Dermatomal Spread Following Posterior TAP Block for Pain Control in Abdominal Surgery in Children and Young Adults

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Methods

The transversus abdominis plane (TAP) block is a regional anesthetic (RA) technique used for pain control after abdominal procedures in both adult and pediatric patients. Several techniques for performing the TAP block have been described (mid-axillary/lateral TAP, posterior TAP/quadratus lumborum type 1) with varying patterns of dermatomal spread and efficacy. While the mid-axillary TAP results in unpredictable spread of local anesthetic (LA), the posterior TAP has not been well studied. We report the results of performing the pTAP block, including dermatomal coverage, opioid consumption, and pain scores, in a series of pediatric patients undergoing various abdominal surgeries.

Introduction

Design: Retrospective observational study: Reviewed medical records of 10 patients, with a total of 15 pTAP blocks for postoperative analgesia, who underwent abdominal surgery. Patient demographics, postoperative opioid consumption, pain scores and distribution of sensory changes were recorded.

Equipment: Portable ultrasound using a 3.5 cm linear probe oscillating at 6-18 Mhz.

Technique:
1. Transducer transverse in mid-axillary line
2. Slide posteriorly until transversus abdominis muscle terminates into thoracolumbar fascia at the quadratus lumborum (QL) muscle (Figures 2a and 2b)
3. 5 or 10-cm 18G tuohy needle for catheter insertion or a 21g 110cm or 22g 80cm needle for single shot blocks inserted in-plane from anterior to posterior
4. Ropivacaine 0.2% (14/15) or mepivacaine (1/15) was bolused in 3.5ml aliquots through the needle

Table 1. Demographics

<table>
<thead>
<tr>
<th>Type of surgery</th>
<th>N (Percentage)</th>
<th>Catheter &amp; SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholecystectomy</td>
<td>2 (20%)</td>
<td>SS</td>
</tr>
<tr>
<td>Ileostomy closure</td>
<td>3 (30%)</td>
<td>Catheter</td>
</tr>
<tr>
<td>Lap adnepocystic</td>
<td>1 (10%)</td>
<td>SS</td>
</tr>
<tr>
<td>Lap G tube</td>
<td>1 (10%)</td>
<td>SS</td>
</tr>
<tr>
<td>Splenectomy</td>
<td>1 (10%)</td>
<td>Catheter</td>
</tr>
<tr>
<td>Ureteral implant</td>
<td>2 (20%)</td>
<td>Catheter</td>
</tr>
</tbody>
</table>

Results

The mean age was 15 yrs (range 7-21) and mean weight was 57 kg (range 27-97). Distribution of surgical procedures & use of catheters are shown in Table 1. Mean volume of LA was 0.4ml/kg. A T7, T8 and T9 dermatomal level was achieved in 40%, 27%, and 27% blocks, respectively. A T11 level was achieved in 6%. Medial to lateral sensory changes extended from the linea alba to the mid-axillary line. The mean intraoperative and PACU opioid consumption were 0.34mg/kg (SD=0.12mg/kg) and 0.04mg/kg (SD=0.05mg/kg). No episodes of PONV or complications related to regional anesthesia were noted.

Discussion

Ninety-four percent of our patients achieved a sensory level at or above T9 which is consistent with the adult literature. This contrasts with the mid-axillary line approach, which achieves T10 in only 50% of blocks and results in an unpredictable/non-dermatome pattern of sensory block. Despite widespread use, the efficacy, indications and best technique of the TAP block remain controversial. Better understanding of the sensory distribution may help to determine the appropriate clinical application of this block. Further studies are needed to determine clinical efficacy and best technical approach of the TAP block for abdominal surgeries.

REFERENCES
