharma *et al.*; [12] also found similar result after abdominal surgeries.

Mankikar *et al.*; [13] studied ultrasound guided transversus abdominis plane block using ropivacaine and found that there was reduced dose of analgesia requirement. Time for injection of first rescue analgesia in study group was prolonged from 4.1 hr to 9.53 hr which was similar to our study.

## CONCLUSION

This study was conducted to find out efficacy of transversus abdominis plane block in providing prolonged post-operative analgesia after infraumbilical surgeries under subarachnoid block. It reduced the dose of rescue analgesia requirement thus reducing the incidence of post-operative nausea and vomiting and antiemetic requirement.

Transversus abdominis plane block also reduced the incidence and level of sedation postoperatively. Thus, transversus abdominis plane block can be reliably used for postoperative pain relief after infraumbilical surgeries under subarachnoid block.

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