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Research Article

Efficacy of Ultrasound Guided Continuous Transverse Abdominis Plane Block for Lower Abdominal Surgeries

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ABSTRACT

Introduction: The effect of a single transverse abdominis plane(TAP) block is not durable, and its analgesic efficacy lasts less than 24 hr. Thus, continuous transverse abdominis plane block by placing the catheter into the transverse abdominal plane and infusing local anaesthetic drugs continuously or intermittently through the catheter were used. This study evaluates the efficacy of ultrasound guided continuous TAP block in comparison with conventional TAP block for lower abdominal surgeries. **Material and methods**: There were 60 patients in the study, allocated to continuous TAP and control groups. parameters measured were pain scores on a visual analog scale (VAS) at various time interval. patients satisfaction were recorded in continuous TAP block group along with its complications related to the block. **Results**: Preoperative pain score was 1 for 2 patients of continuous TAP group and 6 patients of conventional block group. Preoperative pain score was 2 for 13 patients of continuous TAP group and11 patients of conventional block group. Preoperative pain score was 3 for 15 patients of continuous TAP group and 13 patients of conventional block group. **Conclusion**: The anatomical approach of Continuous TAP block is also very safe and reasonably effective. Ultrasound-guided Continuous TAP block reduced postoperative rest and movement pain and analgesic requirements after lower abdominal surgeries and was more effective than conventional block.

Key Words: *postoperative pain, transverse abdominis plane, ultrasound, continuous, conventional.*

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INTRODUCTION

Since the times, pain has remained the most significant issue making patients to seek medical consultation. In post-operative period, potent analgesia is required not only to make patients to bear the surgical stress but also it helps in early ambulation and thereby limits many complications. There has been an everlasting concern among anaesthetist's to provide adequate relief for post-operative pain especially in immediate post-operativeperiod.Traditional pain management with opioids increases the incidence of side effects such as excessive sedation and postoperative nausea and vomiting (PONV) [1-4].

The transverse abdominis plane (TAP) block, a newer regional nerve blockade, has been used as part of a multimodal strategy to optimise postoperative pain control[3-4]. However, the effect of a single TAP block is not durable, and its analgesic efficacy lasts less than 24h [5-6]. Thus, continuous TAP block by placing the catheter into the TAP and infusing local anaesthetic drugs continuously or intermittently through the catheter were used[7-10]. .Hence the present study is designed to investigate the efficacy of ultrasound guided continuous TAP block for lower abdominal surgeries.

Material and methods

60 patients were included in this study after proper permission taken from institutional ethical committee. Study carried out after applying inclusion and exclusion criteria and after taking written valid informed consent. Randomisation of 60 patients was performed by alternating patients to either the continuous TAP group (group A; N =30 received GA with continuous TAP block)or control group(group B; N=30 received GA with conventional TAP block).

General anaesthesia (GA) was standardised in both groups using Premedication -Ondansetron 0.08 mg/kg, Glycopyrrolate 0.004 mg/kg, Midazolam 0.02 mg/kg, Nalbuphine 0.2mg/kg ;Induction-Propofol2mg/kg ,Succinylcholine 2 mg/kg Intubation-With oral endotracheal tube (cuffed) and connected to Bain‘s circuit.Maintenance – 40%O2+60%N2O + 0.4% Isoflurane + vecuronium 0.1mg/kg with intermittent positive pressure ventilation using Bain‘s circuit. After procedure before extubation ultrasound guided(USG) continuous TAP block was given to group A patients . In group B conventional TAP block is given.

The technique used was posterior approach. The investigator was scrubbed and USG Probe was placed in midaxillary line just superior to iliac crest (Figure 1). After identifying abdominal muscle layers(Figure 2), the transverse abdominal plane was reached by using an 18 gauge touhys needle and pulled back incrementally with regular aspiration and then catheter inserted. A bolus of injection Ropivacaine 0.375% 20 ml on each side was given. This was followed by reversal of patient with Neostigmine 0.05mg/kg + Glycopyrrolate 0.008mg/kg intravenously and after fulfilling extubation criteria patient was extubated and shifted to post anaesthesia care unit(PACU). In PACU Ropivacaine 0.2% infusion at 8ml/hour on each side for 48 hours given.

The post-operative pain was measured by Visual Analogue Scale (VAS). The pre-specified primary outcome was dynamic pain scores (upon movement) 6 hr after abdominal surgery. Secondary outcomes were pain scores at rest and dynamic, after 12 hr, 24 hr and 48 hr. Postoperative opioid consumption was measured at 24hr and 48 hr following surgery. Meanwhile, we addressed function-related outcomes including time to first ambulation, and length of hospital stay. Outcomes of side effects were also evaluated, including hypotension and block complications within the first24 hr postoperatively. Other observations recorded included the number of episodes of nausea and vomiting and complications related to the procedure or catheter placement. Additionally, in order to assess satisfaction in the continuous TAP block analgesia group, patients were asked to rate their pain relief as poor, satisfactory, or excellent.

Data was entered in windows excel format. Frequency tables and measures of central tendency (mean) and measures of dispersion (Standard deviation) were obtained by using the statistical package SPSS software. Outcome variables with a p-value less than 0.05 were selected and cross-tabulation was done to determine the strength and direction of the association between variables. Chi-square test was used to check statistical associations between variables and covariates.

