Pediatric Sutureless Circumcision Without Using Skin Closure Adhesives

A New Technique for Poor Setting

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INTRODUCTION

Circumcision is one of the most common procedures performed worldwide. Neonatal circumcision is mostly done due to social, cultural, personal, and religious reasons.[1] In 2005, 60% to 80% of boys in the USA were circumcised.[2,3]

World Health Organization has introduced medical male circumcision as a human immunodeficiency virus (HIV) preventive method.[4] Nevertheless, inadequate funding and concerns about the safety of the surgical procedure, as well as diverse misunderstanding about its safety and efficacy, have resulted in many men reluctance to circumcision.

Many various methods can be used for circumcision, but the two commonly used are the sleeve technique and use of the Plastibell® device. With the sleeve technique, the skin edges are approximated by interrupted stitches using non-absorbable suture materials. The main disadvantage of this method is unsatisfactory cosmesis.[5,6] On the other hand, proximal migration of the Plastibell® ring, due to use of an inappropriate size, may occur causing serious penile injury.[7]

For the skin closure in sleeve technique, the long chain derivatives of cyanoacrylate (CA), including n-butyl-CA and 2-octyl-CA, were developed with minor toxicity and good bonding strength.[6,8] However, the CA tissue adhesives are not

available in every community. Furthermore, cost of 2-octyl-CA glue is estimated to be around 15 USD for each patient.

Technique of sutureless circumcision, compared to the standard closure using interrupted sutures, has significant advantages in children, including better postoperative appearance, parental satisfaction, decreased inflammation and infection rates, and a diminished operative time.[6,9-11]

To promote large population-based circumcision programs, which might significantly reduce the spread of HIV and acquired immunodeficiency syndrome, an easy, safe, cost-effective, and cosmetically acceptable technique can be helpful. To the best of our knowledge, there have been no reports of pediatric sutureless circumcision without auxiliary measure for the skin closure.

CASE REPORT

From September 2007 to July 2010, a total of 126 children were circumcised by the same surgeon.

The indication for circumcision was ritual causes and none of our subjects had phimosis or other conditions, such as urinary tract infection or repetitive balanoposthitis.

The study was approved by the Medical Ethics Committee of Guilan University of Medical Sciences and all the parents of the children involved signed an informed consent allowing their child to participate.

TECHNIQUE

Seventy-one surgeries were performed under general anesthesia, due to parental preference, and 55 children underwent local anesthesia with dorsal penile block using lidocaine 0.25%. First, the foreskin was completely retracted, freeing the adhesions from the glans. Thereafter, the skin was marked circumferentially with a surgical pen to afford a suitable tissue apposition. Mosquito forceps were applied to the tip of the foreskin ventrally and dorsally, and the foreskin was protracted. A straight

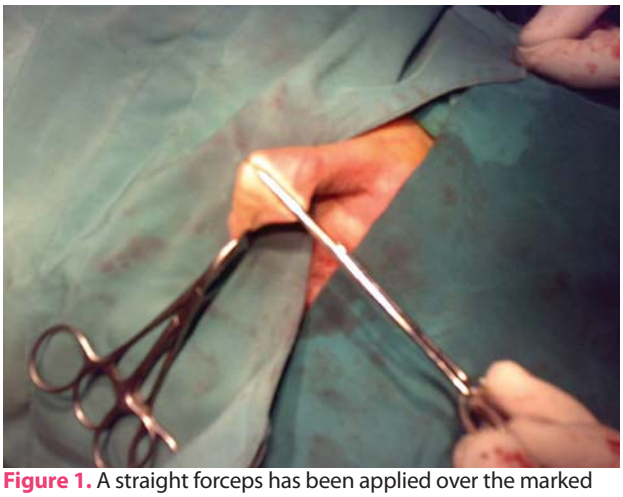

Figure 1. A straight forceps has been applied over the marked line above the glans.

