INTRODUCTION

- Circumcision is one of the most frequent surgical procedures for pediatric males. Dorsal penile nerve block (DPNB)1 has been approved for this procedure.2
- We describe a new, modified ultrasound-guided in-plane penile block technique in pediatric patients undergoing circumcision and compare this technique to patients who received DPNB landmark technique.

MATERIALS AND METHODS

- After obtaining informed consent and IRB approval, 32 patients were identified undergoing circumcision and divided into 2 groups, ultrasound-guided (US) and DPNB landmark (LM) technique.
- Penile and surrounding area were prepped steriley after induction of general anesthesia.
- A Linear ultrasound probe (5 to 10 MHz) was used. Probe was placed transversely along the base of penis with gentle traction of penis (Figures 1 & 2).
- After recognizing the anatomical structures, needle was advanced using the in-plane technique under real-time ultrasound guidance.
- After passing through Buck’s fascia, needle tip was positioned lateral to dorsal artery. One ml of plain 0.25% bupivacaine was injected after negative aspiration under direct vision.3

STATISTICAL ANALYSIS

- For continuous-type outcomes, a Wilcoxon rank sum test and for binary outcomes, a Fisher’s exact test were applied.

RESULTS

- No significant difference in age, weight, and pain level on PACU arrival (P > 0.05).
- Use of bupivacaine larger in LM group vs US group (median 6 ml vs 2 ml; p-value < 0.001).
- Total intra-operative opioids used was larger in LM group versus US group (median 0.14 mg/kg vs 0.03 mg/kg; p-value = 0.001).
- No significant difference was found between the two groups for postoperative opioids use (P-value = 0.324).
- The LM group was approximately 1.8 times more likely to require rescue medication and approximately 2.14 times more likely to have a complication than the ultrasound-guided group.
- Ultrasound group took the rescue medication 21.5 minutes in median later than the LM group, this difference indicating the ultrasound-guided group had a more lasting effect than the DPNB group.

DISCUSSION

- Ultrasound imaging techniques in regional anesthesia is a leading change in pediatric regional anesthesia.
- It allows the practitioner to visualize the target and surrounding structures, maneuver the needle under real-time observation and correctly administer the local analesics at target.
- Our data suggested: less use of local anesthetic volume, less intraoperative use of narcotics, longer time for rescue pain medication, and less vomiting in US group as compared with the LM technique.
- This technique is easy to learn and requires less time to perform without prolonging the surgical times and disturbing the field.

Ultrasound allows the three-dimensional anatomy of the penile structures and allows the needle placement directly into the substance of Buck’s fascia and avoiding the problems that could occur.

CONCLUSION

- The limitation of this pilot study is the small number of study subjects.
- Ultrasound-guided dorsal penile nerve block shows to be a reliable technique that minimizes adverse events.
- We advocate the ultrasound-guided dorsal penile nerve block technique to improve clinical care for patients undergoing circumcision.

REFERENCES

5. Griffin J, Nicholas B. Ultrasound in regional anaesthesia. Anaesthesia 2010; 65:1-12

Table 1. Comparison of Baseline Variables/Continuous-type Outcomes between 2 Groups

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Ultrasonography (N=16)</th>
<th>DPNB LM (N=16)</th>
<th>Wilcoxon</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>6.0 (5.9, 9.0)</td>
<td>6.5 (5.0, 10.0)</td>
<td>0.985</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>21.5 (19.1, 33.7)</td>
<td>23.0 (19, 132.4)</td>
<td>0.806</td>
<td></td>
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<tr>
<td>Pain on Arrival</td>
<td>0 (0, 0)</td>
<td>5 (0, 0)</td>
<td>0.099</td>
<td></td>
</tr>
<tr>
<td>Bupivacaine (mL)</td>
<td>2.00 (1.0, 3.0)</td>
<td>6.00 (4.0, 9.0, 0.0)</td>
<td>-0.001</td>
<td></td>
</tr>
<tr>
<td>Total intra-operative opioids (mg/kg)</td>
<td>0.00 (0.0, 0.0)</td>
<td>0.14 (0.0, 0.19)</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Post-op opioid requirement (mg/kg)</td>
<td>0.00 (0.0, 0.0)</td>
<td>0.00 (0.0, 0.08)</td>
<td>0.324</td>
<td></td>
</tr>
<tr>
<td>Time to first rescue medication (min)</td>
<td>55.5 (54.5, 56.5)</td>
<td>3.40 (16.8, 3.5)</td>
<td>0.014</td>
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</table>

Table 2. Comparison of Binary Outcomes between Two Groups

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Ultrasonography (N=16)</th>
<th>DPNB LM (N=16)</th>
<th>OR (95% CI)</th>
<th>Fisher's exact p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rescue medication required (yes/no)</td>
<td>4 (25%)</td>
<td>6 (38%)</td>
<td>0.8 [0.38, 2.2]</td>
<td>0.704</td>
</tr>
<tr>
<td>Complications (nausea/vomiting)</td>
<td>1 (6%)</td>
<td>2 (13%)</td>
<td>2.14 [0.726, 3.1]</td>
<td>0.999</td>
</tr>
</tbody>
</table>

*The only complications reported were nausea/vomiting.

1. Ultrasound-guided Penile Nerve Block for Circumcision: A New, Modified In-Plane Technique Suggesting Lower Anesthetic Volume and Narcotic Use

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