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## Sutureless circumcision: a prospective randomised controlled study

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**Abstract** Our aim was to study the advantages of glue versus sutures for circumcision in children. A randomised prospective controlled study was conducted with 152 boys; glue was used on 80 and sutures on 72). The procedures were quicker and the duration and severity of postoperative pain were significantly less ( $p < 0.001$ ) in the cases in which glue was used. The tissue glue is a perfectly feasible alternative to sutures for circumcision in children and has potentially significant advantages.

**Keywords** Tissue glue · Circumcision · Children

### Introduction

Circumcision is one of the most common surgical procedures [1]. The technique varies from excision without suturing, to Plastibell with ligature, to wound approximation with sutures. The application of tissue glue for circumcision in children [2] has not been well accepted, although it has been used for facial lacerations [3]. A recent randomised study comparing glue with sutures in circumcision concluded that glue application is a feasible alternative but offers no extra advantage when compared with suturing [4]. Another study has shown that tissue glue results in the most efficient use of resources [5] and that the antibacterial property of the glue is beneficial [6]. Our aim was to study the advantages of glue versus sutures for circumcision in children.

### Materials and methods

One hundred and fifty-two boys were randomised prospectively to receive either glue or suturing for wound approximation in circumcision. Informed consent from the parents was obtained at the time of admission to the day surgery. All boys undergoing circumcision in day surgery, performed by the authors, were included in the study. The boys with partially buried penis, pseudo-buried penis caused by obesity, bleeding disorders, and known or presumed allergy to tissue glue were excluded from the study. The glue used was Histoacryl. The sutures used were catgut 6/0 or 1/2 length PDS 6/0, as per the surgeon's preference.

The time to wound approximation following the circumcision and haemostasis was recorded by an independent observer in the operating suite. The outcome measures used were wound healing and cosmesis, scab formation, postoperative pain and comfort levels, and time to wound closure. An independent observer assessed the cases at weekly intervals. Parents were given pain score charts, and these, along with their comments, were given to the independent observer. The respective surgeon reviewed each patient 2 weeks after the operation.

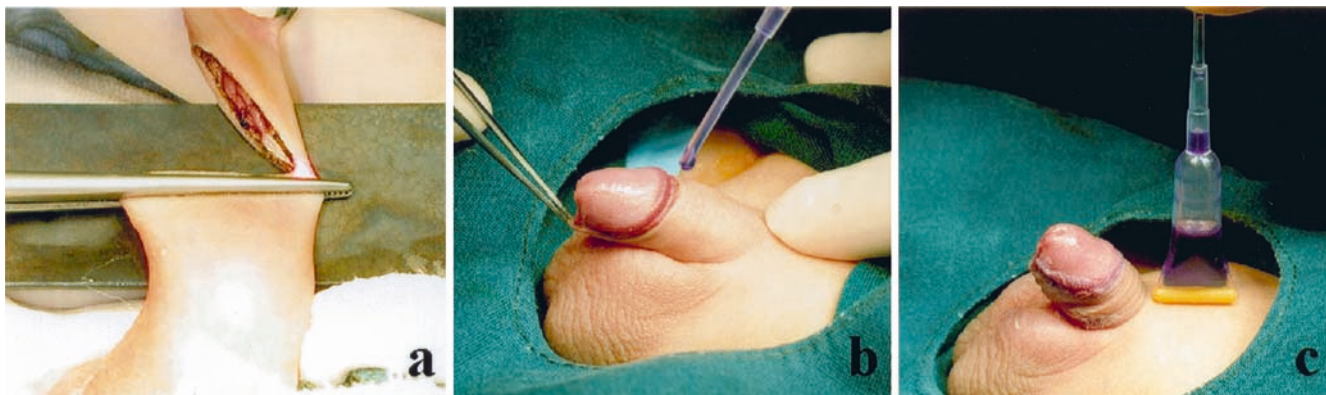
SPSS was used for statistical analysis with the *t*-test and chi-square test. The Mann-Whitney test was used for nonparametric data. The study was approved by the hospital's ethics committee.

