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Title: Efficacy of Ultrasound-Guided Transversalis Fascia Plane Block in Pediatric Ureteroneocystostomy Surgery

Running Title: TFP Block in Ureteroneocystostomy

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Efficacy of ultrasound-guided transversalis fascia plane block in pediatric ureteroneocystostomy surgery

- Letter to the Editor -

One of the methods used to treat Vesico Ureteral Reflux (VUR) in children is ureteroneocystostomy surgery. Although less invasive methods such as laparoscopic or robotic have been developed for this procedure, open surgeries are still up-to-date [1]. Various medical treatments and regional anesthesia techniques are used in the treatment of post-surgical pain in children. The transversalis fascia is a structure that covers the inner plane of the abdominal muscles and includes the preperitoneal fat layer posteriorly. Transversalis Fascia Plane block (TFP block), which was first defined by applying local anesthetic to this region in 2009, has been used effectively in lower abdominal surgery [2,3]. The TFP block procedure defined by Hebbard aims to block the iliohypogastric and ilioinguinal nerves, which are the proximal branches of the T12 and L1 spinal nerves, which run between the transversus abdominis muscle and the transversalis fascia [2]. The FLACC (Face, Legs, Activity, Cry, Consolability) scale is an observational pain rating method developed by Merkel et al. in 1997. It is used to evaluate pain in children aged two months to 7 years.

We present the efficacy of TFP block in five pediatric patients who underwent bilateral or unilateral ureteroneocystostomy surgery. Written consent from patients and parents was obtained to implement this block and subsequently publish the report.

Five pediatric patients aged 4–7 years without any history of other systemic disease were taken to the operating room for open ureteroneocystostomy surgery. General anesthesia induction was performed with 2 mg/kg propofol, 2 mcg/kg fentanyl, and 0.6 mg/kg rocuronium, and the patients
were intubated. Anesthesia was maintained with 1%–2% sevoflurane, 50% O₂, and 0.125–0.25 mcg/kg/min remifentanil. TFP block was planned before starting the surgical procedure to provide peri-operative and postoperative analgesia to the patient. While the patient is supine, the area to be operated and the linear USG probe were prepared sterile. The USG probe was placed on the anterior abdominal wall in the transverse plane, and oblique externus, oblique internus, and transversus abdominis muscles were visualized. Then, the USG probe was directed laterally, and the fascia transversalis and periperitoneal adipose tissue were visualized. With the in-plane technique, the posterior tail of the transversus abdominis muscle was passed with a 50 mm block needle, and the fascia transversalis plane was entered. After confirming the needle site with saline, 0.5 ml/kg of 0.25% bupivacaine was injected. If the surgical procedure was bilateral, the same procedure was repeated for the opposite side. 10 mg/kg paracetamol was administered intravenously to all patients 30 minutes before the end of the operation and was repeated every six hours postoperatively. Postoperatively, the effect of muscle relaxant was antagonized using 0.06 mg/kg neostigmine and 0.03 mg/kg atropine, and the patients were awakened. Pain assessment of the patients was performed with FLACC scoring at 1, 2, 4, 12, and 24 hours. It was planned to administer 10 mg/kg oral ibuprofen in the ward to patients with a FLACC score of 4 and above for rescue analgesia.

Demographic data and postoperative pain scores of the patients were as in the table (Table 1). None of the patients had a FLACC score of 4 or higher in the postoperative 24-hour follow-up and did not need additional analgesics.

The application of medical treatment methods in treating postoperative pain in children who underwent ureteroneocystostomy surgery is limited. The use of opioids in the relief of this pain is limited in children [4]. The use of non-steroidal anti-inflammatory drugs increases the risk in this patient group due to the possibility of potential renal damage. Such reasons highlight the importance of regional anesthesia techniques used to provide postoperative analgesia in children.
Caudal analgesia is one of these methods and provides adequate postoperative analgesia. However, carries risks such as dural puncture, drug administration to the subarachnoid space, constipation, or hypotension [4]. In addition, it is a limited method because it requires a lateral decubitus position for the procedure and premature closure of the hiatus sacralis in some children.

The use of plane blocks to prevent postoperative pain in cases undergoing ureteroneocystostomy surgery is not very common. Studies on plane blocks used for ureteroneocystostomy in pediatric cases are limited in the literature. In an article presenting a single pediatric case, it was shown that TFP block effectively reduces postoperative pain after ureteroneocystostomy surgery [3]. TFP block is a regional anesthesia technique that has been successfully applied in other lower abdominal surgeries and has been shown to provide effective analgesia in the postoperative period. It has been successfully used for intraoperative or postoperative analgesia in surgeries such as cesarean section, inguinal hernia, and iliac crest grafts [5]. We also performed TFP block in five cases who underwent ureteroneocystostomy surgery and presented in this article. It was important to be effective that the surgical procedures were located in the iliohypogastric nerve and ilioinguinal nerve dermatome areas. The advantages of this regional anesthesia technique are that the TFP block is less invasive than the caudal block, it is ergonomically easier to apply the block in the supine position, and the studies in the literature have shown that it provides effective postoperative analgesia in the lower abdominal surgeries.

On the FLACC scale, changes in five behaviors in children in response to pain are graded as 0, 1, or 2 points. The total score is between 0 and 10 points. Interpretation of the total score received; 0 points: comfortable, 1–3 points: mild pain, 4–6 points: moderate pain, 7–10 points: severe pain. None of the patients' pain scores increased above four during follow-up in this case series and did not require additional analgesic agents. These results showed that TFP block significantly reduced early postoperative pain in children who underwent ureteroneocystostomy surgery.
As a result, TFP block applied before surgery provides effective analgesia in the postoperative period in pediatric ureteroneocystostomy surgeries. It has been shown that TFP block can provide effective postoperative analgesia in other pediatric lower abdominal surgeries. However, extensive series of randomized controlled studies are needed to prove its efficacy and safety.
References


<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
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<td>4 years</td>
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<tr>
<td>Surgical area</td>
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<td>Surgical time</td>
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<td>2</td>
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<td>1</td>
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FLACC: Face, Legs, Activity, Cry, Consolability scale.