



Transversus Abdominis Plane Block Versus Wound Infiltration of Local Anesthesia For Post Operative Analgesia

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Abstract

Background: Since the concept of day care surgeries are getting more popular, surgeons and anesthesiologists are trying their best to provide adequate post operative analgesia. Infiltration of surgical wound with local anesthetics has been a well established practice to take care of post operative pain and the TAP block has been recently popularized.

Aim: To compare the efficacy of TAP block with wound infiltration of local anesthesia for post operative pain.

Material and Method: The study included total 50 patients grouped in two groups having 25 each. Group I received TAP block and group II received local infiltration of local anesthesia. The pain scores were measured in the two groups using VAS at 1 hour, 3 hours, 6 hours and 12 hours after surgery.

Results: The TAP block group was shown to have statistically significant post operative analgesia even after 12 hours of surgery as compared to wound infiltration group; however the pain scores in both the groups were comparable till 6 hours of surgery.

Conclusion: TAP block and wound infiltration of local anesthesia both provide significant post operative analgesia initially but the effects are more long lasting in TAP block.

Keywords- TAP block, analgesia, anesthesia, local infiltration.

Introduction

Since the concept of day care surgeries are getting more popular, surgeons and anesthesiologists are trying their best to provide adequate post operative analgesia. The proper management of post operative pain ensures early ambulation of patients and obviates many post operative complications.^[1-4] The most common modality for management of post operative pain has remained the parenteral use of non steroidal anti inflammatory drugs (NSAIDs) and opioids. The infiltration of surgical wound with long acting local anesthetic agents has also remained a popular method to take care of immediate post operative pain. This technique is virtually cost free, rapid and hardly requires any special technical expertise or equipment for its use. But as there are advances in anesthetic techniques, more and more locoregional blocks are being tried to take care of post operative pain. The choice of anesthetic block technique depends upon the site of surgical incision proposed. It may be emphasized that the locoregional pain blocks are technically demanding procedures and require expertise to use.

Transversus abdominis plane (TAP) block is a novel approach in which local anesthetic agent is injected into the plane between the internal oblique and transversus abdominis muscles.^[5] this technique was described by Kuppuvelumani et al. in 1993 and was formally documented in 2001 by Rafi^[5-8]. The technique of TAP block has been found to be a safe and effective tool in a variety of general, gynecological, urological, plastic, and pediatric surgeries, and it is suggested as part of the multimodal anesthetic approach to enhance recovery after lower abdominal surgeries^[5, 9-19].

The current study has tried to find out that whether TAP block is able to provide prolonged analgesic effect as compared to infiltration of surgical wound with local anesthetic agent? The outcome measures evaluated were the pain score at various intervals using Visual Analogue Scale.

Objective

The aim of this study has been to test the efficacy of TAP block versus wound infiltration with local anesthetic agent specially to provide prolonged post operative analgesia. The patients included in this study were either of inguinal hernia or infraumbilical incisional hernia. Another objective of this study has been to promote workers to perform studies to test for the efficacy of other locoregional blocks as well so that post operative pain management could become an easily manageable task.

Patients and Methods

The study was conducted in department of general surgery and anesthesiology, U.P. Rural Institute of Medical Sciences & Research, Saifai, Etawah, Uttar Pradesh(India). The study was conducted after taking approval from Ethical Committee of the Institute. The study included total 50 patients of ASA grades I/II, after taking written and informed consent. The inclusion criteria were the patients presenting with infraumbilical hernia may it is incisional hernia, spigelian hernia, inguinal hernia etc. The exclusion criteria were history of hernia repair for same/similar hernia, patients having known co morbidities like diabetes, hypertension, tuberculosis, coronary artery diseases, patients of ASA grade \geq III, patients having any contraindication to general anesthesia and the patients not willing to take part in the study.

The patients were thoroughly randomized so as to remove any selection bias and then they were divided in two groups. TAP group included patients receiving transverses abdominis plane block for management of post operative pain and LWI group included patients receiving local wound infiltration with local anesthetic agents for relief of pain. All the patients were subjected to hernia repair under general anesthesia with the endotracheal intubation.

The premedication was done with Lorazepam 1 mg and Ranitidine 150 mg orally night prior and morning of surgery. Inside the operating room,

intravenous access was obtained, monitor was connected and baseline non-invasive blood pressure (NBP), heart rate (HR), electrocardiography (ECG) and pulse oximetry (SpO₂) were obtained. The induction was done using inj. Midazolam 0.02 mg/kg and inj. Propofol 2 mg/kg and intravenous inj. Fentanyl 3µg/ kg was used for analgesia. The intubation was done with standard size endotracheal tube (suitable for the patient) after relaxation provided by inj. vecuronium 0.1 mg/kg IV. Anesthesia was maintained with 50:50 oxygen mixed with air, and isoflurane 1-1.5%. Intraoperative monitoring of ECG, HR, NIBP, SpO₂, capnograph, nasopharyngeal temperature urine output and spirometer were continued throughout the operation. At the end of operation, TAP group (n=25) received bilateral TAP block with 20 ml of 0.25% bupivacaine on each side by midaxillary approach under ultrasound guidance with Mindrey® portable ultrasound machine with 7.5 MHz linear probe. The patient in supine position, under aseptic conditions, the probe was placed transversely between the iliac crest and costal margin. A long peripheral nerve stimulating needle, 22G, 8 cm, was advanced in-plane. After visualization of the tip of the needle reaching the plane, 2ml of anesthetic solution was instilled to view the hydrodissection, confirming the correct placement. Following this, the total volume of drug was instilled, creating a meniscus between the planes. The LWI group (n=25) received local wound infiltration with 0.25% bupivacaine 20 ml at the end of operation. Visual analogue score (VAS), 1-10 was recorded by a blinded investigator at 1, 3, 6 and 12 hours during rest, during cough, and during mobilization. Patients with VAS score or > 4 at any point of time, received either or both of diclofenac 75 mg intramuscularly and tramadol 50 mg intramuscularly. The primary outcome measure was the time interval after which there was requirement of first supplemental doses of analgesia which was the time when VAS score happened to be ≥ 4 .

