Is penile block better than caudal epidural block for postcircumcision analgesia?

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Abstract
Purpose. To compare caudal and penile block for postoperative analgesia in children undergoing circumcision with respect to efficacy, complication rates, and parental satisfaction.
Methods. The study population consisted of 100 ASA I and II boys aged 3 to 8 years who were undergoing circumcision for religious reasons. In all participants, inhalation anesthesia was administered with oxygen: nitrous oxide (1:2) and halothane. The participants were allocated randomly into two groups of 50 children each. Group 1 received penile block and Group 2 caudal block. The penile block was achieved by injecting bupivacaine into the two compartments of the subpubic space, with an additional ventral infiltration of a small volume of bupivacaine along the raphe of the penis. For caudal block, 1 ml·kg⁻¹ body weight of 0.25% bupivacaine was administered.
Results. Penile block shortened the induction-incision time and enabled earlier discharge home compared with caudal block. One patient undergoing penile block and nine patients undergoing caudal block vomited.
Conclusions. Penile and caudal block are equally effective for postcircumcision analgesia and neither is associated with serious complications. Anesthesiologist preference should be the deciding factor in choosing one technique over the other.

Key words Postoperative analgesia · Circumcision · Penile block · Caudal block

Introduction

Jewish ritual circumcision is performed usually in newborns and rarely in older children. Circumcision is the most commonly practiced surgical procedure in children [1], with approximately 1200000 performed in the United States in 1992 [2]. Since most circumcisions are performed in newborns, it is difficult to assess the intensity of postoperative pain. It is widely accepted that pain control should be provided after circumcision for ethical, humanitarian, and physiological reasons [3,4].

Caudal block and penile block are widely used for postoperative analgesia, but the best technique for postcircumcision pain control has not been determined to date. The large wave of immigration from the former Soviet Union to Israel provided us a population who could self-report pain intensity and assess the quality of postoperative analgesia after circumcision.

The aim of this study was to compare the quality of postcircumcision analgesia with penile block or caudal anesthesia in children aged from 3 to 8 years using a visual scale.

Methods

The ethics committee of the hospital approved the study, and informed written consent was obtained from all the subjects’ parents.

One hundred consecutive ASA I and II children aged from 3 to 8 years undergoing circumcision for religious reasons were enrolled in this study and allocated to two groups of 50 patients each by a lottery of closed envelopes.

General anesthesia was induced in all patients with halothane in an admixture of nitrous oxide:oxygen (2:4 l·min⁻¹). Once adequate anesthesia was obtained, penile block was performed in the 50 patients in Group 1 by injection of bupivacaine 0.5%, 0.2 ml·kg⁻¹ of body weight into the two compartments of the subpubic space, which is traversed by the nerve before it enters the base of the penis [5]. An additional amount of the same local anesthetic (0.1 ml·kg of body weight) was
injected into the dorsal aspect of the penis, along the raphe of the penis near the scrotum [6]. In the 50 patients in Group 2, caudal block was carried out in the lateral position, with 1 ml·kg\(^{-1}\) body weight of plain 0.25% bupivacaine (up to 20 ml).

In both groups, after the block was accomplished, anesthesia was maintained with halothane 0.5% in 70% nitrous oxide [7] delivered through a Jackson-Rees attachment and face mask with spontaneous respiration. When signs of insufficient anesthesia, such as phonation, movements, tachycardia, and hypertension, were observed, the concentration of halothane was increased until the signs disappeared. Significant bradycardia and hypotension were treated by administration of atropine, fluids, or both, as required.

A circulating operating room nurse who was unaware of the block technique recorded the induction-incision time (the time interval from the beginning of the halothane administration until the beginning of surgery).

An anesthesiologist who was not involved in the study reviewed the automatic record of the anesthesia monitor (ASA 3, Datex, Instrumentarium Corp, Helsinki, Finland) at the end of each procedure. A variation of 20% or more in blood pressure and pulse rate in either direction was considered clinically significant [8].

Immediately after surgery, the children were transferred to the recovery room where a nurse who was unaware of the study protocol applied the five-point Faces Pain Assessment Ruler [9] (Fig. 1) when the child was fully awake for pain intensity self-assessment. Other parameters recorded in the recovery room were time to respond to commands (TRC), discharge time to the day care infirmary, and complications. When the pain assessment indicated a distressing or excruciating degree of severity, 15 mg·kg\(^{-1}\) of body weight of oral paracetamol, as syrup or tablet according to the child’s preference, was administered for postoperative pain relief.

The children were discharged home from the day care infirmary after 120 min, unless any complication occurred, in which case the clinic nurse recorded the cause of delay in discharge to home.

Table 1. Comparative data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1</th>
<th>Group 2</th>
<th>(P) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)</td>
<td>5 ± 2</td>
<td>5 ± 2</td>
<td>0.41</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>20 ± 4</td>
<td>20 ± 4</td>
<td>0.64</td>
</tr>
<tr>
<td>Induction-incision time (min)</td>
<td>4.5 ± 1</td>
<td>6.4 ± 1.8</td>
<td>0.001</td>
</tr>
<tr>
<td>Pain score</td>
<td>1.0 ± 1.2</td>
<td>1.5 ± 2.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Paracetamol in recovery room (n)</td>
<td>0/50</td>
<td>2/50</td>
<td>0.324</td>
</tr>
<tr>
<td>Time to discharge home (min)</td>
<td>122 ± 4.6</td>
<td>159 ± 46</td>
<td>0.001</td>
</tr>
</tbody>
</table>

The parents were requested to observe and record the need for paracetamol at home during the first postoperative day and to report it to the case surgeon at the routine 24-hour postoperative visit. The parents were also asked to rate their degree of satisfaction with the postoperative course by means of a 10-cm visual analogue scale (0, not satisfied at all; 10, extraordinarily satisfied).

Statistical analysis was performed with the Epi-Info (CDC, Atlanta, GA, USA) Software Package. Fisher’s exact test was applied for qualitative data and Student’s \(t\)-test for quantitative data. A \(P\) value <0.05 was considered statistically significant.

Results

Table 1 summarizes the comparative results between the two groups.

There were no differences related to age and weight between the children of the two groups. The induction-incision time was 4.5 ± 1 min in group 1 and 6.4 ± 1.8 min in Group 2 (\(P < 0.001\)). There was no difference in pain severity between the two groups (\(P = 0.10\)). Paracetamol was given in the postanesthesia care unit to two patients of Group 2 and in none of Group 1 (\(P = 0.324\)).