

Original Article**Patient Satisfaction of Transversus Abdominis Plane (TAP) block in Total Abdominal Hysterectomy**

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Abstract

Background: Transversus Abdominis Plane (TAP) block is a regional anaesthetic technique which is used for post-operative pain management. TAP blocks can be performed in various approaches. Two important approaches are ultrasound-guided lateral and posterior approaches.

Objective: Aim of the study is to compare presence of complications and patient satisfaction level between lateral and posterior approaches of ultrasound-guided TAP block after total abdominal hysterectomy under subarachnoid anesthesia

Methods: This randomized clinical trial was carried out in the Department of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU, Dhaka. A total of 90 patients were scheduled for elective total abdominal hysterectomy and assigned into two equal groups, group A and group B received ultrasound guided TAP block in lateral approach and in posterior approach respectively. Then patients were observed for postoperative complications

after 1 hour, 2 hours, 4 hours, 6 hours, 12 hours and 24 hours of TAP block, patient's overall satisfaction regarding postoperative analgesia. Statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-22).

Results: The mean patient's satisfaction about post operative analgesia, the differences were statistically significant ($p < 0.05$). The difference of postoperative complications like nausea, vomiting and sedation were statistically significant ($p < 0.05$) between two groups.

Conclusion: TAP block in posterior approach provided considerably good patient satisfaction and less complications in post operative first 24 hours than lateral approach after total abdominal hysterectomy.

Keywords: Post operative analgesia, TAP block, VAS score, Total Abdominal Hysterectomy.

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Introduction

Hysterectomy is one of the common surgical procedures leading to severe postoperative pain in women^{1,2}. Poor pain control after hysterectomy can be associated with post operative hemodynamic changes and other complications. Ultimately that causes prolonged hospital stay and it also has an impact on psychological changes, quality of life, and patient satisfaction³. Moreover, good post operative analgesia can prevent the development of chronic pain after hysterectomy². Transversus Abdominis Plane (TAP) block is a peripheral nerve block technique that blocks the anterior division of T₆ to the L₁ spinal nerve, supplying the anterolateral abdominal wall, which carries pain sensation after abdominal incisions⁴. These nerves runs into the fascial plane between the internal oblique and transversus abdominis muscles⁵. TAP block can provide postoperative analgesia after low abdominal surgery. In this technique, local anesthetic is administered into the neurovascular plane between the internal oblique and transversus muscles by ultrasound guidance. Out of several techniques, lateral TAP and posterior TAP block is popular. When local anaesthetic

injection is administered along mid axillary line is called lateral TAP block and if in lumbar triangle of petit called posterior TAP block⁶. Since the first description of the transversus abdominis plane (TAP) block in 2007⁷, many studies have reported that TAP block is a useful strategy to manage postoperative pain for patients undergoing lower abdominal surgery, including hysterectomy^{8,9,10}. TAP block is an effective analgesic for women who underwent total abdominal hysterectomy (TAH)². It can reduce post operative pain on movement after TAH and reduce post operative complications⁶. It also can effectively use as a part of multimodal analgesia in patients undergoing total abdominal hysterectomy. Earlier, TAP block is performed prior to surgical incision for hysterectomy, and they found that the TAP block with Ropivacaine reduced postoperative VAS scores at 6, 36, and 48 h and total morphine requirements in the first 48 postoperative hours were also reduced^{11,12}. TAP block delivers a superior analgesic effect with less post operative complications with good quality of recovery scores in patients undergoing total abdominal hysterectomy¹³.

After the abdominal hysterectomy, a well-planned analgesia plan is needed to provide early mobilization, shorten post-anesthetic care unit, hospital stay, and to ensure adequate patient comfort. Reducing post operative complications and hospital stay can lead to good patient satisfaction. Considering the mentioned facts and figure, the present study was aimed to evaluate post operative complications and overall patient satisfaction between two techniques of transversus abdominis plane block in total abdominal hysterectomy

Materials and Methods

This randomized clinical trial study was done in 90 patients who underwent elective total abdominal hysterectomy under subarachnoid block in the Department of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU, Dhaka. Inclusion criteria was patients scheduled for total abdominal hysterectomy with subarachnoid block, total abdominal hysterectomy done by pfannensteil incision, aged 30 - 50 years old and ASA physical status I and II were enrolled in this study. Infection on the site of block, psychological disorder, requiring general anaesthesia, coagulopathy, neuropathic pain, addiction to any substance, patient under treatment with anti-depressants and allergic to local anesthetic agent were excluded from the study.

