

# Transversus abdominis plane catheters for postoperative pain relief in pediatric patients

Sumitra G. Bakshi, Jeson R. Doctor, Bhakti D. Trivedi, Sajid S. Qureshi<sup>1</sup>

Departments of Anesthesiology, Critical Care, <sup>1</sup>Pain and Paediatric Surgery, Tata Memorial Hospital, Mumbai, Maharashtra, India

## Abstract

Regional techniques provides excellent post operative pain relief in pediatric patients. Transversus abdominis plane (TAP) block is a newer regional technique available. Though there is emerging evidence proving the efficacy of TAP blocks, there is limited literature on use of TAP catheters in pediatric patients. TAP catheters were placed in two children following laparotomy with transverse incisions and in both epidural was avoided, with good post operative pain relief. Ultrasound guidance was used in one child, while in the other the catheter was placed under direct vision after dissection of the plane between transversus abdominis and internal oblique. Intermittent boluses of high volumes of local anesthetic (0.6-0.7 ml/kg) were used through the TAP catheter, ensuring that the maximum permissible level of bupivacaine was not exceeded. In adults, continuous abdominal catheters have found a place for post-operative pain management, when epidural analgesia is contraindicated. At present, the use of TAP catheters by pediatric anesthesiologists is limited, though there exists diverse clinical scenarios when these catheters may be of benefit. Contraindication of neuraxial blockade and septic patients are the two scenarios we have reported. In conclusion, TAP catheters are effective analgesia technique for laparotomies with transverse incision in pediatric patients.

**Key words:** Pediatric patients, postoperative pain management, transversus abdominis plane catheters

## Introduction

Regional techniques provide excellent postoperative pain relief in pediatric patients.<sup>[1]</sup> Transversus abdominis plane (TAP) block is a newer regional technique available.<sup>[2]</sup> Although there is emerging evidence proving the efficacy of TAP blocks, there is limited literature on use of TAP catheters in pediatric patients. We share the pain management of two children, in whom TAP catheters were inserted.

## Case Reports

### Case 1

Infant weighing 7 kg was planned for right adrenalectomy. Epidural analgesia was not planned in view of multiple spinal

osteolytic lesions. General anesthesia was administered. A right transverse supraumbilical incision was taken for surgical exposure, intraoperative course was uneventful. At closure, a 19G Tuohy needle was placed in between transversus abdominis and internal oblique muscle under ultrasound guidance [Figure 1]. The uniform hydrodissection of the TAP using saline confirmed the placement. A 21G epidural catheter was threaded through the Tuohy's needle to a depth of 2–3 cm. Bupivacaine, 5cc of 0.25%, was given through the catheter after closure and 8 hourly. Coanalgesic included 100 mg of paracetamol and 80 mg of ibuprofen oral every 8 hourly. The child was pain-free and catheter was removed at 72 h. The site was healthy and pain medications continued on a need basis.

### Case 2

A 4-year-old, 10 kg, child was posted for urgent exploratory laparotomy for suspected infection of mesenteric cyst. In

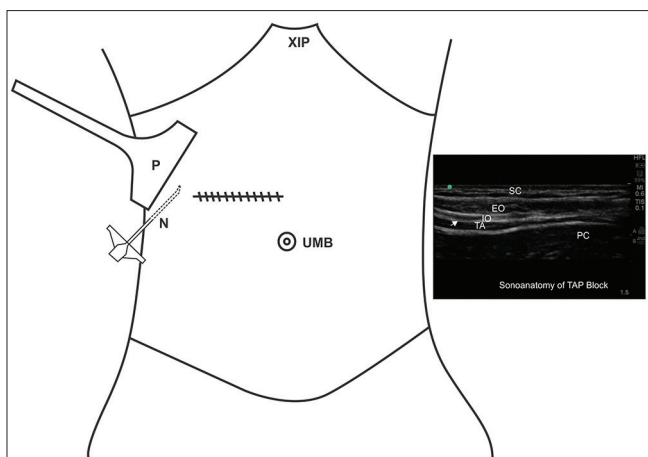
Address for correspondence: Dr. Sumitra G. Bakshi,  
Department of Anesthesiology, Critical Care and Pain, Tata Memorial Hospital, Mumbai, Maharashtra, India.  
E-mail: sumitrabakshi@yahoo.in