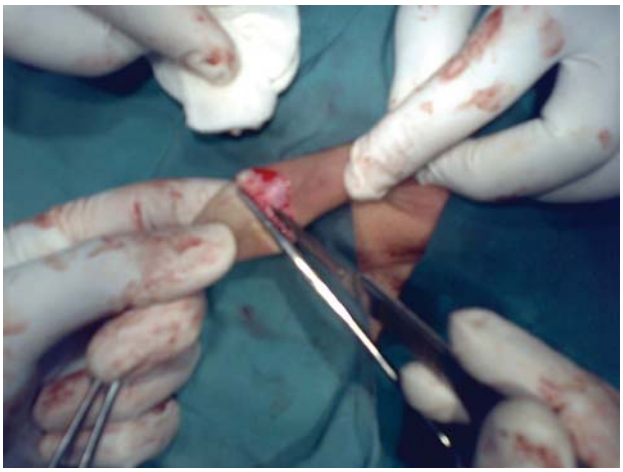

Figure 2. The foreskin is incised below the forceps using a scalpel blade through the skin and dartos fascia to the inner mucosa.

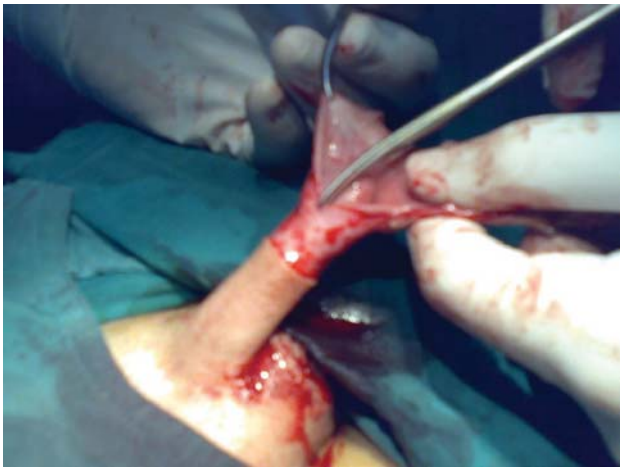

Figure 3. A dorsal slit is made through both layers of the prepuce back to the incision line of the skin.

Figure 4. The edges of incision have not been closed with sutures, and tissue–glue has not been applied.

Figure 5. Six-month post-operative result.

forceps was applied over the marked line above the glans (Figure 1). Care was taken to ensure that glans was not caught within the forceps. The foreskin was incised below the forceps using a scalpel blade through the skin and dartos fascia to the inner mucosa (Figure 2). Thereafter, a dorsal slit was made through both layers of the prepuce back to the incision line of the skin, and inner mucosa was trimmed with scissors, leaving an adequate mucosal cuff (Figure 3).

In all the children, the frenulum was sectioned with electric cauterization. Furthermore, meticulous hemostasis was secured with electric cauterization or ligation with 5-0 chromic suture for bleeding vessels if necessary. Particular attention was paid to provide complete hemostasis at the frenulum.

The incision was then cleansed, and the skin edges were aligned by upward moving of the penile shaft skin from its usual place below the incision to appose the distal mucosal collar. The edges of incision were not closed with sutures, and tissue–glue was not applied (Figure 4). No dressing was used. Covering gauze was used for 24 to 48 hours to prevent the raw and sensitive tissue from sticking to clothing. To prevent the repair from adhering to the glans or penile shaft skin, antibiotic ointment was applied to the wound for 1 week. Parents whose boys were still in diapers were instructed to leave the penis exposed at convenient times. The children were allowed to bathe after 72 hours as their usual habit after discharge from the hospital.

The duration of the circumcision was recorded by the circulating nurse, since the penile block or foreskin retraction until the covering was done. After the operation, the children were sent home with a prescription of acetaminophen every 6 hours on the day of the surgery and on the following days only if necessary. Parents were told to return to the hospital at any time if anything unusual occurred.

Routine follow-up was done on days 3, 15, 45, 60, and at 12 months after the surgery. The following parameters were addressed: wound infection, dehiscence, hemorrhage, and cosmetic appearance. All parents completed a non-validated satisfaction survey (Appendix). Data were expressed as mean ± standard deviation.

RESULTS

The mean age of the children was 36 ± 11 months (range, 4 months to 6 years). The mean operating

time was 7.12 ± 1.82 minutes. In 7 (5.6%) children, after excision of the prepuce, the skin edges (penile shaft skin and distal mucosal collar) were not apposed spontaneously without traction, and a standard sutured repair was carried out.

One-hundred and nine (91.6%) parents were "very satisfied" with the 12-month postoperative appearance and with the operation being carried out as a day procedure. One (0.8%) parent was "dissatisfied" with the results. No parent stated they were "very dissatisfied".

