Pediatric circumcision using n-butyl-cyanoacrylate plus MS monomer: bacteriostatic and cosmetic advantages over suture

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CIRCUMCISION

- Partial or complete removal of the penis foreskin (prepuce)

- 75% of male population of the United States
ADVANTAGES

• Minor risk of urinary tract infections (UTIs) and penile skin inflammation (e.g. balanitis, posthitis and balanoposthitis)

• Partial protection against sexual transmitted infections (STIs), such as HPV, HSV-2 and HIV

*Morris BJ et al. BMC Pediatr. 2012*
ADVANTAGES

• Decreased risk of invasive penile cancer (as predisponing condition are very uncommon)

Morris BJ et al. ISNR Urol. 2014
INTRODUCTION

• Different techniques have been described

• As adsorbable sutures leave stitch marks along the suture line, the use of glue has been introduced and widely increased
AIM OF STUDY

To test bacteriostatic and cosmetic effects of tissue glue in wound approximation of children circumcision, compared to adsorbable sutures.
MATERIALS

• Surgical Glue: Glubran 2 (0.25 ml) n-butyl cyanoacrylate plus MS monomer (NBCA-MS) by GEM S.r.l. Viareggio, Italy

• Suture: polyglycolic acid 5-0 stitches
MATERIALS
METHODS

Between January 2013 to January 2016
100 boys (range 18 months – 14 years) underwent elective circumcision

73 ethnical/religious reasons
27 phimosis
METHODS

Circumcision
n=100

Suture group
n=50

A (antibiotic)
n=25

B (no antibiotic)
n=25

Glue group
n=50

A (antibiotic)
n=25

B (no antibiotic)
n=25
SURGICAL TECHNIQUE

• The penis foreskin is placed in traction and the skin is incised with the cold-scalpel
• The skin is separated from dartos by round-tip scissors and it is excised with part of the mucosal cuff
• To approximate the wound margins, the frenulum preputii is matched with the raphe penis and the edges are aligned holding the skin together by forceps
In the “suture group”, 4 stitches for each side (approximatively) were employed.
...than the procedure was different in the two groups

In the “glue group” we applied Glubran2 protecting glans and urethra with a damp gauze; edges were held together until the glue was dried (about 1’ each)
GLUE AND SUTURE PROCEDURE
METHODS

After surgery, in each group:

• subgroup A received 6 days of *Amoxicillin/clavulanic acid* (45 mg/6,4 mg/kg/day) and *Neomycin sulfate* topical cream (twice a day)

• subgroup B did not receive any post-operative drugs
METHODS

The post-operative pain score has been assessed after 4, 8 and 24 hours, utilizing Children and Infants Postoperative Pain Scale (ChIPPS)

<table>
<thead>
<tr>
<th>Item</th>
<th>Score 0</th>
<th>Score 1</th>
<th>Score 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crying</td>
<td>None</td>
<td>Moaning</td>
<td>Screaming</td>
</tr>
<tr>
<td>Facial expression</td>
<td>Relaxed smiling</td>
<td>Wry mouth</td>
<td>Grimacing</td>
</tr>
<tr>
<td>Posture of the trunk</td>
<td>Neutral</td>
<td>Variable</td>
<td>Rear up</td>
</tr>
<tr>
<td>Posture of the legs</td>
<td>Neutral</td>
<td>Kicking</td>
<td>Tightened</td>
</tr>
<tr>
<td>Motor restlessness</td>
<td>None</td>
<td>Moderate</td>
<td>Restless</td>
</tr>
</tbody>
</table>

Buttner W, Finke W. Paediatr Anaesth, 2000;10:303-318
METHODS

Wound was examined on 7th postoperative day to evidence:

- edema

- signs of infection (local pain, erythema, serous/seropurulent discharge)
METHODS

Scars were evaluated after 30 and 180 days:

- Sufficient
- Good
- Excellent

on VAS for scar evaluation

R Fearmonti et al. Eplasty 2010
RESULTS

Post-operative complication

No patients of both group experienced any post-operative complication (no bleeding, no dehiscence)
RESULTS

Operation time:

significantly higher in the suture group

(20 vs 14 minutes - P < 0.001)
RESULTS

Postoperative pain:

less duration and severity in the glue group (but not significantly different)
# RESULTS

## Post-operative pain, according to ChIPPS

<table>
<thead>
<tr>
<th></th>
<th>After 4 hours</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Suture</strong></td>
<td>0</td>
<td>17</td>
<td>33</td>
<td>13</td>
<td>22</td>
<td>15</td>
<td>31</td>
</tr>
<tr>
<td><strong>group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Glue</strong></td>
<td>9</td>
<td>29</td>
<td>12</td>
<td>14</td>
<td>29</td>
<td>7</td>
<td>42</td>
</tr>
<tr>
<td><strong>group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$P^*$</td>
<td>ns</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>

* for appropriate Fisher test, mild and moderate pain columns were joined
RESULTS

Edema (7\textsuperscript{th} day)

7 (14\%) cases in suture group
4 (16\%) in subgroup A
3 (12\%) in subgroup B
RESULTS

Infections (7th day)

5 (10%) serous discharges in suture group,
5 (20%) in subgroup B
Comparison of infection rate between the groups after 7 days.

<table>
<thead>
<tr>
<th></th>
<th>Infection</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suture group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>5 (10%)</td>
<td>5 (10%)</td>
</tr>
<tr>
<td><strong>Glue group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td></td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
RESULTS

Infections (7\textsuperscript{th} day)

The incidence of infection in suture group as compared to glue group was statistically significant (P < 0.001)
FOLLOW - UP

After 30 days:

the regularity of the wound edges and the overall cosmetic results were better in the glue group (P < 0.001)
Esthetical results after 30 days

<table>
<thead>
<tr>
<th></th>
<th>Sufficient</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Suture group</td>
<td>18 (36)</td>
<td>29 (58)</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Glue group</td>
<td>0 (0)</td>
<td>18 (36)</td>
<td>32 (64)</td>
</tr>
<tr>
<td>(P^*)</td>
<td></td>
<td></td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>
After 180 days:

cosmetical advantage of tissue glue was further confirmed (P<0.001)
Esthetical results after 180 days

<table>
<thead>
<tr>
<th></th>
<th>Sufficient</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
<td>$n$ (%)</td>
</tr>
<tr>
<td>Suture group</td>
<td>13 (26)</td>
<td>32 (64)</td>
<td>5 (10)</td>
</tr>
<tr>
<td>Glue group</td>
<td>0 (0)</td>
<td>16 (32)</td>
<td>34 (68)</td>
</tr>
<tr>
<td>$p^*$</td>
<td></td>
<td>&lt; 0.001</td>
<td></td>
</tr>
</tbody>
</table>
Estethetical results after 180 days

A: GLUE GROUP

B: SUTURE GROUP
CONCLUSION # 1

In the glue group operation time was significantly shorter and cosmetic results were significantly better compared to the suture one
CONCLUSION # 2

The possibility of avoiding the administration of a post-operative antimicrobial therapy is considerably advantageous in pediatric patients.
CONCLUSION

For all these reasons, surgical tissue glue should be considered a better alternative to adsorbable sutures in pediatric circumcision.
THANK YOU !