Original Article

Open Appendectomies in Children

Effective Use of Transversus Abdominis Plane Block for Postoperative Analgesia after Open Appendectomies in Children

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ABSTRACT

Objective: To evaluate the use of transversus abdominis plane block for effective postoperative analgesia in children after open appendectomies.

Study Design: Single blind randomized control trial study.

Place and Duration of Study: This study was conducted at the Department of Anesthesia and Pediatric Surgery Mohi-ud-Din Teaching Hospital Mirpur AJK from May 2018 to June 2019.

Materials and Methods: Forty children of both sexes, aged 6-14 years undergoing open appendectomy by the McBurney method were enrolled in the study. These children were divided into two groups; Group A received ultrasound guided transversus abdominis plane block with bupivacaine0.25%, 0.25 mL/kg (maximum 20 mL) and Group B (control group) were operated by same method without transversus abdominis plane block.

Results: There was significant decrease in pain intensity in TAP block group as compared to control group (at 6hrs &8hrs 6±2 vs. 3.9±2.3 & 5.28±0.60 vs. 2.36±0.83 respectively with p value <0.001). Apart from the comfort of the children and parenteral satisfaction, hospital stay was reduced in group receiving TAP block (3 vs. 4 days, P = 0.045).

Conclusion: The transverses abdominis plane block should be used as part of multimodal analgesia in pediatric surgical patients, which is minimally invasive procedure with promising result that may improve the quality of life along with enhanced recovery.

Key Words: Transversus abdominis plane, Postoperative analgesia, Appendectomy

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INTRODUCTION

Acute appendicitis (AP) is the world's most prevalent abdominal surgery.[1] Appendectomies with a number that goes up to 8 per cent over the entire lifespan constitute the main share of all surgeries undertaken on children as well as adults. One of the most significant issues in today's medical practice is management in acute pain after the procedure.[2]

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Opioids are widely used to control pain in after operative patients; however, their use has multiple side effects and opiate often slows postoperative recovery.[3,4] Although the block length in various studies is variable, analgesia efficacy was recorded up to 36 hours after the TAP block was mounted.[5]

The duration of the block is variable and effective analgesia have been reported up to 36 hours after a single injection.[6] The monitoring of the patient during procedures includes the monitoring of blood pressure, ECG and pulse oximetry.[7] Seyed hejazi et al[8] showed that caudal block by bupivacaine and adrenaline in preterm infants is more effective and safe than spinal anesthesia and reduced the need for analgesics after surgery.[8] In a study by Carney et al. in 2010 in children with the appendectomy, infiltration of local anesthesia by TAP block up to 48 hours after was effective in comparison to the placebo for pain control surgery.[9]

In this study, we aimed at evaluating the efficacy of TAP block in post-operative pain in patients with appendectomies.

MATERIALS AND METHODS

This single blind randomized control trial was conducted at Department of Anesthesia and Pediatric

Surgery Mohi-ud-Din Teaching Hospital Mirpur AJK from 1st May 2018 to 30th June 2019. Perforated appendices, children allergic to local anesthesia and heart defects and physical deterioration were included. Forty patients (20 in each group) were reported in the sample size. 40 children diagnosed and prepared for appendectomy aged 6 to 14 years were randomly divided into two classes with written informed parental consent. The two classes were exposed to general appendectomy anesthesia. Pre-operative intravascular access has been developed. Monitoring of ECG, pulse oxymeter and NIBP in the operation theatre. General anesthesia with Nalbuphine 0.1 mg / kg accompanied by Propopulation, Induction and Intubation 01-1.5 mg / kg of suxamethonium was performed. The suitably large cuffeddotracheal tube was intubated for all patients. Anesthesia with isoflorene was sustained 1.2–1.4 percent with a combination of oxygen / air or oxygen / N2O along with atracurium 0,3-0,4 mg / kg. All patients received a Grid-Iron appendectomy, were detected by a Tania-coli presence, and removed with a finger or swab by cecum after opening the abdomen. The appendix has historically been regulated with forceps applied to babcock or lane in a manner that encircled and did not harm the appendix. The meso-Annex 's base was clamped, separated and connected into one hemostat. The appendix was crushed near its border with caecum in a hangover, removed and reconstituted only distally into the crushed section. Group A was formed by scrubbing with pyodine solution after inducing a block anesthesia field. After preparing the sample, the transducer was located in the supine position between the costal border and the iliac crest. Three distinct layers have been established, external oblique, internal oblique and transversal abdominal and peritoneal. The 23 G spinal needle with in-line approach leads between internal oblique and transverse abdominal muscle in potential space. The solution distribution has been described as an elliptical two-layer separation. The Petit Triangle injected arbitrarily with Bupivacaine 0.25 per cent, 0.25 mL/kg (maximum 20 mL). Voltarol ® Suppository 12.5 mg or 25 mg is administered as part of multimodal therapy after surgery in all patients depending on age and weight. In the recovery and in the paediatric ward at 0th, 2nd, 8th, 16th and 24th hours, after appendectomy using the McBurney approach the grade of postoperative (Visual Analog Scale = VAS) pain score has been registered. The pain levels were 1 to 10, 1 showing no pain and 10 meaning maximum pain. If the pain level was 4 or higher, children had an analgesic treatment. The acetaminophen Rescue Analgesia was 10 mg/kg intravenous. Statistically important was called a P value < 0.05.