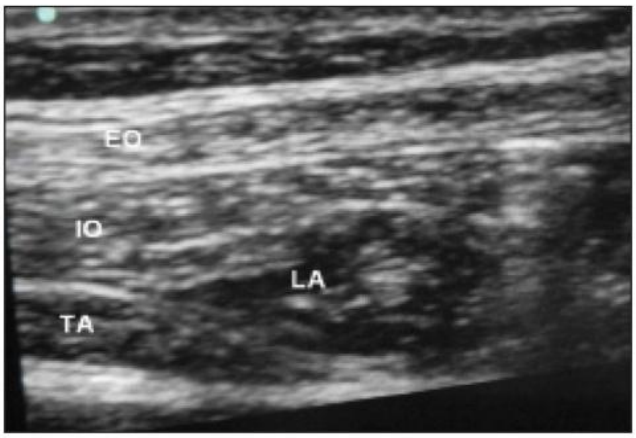
Results

There were no differences in age, sex, or the American society of Anaesthesiology (ASA) classification between the groups. Pain score is consistently lower in group A. Among Continuous TAP block patients unilateral abdominal wall hematoma seen in 3 patients while hypotension seen in 5 patients of conventional block group. The VAS score in group A and group B are shown in Table 1 and Graph 1

Figure 1

Tuohy needle (18-G) inserted anterior to Ultrasound transducer, which is held transversely in plane to perform the TAP block

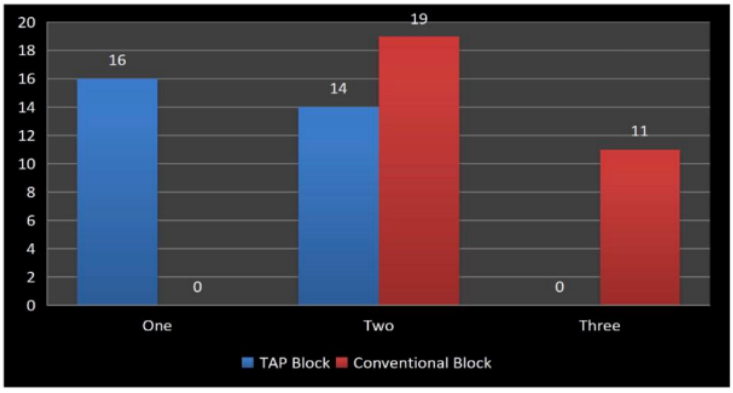
Figure 2



Sonographic image of the abdominal muscles layers with local anesthetic spread in TAP. EO = External oblique, IO = internal oblique, LA = local anaesthetic in TAP, TA = transversus abdominis muscle

Table 1: VAS score for continuous TAP patients and conventional block patients

VAS Score	Continuous TAP Block	Percentage (%)	Conventional Block	Percentage (%)	p value
1	16	27	0	0	0.0001
2	14	23	19	32	
3	0	0	11	18	
Total	30	50	30	50	



Graph 1: Distribution of continuous TAP patients and conventional block patients according to VAS score

Injection tramadol was given in 17 patients from Continuous TAP block after 18hrs and 24 patients from conventional group after 8hr. Injection paracetamol was given in 18 patients from Continuous TAP block after 24hr and 27 patients from conventional group after 12hr. Diclofenac sodium was given in 16 patients from Continuous TAP block after 30hr and 24 patients from conventional group 18hr. The difference between two groups was significant for analgesic required (p value 0.0023).

DISCUSSION

TAP analgesia is gaining place as a new regional analgesic technique for postoperative pain. Its role in abdominal surgery is not fully defined. Our study shows its probable efficacy in major abdominal surgery, in terms of reduced pain scores and opioid use in PACU on days one and two.

VAS score was 1 in 16 Continuous TAP block patient, 2 in 14 TAP block patients while VAS score 2 in 19 conventional block patients and 3 in 11 conventional block patients. The difference between VAS score in both groups was statistically significant (p value 0.0001).

Venkatraman R et al [11] stated that there was no statistically significant difference in VAS scores at 0, 2, and 24 hours. But VAS scores were significantly less in group B at 4, 6, and 12 hours with p value 0.0001.Kandi Y et al [12] mentioned that As regards the VAS, it was found that, there was statistically significant decrease in VAS in group I compared with group II at 2, 6, 10, 14, and 18 h postoperatively. At 24 h, there was no significant difference between the two groups as regards VAS.

Technical problems encountered during the procedure included the need of an assistant to hold the transducer probe, to use large saline flush to confirm the space, and leakage around the catheter. The latter problem was solved by subcutaneous tunnelling of the catheter, with benefit to some patients. TAP dressing may be soiled with preparatory solutions and there is potential for dislodgement and removal of the catheter if the incision is extended. One of the postoperative issues was encroachment of the surgical dressing onto the catheter dressing.

Based on the results of our study, we suggest that continuous TAP block with multimodal analgesia plays an important role in postoperative analgesia but a large-scale study will be necessary.

CONCLUSION

The anatomical approach of Continuous TAP block is very safe and reasonably effective. Ultrasound-guided Continuous TAP block reduced postoperative rest and movement pain and analgesic requirements after lower abdominal surgeries and was more effective than conventional block.

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