Patients were randomly assigned into two equal groups (45 for each group) by randomly selecting their sealed opaque envelopes. The patients were fasting for 8 hours before surgery. Immediately after operation, the Group -A received ultrasound guided TAP in lateral approach. The Group- B in the same period received ultrasound guided TAP in posterior approach. In both the group, the patients were receiving 20ml of 0.25% plain Bupivacaine in each side.

At the day of surgery, patients were received into operation theatre. The baseline parameters were measured, an IV channel was opened and preloading was done with the Hartman's solution of about 500ml. The patients were anaesthetized with help of subarachnoid block. In sitting position on the table, lower back of the patients was disinfected with the 10% povidone iodine and the skin and the needle track between L₃ - L₄ was anaesthetized with hypodermic needle. Then subarachnoid block was performed with 25G Quincke spinal needle using 0.5% Bupivacaine heavy (0.3mg/kg) in both the groups (group-A and group-B). The monitoring of the patient was performed during operation and was continued in the postoperative period. Immediately after completion of surgery, the target site was identified and disinfected with povidone iodine. Then with the guidance of Ultrasound with high frequency (6-8MHz) linear ultrasound probe, the three muscle layer of abdominal wall was identified and needle was introduced. After aspiration, TAP block was performed with the help of 21G 100mm needle using 20 ml of 0.25% plain Bupivacaine solution bilaterally and the solution was injected with intermittent aspiration test to prevent intravascular injection (first 2ml to test easy flow and hypersensitivity). Thereafter, the needle was withdrawn and sterile dressing was placed. In group - A, block was performed in lateral approach where the patient was in supine position. Here ultrasound scanning was done along mid axillary line and needle was introduced in a point between costal margin and iliac spine in mid axillary line. In group B, block was performed in posterior approach, where the patient was turn to the semi-lateral position. A high frequency (6-8 MHz) linear probe was placed along the posterior axillary line and after finding the posterior part of TAP, 20ml of 0.25% Bupivacaine was injected in the posterior junction of the transversus abdominis plane through triangle of petit on both sides.