RESULTS

Patients did not statistically difference in both groups in terms of age, sex, baseline pulse and body mass. The operative time was comparable in both groups. The procedure time was about 10 minutes which corresponds to the average time difference between both groups. Length of hospitalization in TAP block group was shorter comparing to the other group [3 vs. 4 days, P = 0.045] (Table 1).

There was significant reduction in pain intensity in TAP block group as compared to control group at 2hrs, 6hrs &8hrs Mean Visual Analogue Scale (4±1.5 vs. 1.82±0.8, 56±2 vs. 3.9±2.3 and 5.28±0.60 vs. 2.36±0.83 respectively) with p value <0.001 (Table 2).

Table No.1: Patient characteristics, surgical and anaesthesiological factors

Variable	Control group	TAP group	P value
Age (years)	10 (7–13)	8.8 (6.5–12.5)	0.34
Sex (male/ female)	13/7	12/8	0.13
Body mass (kg)	33 (26-50)	28.5 (20.5–42)	0.63
Hospitalization time (days)	4 (3–6)	3 (3–5)	0.045
Baseline pulse	91.29±9.65	90.10±9.01	0.37

Table No.2: Pain severity based on VAS scores during the 24 hours after surgery

Time of check	Control group	TAP group	P value
2 hours after surgery	4±1.51.8	2±0.85	<0.001
4 hours after surgery	4.7±2.2	3.3±2.1	0.01
6 hours after surgery	6±2	3.9±2.3	<0.001
8 hours after surgery	5.28±0.60	2.36±0.83	<0.001
12 hours after surgery	4.9±2	3.3±3	0.01
16 hours after surgery	3.25±1.71	2.65±1.42	0.236
24 hours after surgery	2.60±1.33	2.10±1.03	0.296

DISCUSSION

Acute appendicitis remains the most common surgery with a 7 percent incidence over the span of one life.[10] A timely diagnosis and an early operation are important for successful treatment of acute appendicitis. Acute appendicitis is also not readily detected clinical and negative laparotomy rates between 20% and 25% are not exceptional.[11-12]

An operating specialist who treats appendicitis on a clinical basis is at risk of a rise in the incidence of negative appendicitis or a rise in drilling and sequelae. A medical problem is acute abdominal pain in infants. Although several cases of acute pain in the abdomen are mild, some patients need prompt diagnosis and care to avoid disease.

Transversus abdominis plane block is a regional block used during abdominal surgery for postoperative pain relief. There is a peripheral nerve of spinal roots T6-L1 in the anterolateral abdominal wall. The object of a TAP block is to examine those sensory nerves by adding between the inner Oblique and the transversal abdominal muscles 20-40 ml of the local anesthetics to the neurological plane. Rafi identified the TAP block for the first time in 2001.[13]

The first post-caesarean block experiments in TAP were published in 2008, thanks to a variety of anatomical and clinical tests, by McDonnell et al.[14]

New horizons have emerged for successful post-operative analgesia with the advent of the transversal abdominal block. The TAP block was intended to decrease pain by interrupting the conduction from the wound to the abdominal wall of somatic adverse events. In the possible space between the oblique and transverse muscles of the abdomen in local anesthetic drugs, T7–12 intercostal T7-12, ilioinguinal, and iliohypogastric nerve, as well as lateral branches of the L1-3 dorsal rami, are effectively blocked. Abdominal blocks of the abdominal wall.

Our analysis decreased pain rates in the postoperative period at 2 hours, 6 hours and 8 o'clock. When the pain score was over four on a VAS-level rescues analgesic, pain was compared between the block group TAP and the control group without intervention. In the TAP block with bupivacaine (0.25 percent 0.25 mL/kg maximum 20 ml) with p-value < 0.001 the favourable results are clearly seen.

The literature review indicates that TAP decreases postoperative analgesia opioid requirement, measured by Tan et al[15] in a two blind, controlled study. "40 women had a C-section. None of them had general anesthesia. Half of the TAP was given, and no local analgesia was given to other half. In the TAP community, the intake of morphine and patient satisfaction are lower. However, there has been no improvement in visible discomfort, sedation, vomiting nausea or antiemetic treatment.

Transversus abdominis plane blocks can become technically simpler and safer by expanding the use of ultrasound technology. As an alternative medical aid to analgesia during abdominal procedures, there has been an growing interest in the TAP blocks. Different abdomen-chirurgical procedures such as caesarean sectors, hysterectomy[16], cholecystectomy, colectomy, appendectomy and hernia have received the evidence in the past decade to support the efficacy of TAP blocks.[17]

In our research, we used a quick and safe lateral TAP approach. We injected 0.25% of Bupivacaine between the cross-sectional abdominal plane with ultrasound guidance. That effectively provided lower abdominal analgesia (T10-L1) between the midline and the mid-clavicular line, corresponding to the region of interest in the pain following appendectomy.

CONCLUSION

The use of TAP block as part of multimodal analgesia in pediatric surgical patients, particularly in developing countries with less availability of modern and short acting narcotic agents and fewer up-to-date post-anesthesia care units. TAP block is minimally invasive procedure with promising result that may improve the quality of life along with enhanced recovery.

Author's Contribution:

Concept & Design of Study:	Mubashar Iqbal
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Final Approval of version:	Mubashar Iqbal

Conflict of Interest: The study has no conflict of interest to declare by any author.

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