

# Sutureless versus sutured circumcision: A comparative study

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## Abstract

**Introduction:** Today is the era of “wireless” in technology and here comes era of “sutureless” in the field of surgery. Every surgeon wishes for better wound healing with better cosmesis without complications and early back to routine activities. All this is possible by use of adhesive for wound edges of circumcision is shown by us in this study. In addition, other aim was to study the efficacy, safety, functional outcome, and cosmesis of isoamyl cyanoacrylate when used as adhesive for wound edges of pediatric circumcisions.

**Materials and Methods:** Group A comprised 162 pediatric patients who underwent sutureless circumcisions and Group B comprised a similar number, i.e., 162 pediatric patients who had undergone circumcision by conventional method using absorbable interrupted sutures. Comparative analysis of both the groups was done based on various parameters such as bleeding, infection, foreign body reaction, excessive swelling, and wound dehiscence. In addition, visual analog pain scoring was done after 6 h and after 12 h postoperative.

**Results:** Complications were more commonly seen in sutured Group B versus sutureless circumcision-Group A. In addition, postoperative pain and need of analgesics were seen more commonly in sutured Group B patients. Wound healing and final cosmesis were far better in Group A patients.

**Conclusion:** Our results show that isoamyl cyanoacrylate is comparatively safe, efficient, has better functional outcome and good cosmesis when used as adhesive for wound edges of pediatric circumcisions. Sutureless circumcision technique is better than conventional sutured circumcision.

**Keywords:** Circumcision, isoamyl 2 cyanoacrylate, sutureless

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## INTRODUCTION

Every surgeon wishes to get better wound healing with least sequelae and with best cosmesis. We decided to try for sutureless technique for pediatric circumcisions using isoamyl cyanoacrylate as adhesive for wound edges of circumcision instead of conventional sutures.

### Aim

The aim of this study was to evaluate the safety, efficacy, functional outcome, and cosmesis of isoamyl

2-cyanoacrylate by comparing with the routinely used absorbable suture for closure of wound edges of pediatric circumcisions.

## MATERIALS AND METHODS

Two groups were made Group A, the experimental group comprising of patients who underwent sutureless circumcision Figure 1 and Group B, the control group comprising of patients who underwent circumcision using interrupted absorbable 4/0 or 5/0 suture as needed accordingly. One hundred and sixty-two patients

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underwent sutureless circumcision; they were then compared with similar number, i.e., 162 patients who underwent conventional circumcision using interrupted absorbable suture. Thus, totally, 324 patients were included in this core study group, a prospective study, all operated by a single surgeon (author) in a span of 3½ years with consent being taken from all parents before the procedure, after explaining them. Their age ranged from 1½ years up to 14 years with average age as 2 years 7 months. Patients with phimosis, balanoposthitis, recurrent balanoposthitis and balanitis xerotica obliterans, recurrent urinary tract infection (UTI) were included in this study group. Those patients with paraphimosis and those lost to later follow-up were excluded from this core study group of 324 patients. All these pediatric circumcisions were performed by sleeve technique, only difference between two groups being technique of wound closure, sutureless closure i.e., wound edges closure was done using isoamyl cyanoacrylate versus using interrupted absorbable 4 0 or 5 0 suture. Different parameters such as pain, excessive swelling, bleeding, allergic reaction, wound infection were comparatively studied between the two groups. The excessive swelling was defined as swelling involving more than half of penile shaft. All patients were observed in immediate postoperative period for initial 24 h, then on follow-up on 4<sup>th</sup>, 7<sup>th</sup> postoperative day and after 1 month and 3 months follow-up. Parents were asked to report if any new findings in between these intervals. There was no need of dressing in cases done using sutureless technique i.e., Group A patients did not require any dressings. Parents were informed about bathing from day 5 after surgery.

## RESULTS

Comparative analysis between Group A (sutureless) and Group B (sutured) was done [Table 1]. Comparatively, problems were more commonly seen in Group B as compared to Group A, statistically also  $P = 0.00614$ , the result is significant at  $P < 0.01$ , and thus, overall Group B patients had a significant number of problems as compared to Group A. Bleeding, infection and excessive swelling were not seen in any of the patients of Group A, however, was seen in few patients of Group B. Considering foreign body reaction, it was seen in three patients in sutured group versus two in sutureless group. Wound dehiscence was seen in 1 patient in sutureless group versus none in sutured group. Statistically ( $P < 0.05$  significant), excessive swelling parameter was significantly seen in Group B patients, among the rest other parameters studied individually; otherwise statistically, there was not much significant difference between two group patients. Regarding postoperative

pain, the assessment was done using visual analog pain scale scoring system. Table 2 shows pain assessment 6 h postoperatively depicting mild pain more commonly in Group B as compared to Group A with no need of analgesics in any of these patients. Six h postoperatively moderate pain with need of analgesics was also seen more commonly in Group B for 13 patients as compared to only 5 patients from Group A. Table 3 shows pain assessment 12 h postoperatively depicting mild pain more commonly in Group B as compared to Group A with no need of analgesics in any of these patients. Twelve h postoperatively moderate pain with need of analgesics was also seen more commonly in Group B for 14 patients as compared to only 5 patients from Group A. Severe pain was not found in any of the group patients. Overall considering the pain parameter, mild and moderate pain was seen more commonly in sutured Group B; hence, requirement of analgesics was more common in sutured group i.e., Group B as compared to sutureless i.e., Group A patients. There was no age wise variation in pain parameter like more pain in younger or so. Wound healing was also found to be better in sutureless group patients [Figure 2]. In addition, patients with sutureless circumcision had better cosmesis both in early and late follow-up periods [Figure 3]. Considering patients with balanoposthitis or balanitis xerotica obliterans patients, they did not pose any different problem from phimosis-only patients as regarding sutureless technique, so they were included in this study group.