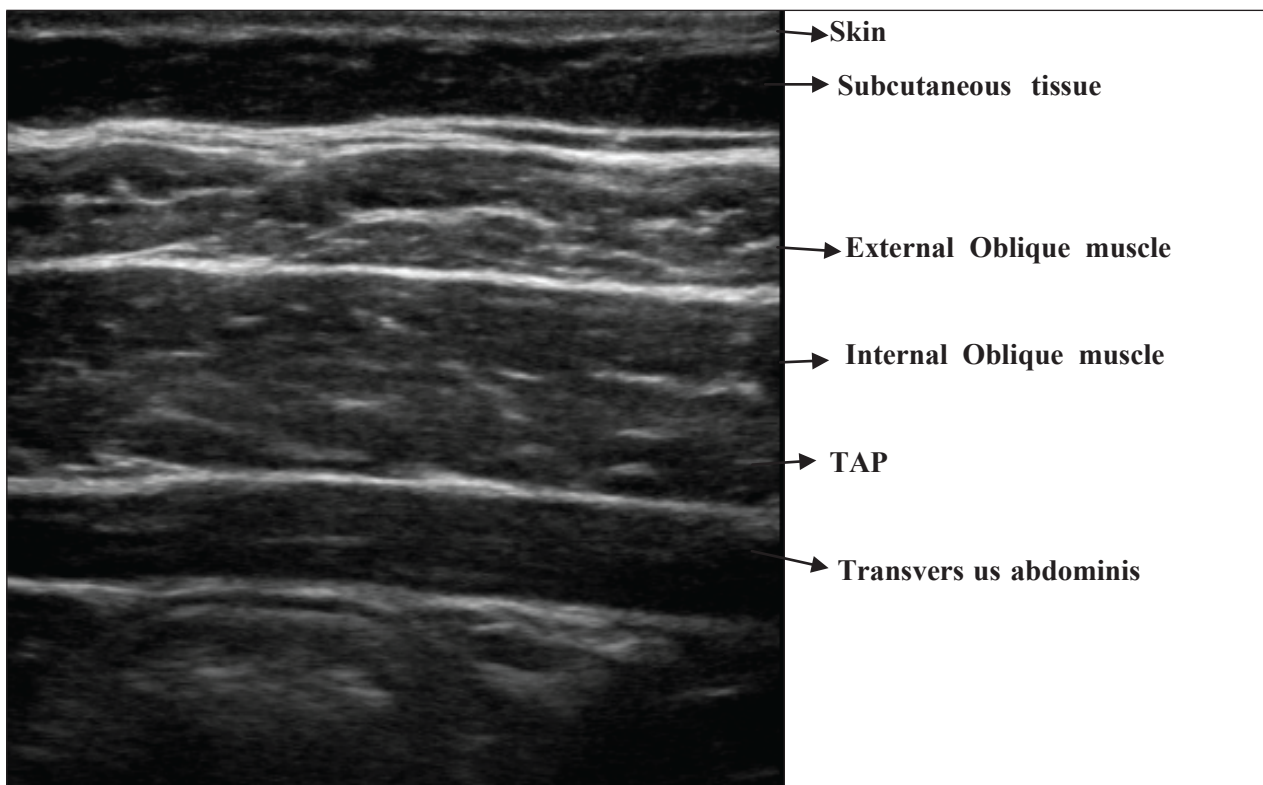


Figure 1: Ultrasound anatomy of TAP block

In the postoperative room, rescue analgesia may or may not be required. If required, it was maintained in both groups with intravenous Inj. morphine through patient controlled analgesia (PCA) device. The PCA device was programmed in the following order-Initial loading dose infusion of (60 mcg/kg) and preset dose of 20 mcg /kg per demand with lockout interval of 10 minutes and 1 hour dose limit 4mg. The PCA device was designed only to reach the endpoint of consumption during the first 24 hours after surgery. Intravenous Ondansetron 4-8 mg was given when required.

All patients was taken into Post Anesthesia Care Unit (PACU) and observed after 1, 2, 4, 6, 12 and 24 postoperative hour. The vital signs were measured. Patient’s satisfaction regarding postoperative analgesia was measured likert scale in which there is 5 parameter ‘Very unsatisfied’, ‘Unsatisfied,’ ‘Neutral,’ ‘satisfied’, ‘very satisfied’.

The study outcomes were recorded 1, 2, 4, 6, 12, 24 hours after TAP block. The patients were also be

observed during study period for presence of any complication like bradycardia, tachycardia (HR less than or more than 20% of preoperative level respectively on two consecutive readings), hypotension and hypertension (MBP less than or more than 20% of preoperative level respectively on two consecutive readings), sedation, nausea, vomiting.



Figure 2: Site of Lateral TAP block along mid axillary line



Figure 3: Site of posterior TAP block, triangle of petit

Statistical analysis:

A statistical analysis was carried out by using the Statistical Package for Social Sciences version 22.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Qualitative variables of this study were expressed as percentage. Quantitative variables were expressed as mean±standard deviation. Student t-test was used to compare continuous variables like mean arterial pressure (MAP), heart rate (HR), at different interval. The results were presented in tables, figures, and diagrams etc. A “p” value <0.05 was considered as significant.

Results

The mean age was found 45.58±3.09 years and 45.24±3.28 years in group A and group B respectively. The mean weight was 60.51±4.63 kg in group A and 59.49±5.57 kg in group B. The mean age and weight were not statistically significant (p>0.05) between two groups.

Table I: Distribution of the study patients by presence of postoperative complication (n= 90)

Complications	Group A (n=45)	Group B (n=45)	P value
	n (%)	n (%)	
Hypotension	1(2.2%)	0(0.0%)	0.315 ^{ns}
PONV	18(40.0%)	6(13.3%)	0.004 ^s
Sedation	25(55.6%)	10(22.2%)	0.001 ^s

s = significant, ns = not significant,

Statistical analysis was done by Chi-square test

Table II: Distribution of the study patients by patient’s satisfaction regarding analgesia (n= 90)

Satisfaction	Group A (n=45)	Group B (n=45)	P value
	n(%)	n(%)	
Unsatisfied	8(17.8%)	3(6.7)	
Neutral	25(55.6%)	15(33.3)	0.008 ^s
Satisfied	12(26.7)	24(53.3%)	
Very satisfied	0(0.0%)	3(6.7%)	

s = significant, ns = not significant,

Statistical analysis was done by Chi-square test

Discussion

Postoperative pain management is necessary to reduce postoperative complications, morbidity and mortality. Several study found TAP block is very effective in the management of postoperative pain after total abdominal hysterectomy. In early post operative period following total abdominal hysterectomy patient may develop several complications like sedation, respiratory depression, nausea and vomiting and patient satisfaction also depends on presence of number and severity of complications.