### Technique

The outer and inner layers of the prepuce were cut with the CO<sub>2</sub> laser, as is the established practice in our department. Haemostasis was achieved with either the laser or a bipolar diathermy, as per the surgeon's preference. In the suture group, the mucosal cuff and the outer skin were approximated with interrupted 6/0 PDS (1/2 length) or 6/0 catgut as per individual preference. In the glue group, similar approximation was achieved with the single circumferential application of the glue. The tip

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**Fig. 1** a Circumcision being performed with CO<sub>2</sub> laser. b No-touch technique for applying the glue. A long pointed nozzle helps with the application. c End result of circumcission

of the nozzle was not in direct contact with the tissues, and the glue was dropped on the dorsal aspect, with the ventral aspect of the cut edges held together with a pair of forceps. (Fig. 1).

## Results

The two groups in the study were matched for age and race. The duration of the procedures, pain severity, and pain duration were significantly different ( $p < 0.001$ , Table 1) between the two groups. Other parameters, including bleeding, infection, and scabbing, were not significantly different. The regularity of the wound edge and, thus, the overall cosmesis was better in the group with glue but did not show statistical significance. In one patient with a major postoperative bleed, the penile shaft swelling was remarkable, but the glue did not separate. When the procedures were compared between siblings, parents preferred the glue to sutures, the reasons given including less pain and better cosmesis. There were no allergic reactions to tissue glue.

## Discussion

The use of tissue glue is not new to paediatric surgeons [2, 3, 4], and particularly the use of cyanoacrylate for

circumcision [2, 4] has been reported. However, the advantages of glue over sutures have not been established. An earlier prospective study has shown it to be a feasible alternative with no obvious advantages and with prolonged operative times [4].

In our study we have shown that the operating time is reduced significantly by using glue. The duration of the operation measured in the previous study probably included the entire operation [4]. If this is true, then the operating time is misleading. As in our study, it is more accurate to compare the time taken to achieve approximation of the cut edges with either method.

In our experience, the duration of pain and its severity is also significantly less with the glue compared with sutures. Parents prefer the glue for similar reasons. The use of glue is not associated with any increased risk compared with conventional sutures.

We used a single linear application of the glue to the cut edges, unlike earlier reports that suggest that 8–10 linear applications are required. In a study in children from the department of emergency medicine, the use of tissue glue for facial lacerations resulted in the most efficient use of resources and was preferred by a majority of the parents [5]. The antibacterial effect of the tissue glue is beneficial to patients, and a study has demonstrated that Histoacryl vials do not become contaminated after repeated use [6].

Unlike earlier researchers, we believe that using glue to approximate circumcission wounds saves operative time, is associated with less postoperative pain (severity and duration), and probably is more cosmetically appealing.

**Table 1** Statistics comparing circumcission using glue or sutures (NS not significant)

	Glue	Sutures	P-value
Number	80	72	NS
Age(years; mean)	6.96	7.61	NS
Operation time (min) <sup>a</sup>	0.54; 0.20–4.56	3.34; 2–11.50	<0.001
Pain duration (days) <sup>a</sup>	0; 0–2	2; 0–3	<0.001
Pain severity (score) <sup>a</sup>	1; 1–6	2; 1–8	<0.001
Bleeding	3	2	NS
Infection	1	1	NS

<sup>a</sup>Values indicate median; minimum to maximum

## References

- Williams N, Kapila L (1993) Complications of circumcission. *Br J Surg* 80:1231–1236
- Zafar F, Thompson JN, Pati J, Kiely EA, Abel PD (1993) Sutureless circumcission. *Br J Surg* 80:859
- Elmasalme Matbouli SA, Zuberi MS (1995) Use of tissue adhesive in the closure of small incisions and lacerations. *J Paediatr Surg* 30:837–838
- Cheng W, Saing H (1997) A prospective randomised study of wound approximation with tissue glue in circumcission in children. *J Paediatr Child Health* 33:515–516

5. Osmond MH, Klassen TP, Quinn JV (1995) Economic comparison of a tissue adhesive and suturing in the repair of pediatric facial lacerations. *J. Pediatr* 126:892–895
6. Quinn JV, Osmond MH, Yurack JA, Moir PJ (1995) N-2- Butylacrylate: risk of bacterial contamination with an appraisal of its antimicrobial effects. *J Emerg Med* 13:581–585