Appendectomy Pain Control by Transversus Abdominis Plane (TAP) Block in Children

Mahin Seyedhejazi¹, Samira Motarabbesoun¹, Yashar Eslampoor¹, Nasrin Taghizadieh¹ and Nazanin Hazhir¹, *

¹Anesthesiology Department, Children's Hospital, Tabriz University of Medical Sciences, Tabriz, Iran
*Corresponding author: Anesthesiology Department, Children's Hospital, Tabriz University of Medical Sciences, Sheshgelan st., Tabriz, Iran. Tel: +98-9146303383, Email: nazaninhazhir@yahoo.com

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Abstract

Background: Pain control after surgery in children is very important. Despite having good analgesic effects, the use of opioids is, however, limited due to side effects.

Objectives: This study was aimed to investigate the effect of transverse abdominis plane (TAP) block on the intensity and frequency of pain after appendectomy in children.

Methods: In a single-blinded clinical trial, 40 children aged from 4 to 16 years, candidates for the appendectomy, were divided randomly to intervention and control groups. The intervention group received ultrasound-guided TAP block using 0.25 mL/kg of 0.25% bupivacaine in the Petit triangle after general anesthesia. Postoperative pain was assessed within the first 24 hours after surgery based on the Wong-Baker FACES Pain Rating Scale (WBFP).

Results: There was a reduction in WBFP scores at 2 hours after appendectomy in the intervention group compared with the control group (5.05 ± 2.83 vs 6.30 ± 2.2063). Also, the pain intensity within 24 hours after surgery in the intervention and control groups was 3.10 ± 1.33, and 3.60 ± 1.63 respectively according to WBFP scale (P > 0.05).

Conclusions: The TAP block was effective to reduce pain after appendectomy in children, however, there was no significant difference between intervention and control groups. Further studies with larger sample sizes are needed to be done in this area of research.

Keywords: Appendectomy, Children, TAP Block, Wong-Baker FACES Pain Scale, Pain

1. Background

Acute pain control after surgery is one of the basic medical issues and challenges (1). Routinely the opioids are used for pain control after surgery; however, the widespread use of opioids has numerous side effects and delay postoperative recovery (2, 3). According to the World Health Organization guidelines, the excessive use of opioids decreases the patients' satisfaction (4, 5). Appendectomy is one of the most common surgeries among adults as well as children with the risk of 8% during the whole life. The use of opioids for pain control in children is limited due to their side effects (6-8). More recent studies have shown that Tap block reduces postoperative pain, as well as analgesic drug usage (9, 10). The duration of the block is variable and effective analgesia have been reported up to 36 hours after a single injection (11). The monitoring of the patient during procedures includes the monitoring of blood pressure, ECG and pulse oximetry (12). Seyedhejazi et al. 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 (13). 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 (14).

2. Objectives

Considering the importance of postoperative analgesia, few studies on the use of bupivacaine for pain control after appendectomy in children and controversy in this context, we designed this study; thus the aim of this study was to investigate the effect of TAP block on the intensity and frequency of pain after appendectomy in children.

3. Methods

After obtaining approval from the Ethics Committee of Tabriz University of Medical Sciences, this single-blind ran-
The mean age of the patients in the intervention and control groups were respectively 9.90 ± 2.1 and 10.10 ± 2.31 years. The duration of general anesthesia was 69.00 ± 18.75 minutes for intervention groups and 76.00 ± 17.51 minutes in the control group (P = 0.230). The mean systolic and diastolic blood pressure at different times before and after surgery in the two groups showed no statistical difference (P > 0.05). The mean heart rate of the patients showed no statistically significant difference (P > 0.05) in the two groups before and 24 hours after surgery in different hours (every 4 hours). Pain intensity was equal in all patients of the two groups after surgery and in recovery, based on the WBFP score (Table 1). The mean time of the need for the first analgesic after surgery in the intervention and control groups was 9.81 ± 8.89 and 8.81 ± 6.75 hours, respectively (P = 0.460). The mean frequency of analgesic consumption during the 24 hours after surgery in the intervention and control groups was 1.15 ± 0.75 and 1.30 ± 0.92 times, respectively (P = 0.575).

The average dose of acetaminophen in the intervention and control groups was 137.50 ± 98.50 mg and 191.25 ± 107.07 mg, respectively (P = 0.107). Although the mean dose of acetaminophen in the intervention group was less than the control group, this difference was not statistically significant (P = 0.107). In none of the two groups, postoperative complications were seen and the duration of hospital stay 24 hours after appendectomy was not significantly different in both groups (P = 1.00).

5. Discussion

The use of multi-modal analgesia, effectively reduce pain after surgery and improve the outcome of the patient. The use of opioids because of undesirable side effects is limited in pediatric age group. The use of anesthesia around the spinal cord can cause restriction of movement and cardiovascular and gastrointestinal complications. Thus in order to improve the quality of recovery time and reduce the consumption of opioids, the use of local minimally invasive analgesic techniques is necessary, particularly in abdominal surgery (15). According to the result of this study, pain intensities were low after surgery and during recovery, based on the WBFP score in the two groups. The difference in the mean pain scores was not statistically significant (P > 0.05) in both groups in the interval of 24 hours after recovery. Seyedhejazi et al. in 2014, compared caudal block with the block of an ilioinguinal iliohypogastric nerve by bupivacaine and clonidine and showed that both methods are nearly identical and there is no statistical difference between the two methods in decreasing pain intensity and opioids usage. This study reported that peripheral nerve blocks were a useful method and comparable to caudal anesthesia in pain relief (16). The result of our study revealed that the first time request for the postoperative analgesics in the control group was earlier than the intervention group; however, this difference was not statistically significant (P = 0.460). The frequency of the use of analgesics in the first 24 hours after surgery in the control group was slightly more than the interven-
Anesthesia for pain relief after surgery is an effective method for pain relief after surgery. This study also revealed that there were few studies about the use of TAP block for pain relief after surgery (24). Several new studies have reported that TAP block is a safe and effective method for anesthesia in various surgeries such as cholecystectomy, laparoscopic inguinal surgery, and cesarean section; however, in order to obtain more definitive results, further investigation is needed in this area of research (11, 25). Finally, there is controversy in this field because of the complexity of the relationship between pain and analgesia induced by the TAP block. The difference in the sample size, parameters defined, the difference in age, and type of surgery in these studies could explain these conflicting results.

TAP block is an effective method for pain relief after surgery and in reducing the use of narcotic analgesics, which can reduce the length of hospital stay, nosocomial infection, and health care costs (26, 27).

The present study shows that the TAP block reduces the intensity and frequency of postappendectomy pain in children; however, there was no statistically significant difference between the two groups. The first time to request pain medication in the control group was earlier than the intervention group; however, this difference was not also statistically significant.

The total dose of analgesics consumption in the control group was lower than the intervention group 24 hours after surgery, however, this difference was not also statistically significant.

Limitation of this study is the small sample size.

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Footnotes

Clinical Trial Registration: IRCT201503020401N11.

Conflict of Interests: The authors declared that they had no conflict of interest.

Ethical Considerations: This study has been approved by the Ethics Committee of Tabriz University of Medical Sciences (https://en.irc.ir/trial/4225).

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Patient Consent: The written informed consent was taken from parents.

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