Statistical Analysis: Statistical analysis was done using SPSS software version 16.0. For categorical variables Chi-square test was done. For comparing two groups of mean Independent Student's t test was used. p-value <0.05 is considered as statistical significance

Results

The study included a total of 50 patients grouped in two different groups. Group I contains patients having TAP block for post operative analgesia and group II contains patients receiving local anesthetic agent for post operative analgesia.

The minimum age of patients in group I was 18 years, maximum age was 75 years and the mean age was 39.96 ± 15.80 . Whereas minimum, maximum age and mean age in patients of group II were 19 years, 63 years and 40.16 ± 14.36 respectively. However there was no statistically significant difference in age of the patients of both the groups (p=0.963). [Table 1]

The mean body mass index (BMI) of patients in groups I was 26.01 ± 5.11 and in group II was 25.73 ± 5.68 . Although there was no statistically significant difference in between groups (p=0.853). [Table 1]

The study has taken patients only of ASA grades I and II and on statistical analysis there was no difference in ASA grades of patients in the two groups. (p=0.571) [Table 1].

Table 2 shows the comparison of the pain scores of the patients in the two groups as measured on Visual Analogue Scale (VAS). VAS 1, VAS3, VAS6 and VAS12 stands for pain score on visual analogue score at 1 hour, 3 hours, 6 hours and 12 hours after surgery respectively. There is no statistically significant difference of pain scores in the two groups at 1 hour, 3 hours and 6 hours and p values are more than 0.05. While when we compared VAS score in the patients in the two groups at 12 hours after surgery we noticed that the pain score in group I was 6.80 ± 2.000 and pain score in the group II was 8.92 ± 1.256 and this difference was also statistically significant (p=<0.001).

Hence we observed that though the pain relief in immediate post operative period was almost equivalent in the two groups but TAP block group

continued to have pain relief even upto 12 hours of operation.

Table 1- Variables in the two groups

Variables	Group 1 (n=25)	Group 2 (n=25)	p-value
Age (years)	39.96±15.80	40.16±14.36	0.963
BMI (kg/m ²)	26.01±5.11	25.73±5.68	0.853
ASA Grade			0.571
I	14	12	
II	11	13	

Table 2: Comparison of Pain Scores in the two groups

Variables	Group 1 (n=25)	Group 2 (n=25)	p-value
VAS1	2.32±1.180	2.36±1.186	0.905
VAS3	3.04±1.719	3.68±1.651	0.186
VAS6	4.28±1.882	5.84±1.724	0.004
VAS12	6.80±2.000	8.92±1.256	<0.001

Discussion

Infiltration of surgical wound with local anesthetic agents has been a routine practice at many centers around the world. It was found to provide good post operative pain relief. Moreover it was almost inexpensive, rapid, without too many systemic complication and requires not much of expertise to apply.^[20] The role of TAP block to provide effective postoperative analgesia for different types of lower abdominal surgeries has also been studied.^[21-23] It was also found that performing TAP block under ultrasound guidance is easy, reliable and safe^[20,22] It was also found that the complications of TAP block like liver injury, bowel hematoma, though possible, are less likely with ultrasound guidance.^[23]

The studies have claimed that the TAP block provides post operative pain relief lasting 24hours postoperatively and some even 48 hours.^[22, 24] The current study has recorded the pain relief till 12 hours of surgery as measured by VAS score at different intervals in the post operative period. We have noticed that in TAP block group there was

significantly less pain upto 12 hours of surgery than in local infiltration group at rest, cough and on movement. The similar findings were also noted in study by Ranjit S (2014) and Mc Donnell et al.^[20, 24] The decreased pain perception on movement and cough has certainly also helped in early mobilization, improvement in pulmonary function and better recovery of these patients.^[20] Qingduo Guo et al (2015) found that the TAP block lowers VAS pain scores at rest and on movement at 8 and 24 hour postoperatively, but no significant difference was found at 1 hour compared with wound infiltration.^[25] This finding almost goes consistent to finding of our study. They also found that local anesthetic wound infiltration may provide brief pain relief for less than 8 hour after surgery. We have also found the results like this as pain scores in both the groups were comparable upto 6 hours of surgery. Few other studies have shown that the wound infiltration only decrease immediate postoperative pain scores (in PACU or within several hours postoperatively) compared with placebo or no

intervention in breast surgery ^[26, 27], hip arthroplasty ^[28], inguinal herniorrhaphy ^[29] and caesarean section ^[30]. In contrast, using catheter technique, both wound infiltration and TAP block can permit the delivery of continuous analgesia for a longer postoperative duration than single-shot block. In a meta-analysis included nine studies with 505 participants, continuous local anesthetic wound catheter infiltration even was equivalent to epidural analgesia in terms of pain scores at rest and on movement at 24 and 48 hour after abdominal surgery ^[31]. It may therefore be suggested that the further studies should include the consideration to assess the analgesia efficacy of local anesthetic wound catheter infiltration after surgery.

Conclusion

The TAP block and infiltration of wound with local anesthesia both provide good post operative pain relief however the effect is not long lasting in cases of local infiltration. The TAP block however provides significantly better post operative analgesia even upto 12 hours after surgery. There is need to study the analgesic effects in both the groups in further studies by using continuous administration of drug using catheter.

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