**Table 1: Comparative analysis of postoperative complications between two groups**

Complications	Isoamyl cyanoacrylate group (n=162)	Sutured group (n=162)	P
Bleeding	0	1	0.317
Infection	0	3	0.248
Excessive swelling	0	7	0.015
Foreign body (local) reaction	2	3	0.653
Wound dehiscence	1	0	0.317

$P < 0.05$ : Significant

**Table 2: Visual analog pain score of postoperative pain after 6 h**

	Group A (IAC)	Group B (sutured)
Mild (1-3)	9	21
Mod (4-6)	5	13
Severe (7-10)	0	0

IAC: Iso-amyl cyanoacrylate

**Table 3: Visual analog score of postoperative pain after 12 h**

	Group A (IAC)	Group B (sutured)
Mild (1-3)	14	27
Mod (4-6)	5	14
Severe (7-10)	0	0

IAC: Iso-amyl cyanoacrylate



Figure 1: Sutureless circumcision photo



Figure 2: Postoperative day 6 photo



Figure 3: Postoperative 1 month photo

## DISCUSSION

Circumcision is commonly performed surgical procedure. It is done for different reasons such as phimosis,

balanoposthitis, recurrent balanoposthitis and balanitis xerotica obliterans, recurrent UTI, religious, or cultural reasons etc.<sup>[1]</sup> There are different techniques of performing circumcision, however, in any case requires suturing of wound edges to complete the procedure. Suturing as in any case may result in wound infection, bleeding, tissue tear, needle prick injuries, granulations, tissue ischemia, foreign body reactions, suture tracks, scarring, etc., such are the immediate and delayed complications of suturing. Basics lies in supporting wound edges to prevent bleeding, infection and strengthening wound edges until healing increases their tensile strength, approximating skin edges for an esthetically pleasing and functional outcome. Wound closure techniques have evolved from the earliest development of nonabsorbable suturing materials to advanced modalities such as synthetic absorbable sutures, staples, and tissue adhesives. Here, we have used isoamyl cyanoacrylate as adhesive for approximation of wound edges playing a role of sutures and also have done comparative analysis of sutureless circumcision using isoamyl cyanoacrylate to approximate wound edges with conventional use of absorbable suture material for approximation of wound edges in pediatric patients. There are very few studies regarding such comparative analysis in the pediatric age group. Use of this adhesive was thought in view of sutureless procedure and to study its safety, efficacy, functional outcome, and cosmesis. Surgical complications of male circumcision can include excessive bleeding, hematoma formation, unsatisfactory cosmetic effect, lacerations of the penis and injury to the glans, too little or too much of foreskin excised, meatal stenosis, urinary retention, phimosis, and buried penis.<sup>[2]</sup> The two most common complications of circumcision are bleeding and wound infection.<sup>[2]</sup> The cyanoacrylate tissue glue has been claimed to have the advantages of being hemostatic,<sup>[3]</sup> bacteriostatic<sup>[4,5]</sup> and easy to use. The use of cyanoacrylate as tissue adhesive as an alternative to sutures has invoked curiosity and interest in the field of cosmesis and wound healing. Frase and Geode in their study found that 2-octyl cyanoacrylate is the feasible option over suture material for circumcision especially in children.<sup>[6]</sup> Arunachalam *et al.* showed that 2-octyl cyanoacrylate is cosmetically superior and its operative time is significantly less in comparison to suture group.<sup>[7]</sup> Kaye *et al.* published their wide experience with sutureless circumcision, and they concluded that it is safe, efficient, and a cosmetically appealing alternative to sutures which support our finding.<sup>[8]</sup> Compared to other cyanoacrylates iso amyl 2-cyanoacrylate has unique properties having faster tissue bonding capacity and curing, than octyl cyanoacrylate. Iso amyl 2-cyanoacrylate is superior to N-butyl cyanoacrylate

since it does not get brittle and fracture on long lacerations. Its fast polymerization, immediate hemostasis, excellent tensile strength, biocompatibility, ease of application, and bacteriostatic properties make it very effective and useful in closing surgical or wound incisions.<sup>[9]</sup> Our study shows use of isoamyl 2 cyanoacrylate as tissue adhesive instead of conventional absorbable interrupted suturing technique for pediatric circumcisions. Our results show that when isoamyl cyanoacrylate is used for pediatric circumcisions, there are less chances of bleeding, infection, lesser degree, and incidence of swelling, above all, there is less post-operative pain, hence lesser use of analgesics in our pediatric patients. In addition, wound healing was found to be better and with best final cosmesis in follow-up period as compared to sutured group patients. Our results show that isoamyl cyanoacrylate is comparatively safe, efficient, has better functional outcome and good cosmesis when used as adhesive for wound edges of pediatric circumcisions.

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#### Conflicts of interest

There are no conflicts of interest.

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