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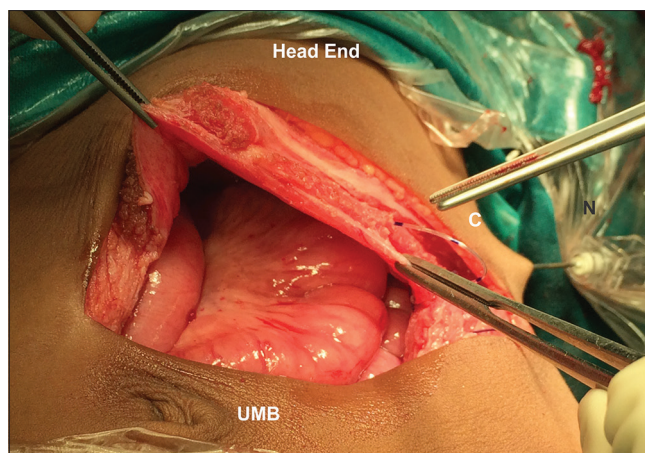
**Figure 1:** Schematic diagram showing the position of ultrasound probe (P), direction of needle (N) with respect to the incision and the relevant ultrasound anatomy. UMB = umbilicus, XIP = xiphisternum, SC = subcutaneous tissue, EO = external oblique muscle, IO = internal oblique muscle, TA = transversus abdominis muscle, PC = Peritoneal cavity. Arrow points to the transversus abdominis plane. The needle is inserted by “in plane” technique

view of high white blood cell count ( $21.99 \times 10^9/L$ ) and elevated C-reactive protein levels (18.4 mg/dL), epidural analgesia was deferred. A transverse incision was made for surgical exposure. At wound closure, due to unavailability of ultrasound, the surgical team was asked to dissect the plane between transversus abdominis and internal oblique and a 21G catheter was placed in the plane under vision [Figure 2]. Bupivacaine, 6 mL of 0.25%, was given through the catheter, 8 hourly along with oral ibuprofen and paracetamol. Pain relief was adequate and catheter removed at 48 h.

## Discussion

Regional analgesic technique has been advocated for pain relief following major surgeries in children.<sup>[1]</sup> Use of ultrasound guidance has increased the safety and efficacy of blocks<sup>[1,3]</sup> and is responsible for increased use of regional techniques. Few catheters, including the TAP catheters, can be placed under vision by the surgeons.<sup>[4]</sup> Spillage of local anesthetic from the dissected planes is a possibility with this technique though this has not been formally studied.

Guidance on best volume and dose for the TAP block is lacking.<sup>[2]</sup> A few studies advocate use of high volume of local anesthetic through these catheters.<sup>[2]</sup> We used intermittent boluses of high volumes of local anesthetic (0.6–0.7 ml/kg) through the TAP catheter, ensuring that the maximum permissible level of bupivacaine is not exceeded.



**Figure 2:** Surgically placed catheter (C), the plane between transversus abdominis muscle and internal oblique is surgically dissected and catheter is placed under direct vision using the metallic Tuohy needle (N). UMB = Umbilicus

In adults, continuous abdominal catheters have found a place for postoperative pain management, when epidural analgesia is contraindicated.<sup>[3]</sup> At present, the use of TAP catheters by pediatric anesthesiologist is limited though there are diverse clinical scenarios when these catheters may be of benefit.<sup>[5]</sup> Contraindication of neuraxial blockade and septic patients are the two scenarios we have reported. In conclusion, TAP catheters are effective analgesia technique for laparotomies with transverse incision in pediatric patients.

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## Conflicts of interest

There are no conflicts of interest.

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