In this study there was some block or local anaesthetic related and some are opioids related. This study showed

no incidence of respiratory depression local anesthetic toxicity, bradycardia, hemorrhage, pruritus within 24 hours of TAP blocks in both groups of patient. Block failure found two cases in patient's having posterior TAP, but none in lateral TAP patients ($p>0.05$).

For posterior TAP patient needed to remain in semi lateral posture which was sometimes difficult for the patients. If proper positioning is not ensured, there may be difficult to identify posterior TAP by ultrasound, so there might chance of block failure. Another cause was in few cases, due to edematous and distorted anatomy sometimes layers of muscles were difficult to identify in posterior TAP.

Results of this study also showed, morphine related side effects was evident in both groups of patients, among them sedation and postoperative nausea-vomiting was common. Morphine has side effect like sedation, nausea, vomiting. So the group of patient consumed more Morphine, they had more incidence of Morphine related side effect like sedation, nausea, vomiting etc. The patients of posterior TAP blocks had relatively less Morphine than the lateral TAP block patients. So, sedation and postoperative nausea-vomiting was more common in lateral TAP than the posterior TAP and the differences were statistically significant ($p<0.05$) between two groups. Abdallah et al.^{6,7} study showed the incidence of postoperative nausea and vomiting is similar between the TAP block and the control group for both the posterior and the lateral techniques at 24 and 48 h. The incidence of pruritus in the lateral TAP block technique was increased at 24 h compared with control, but there was no difference at 48 h. There were no data on the incidence of pruritus for the posterior technique. The incidence of sedation was reduced at 24 hours and at 48 h compared with the control group when the posterior TAP block technique was performed; but there was no difference from control at 24 h with the lateral technique. Cause of this may be, both posterior and lateral TAP patient were sensitive to Morphine and nausea, vomiting occurs similarly in both type of TAP. But posterior TAP gives prolonged analgesia so in late postoperative period less amount of Morphine required. So there are fewer incidences of sedation and pruritus in posterior TAP patients. In the

current study there was very less incidence of sedation in late part of postoperative period.

In this study showed that patient's satisfaction regarding post operative analgesia after 24 hours of TAP was higher in the patients having posterior TAP block. More percentage of patients was satisfied in posterior TAP block group than lateral TAP block. The patients had more analgesia and less nausea, vomiting got more comfort and they were more satisfied, which is consistent with Faiz et al.¹⁴ study, they also found patients' satisfaction was significantly ($p<0.05$) higher in the posterior group than patients having lateral TAP block.

The present study findings suggested that TAP block in posterior approach provided effective and longer duration analgesia than lateral TAP block and patient's satisfaction regarding was also better. Several possible explanations may account for these findings. Firstly, injection in posterior area of TAP probably results in the blockade of lateral cutaneous branches of thoracolumbar nerves before branching or anastomosis^{8,9,15,16}. Secondly, the posterior approach and not the lateral approach spreads the local anesthetic regionally and in a retrograde fashion in the paravertebral space covering from T₄ to L₁ within 4 hours after injection and potentially blocks a few degrees along the thoracolumbar sympathetic system¹⁷. Evidence suggests that due to the role of sympathetic nervous system in pain immediately after surgery, probably this is the reason for the posterior approach to achieve faster and longer analgesic effect. Finally, the posterior TAP block injection probably causes the formation of a depot or focus of local anesthetic in the neurofascial TAP plane. This depot of local anesthetic probably also justify the better effect of the posterior approach¹⁸.

Conclusion

TAP block in posterior approach provided considerably good patient satisfaction regarding post operative analgesia, good comfort and less complication in post-operative first 24 hours than lateral approach after total abdominal hysterectomy.

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