Six (5.0%) children represented with an apparent dehiscence at ventral aspect 2 to 3 days after surgery. These minor deficits were managed conservatively and the final cosmetic results were satisfactory to both patients and surgeons.

Other complications included minor postoperative bleeding in 8 (6.7%) subjects, which were managed by compressive dressing, and meatal stenosis in 4 (3.4%), which might be due to extensive diathermy used near the frenulum. Hematoma or bleeding requiring additional intervention did not occur. Adhesion or skin bridge, distortion, fistula, and abnormal scarring did not happen in any children, and nearly all the subjects had very good or excellent cosmetic results. Figure 5 shows postoperative condition after 6 months. Parents of 111 (93.3%) children wanted their next son undergo this operation as well.

DISCUSSION

Circumcision is one of the oldest and most frequently performed operations with some potential complications. Many surgeons use interrupted chromic or plain catgut sutures to appose the skin edges. In some reports, tissue glue for the skin edges reapproximation has demonstrated acceptable cosmetic results.[6,12,13]

In a prospective randomized controlled study, the advantages of tissue glue versus sutures for circumcision were compared in 152 boys.[9] Glue was used in 80 and sutures in 72 subjects. The authors reported a superior cosmetic result following tissue glue approximation, which did not reach statistical significance. In a further 252 cases of sutureless circumcision with tissue glue approximation, there were two postoperative complications of wound dehiscence.[9] The authors concluded that the sutureless circumcision technique should be reserved for boys under the age of 12 years due to the increased risk of wound dehiscence following penile erection.

In another study by Cheng and colleagues, 40 boys underwent circumcision with tissue glue and 46 boys underwent circumcision with suturing; the age range of the patients was 1 to 11 years. The cosmetic results of the two groups were comparable. Furthermore, the incidence of bleeding and infection was similar.[12] In the above-mentioned study, the only significant finding was that the median length of surgery with tissue glue application was longer than conventional suturing; however, this has not been reported in other studies.[9,10] In a most recent systematic literature review, Lane and associates concluded that sutureless circumcision in children seems to have significant advantages to the standard closure technique, using interrupted sutures.[11]

Circumcision endures potential complications, including bleeding, infection, dehiscence of the wound, meatal stenosis, cosmetic failure due to abnormal scarring, penile injury, such as glanular necrosis and glans and penis amputation, and urethral injury, such as urethrocutaneous fistula.[14-16]

Bleeding can occur at a variety of points during circumcision and typically happens at the frenulum as apposed to the preputial excision line. This complication can be reduced by adequate hemostasis during surgery using bipolar electrocautery and suture ligature. The reported rate of bleeding as the early complication of circumcision was between 0.1% and 35%.[17] Ben Chaim and coworkers reported acute bleeding after circumcision in 24% of their patients.[18] However, Wiswell and colleagues

reported excessive bleeding in 3 out of 478 boys who underwent circumcision beyond the neonatal period.[19] With this technique, meticulous hemostasis has outmost importance, because bleeding can be worrisome for parents and the child may require re-operation. To avoid the bleeding, we achieved excellent hemostasis. In our study, minor bleeding occurred in 8 (6.7 %) patients within few hours after the operation and all of them were managed by compressive dressing.

Tissue adhesives have some complications, especially if applied by inexperienced surgeon. In circumcisions using tissue glue, meticulous skin edges apposition is important, since insertion of tissue glue into the skin edges can slow the healing process and may result in a foreign body reaction.[20] Even with the newer formulation of CA tissue adhesives, such as 2-octyl CA, run down of tissue glue can be challenging and may result in unwanted adherence of the incision to the glans or penile shaft.[6] Furthermore, to avoid difficult skin releasing, it is mandatory to take away any forceps prior to polymerization of tissue adhesives. Using tissue glue in children with hidden penis, even partial, can lead to unwanted complications.[6] Elmore and associates recommended that tissue glue should not be used by those who depend on sutures to manage unsatisfactory skin edge apposition or for hemostasis.[6]

Recent data stating that circumcision confers significant protection against the spread of HIV has raised considerable interest in the procedure.[21,22] The HIV is very highly prevalent in many underdeveloped countries, mainly in sub-Saharan Africa, where usually medical resources are very limited and the parents have to pay for circumcision.

The cost of 2-OCA is around 15 USD per vial while chromic suture costs about 7 USD. Furthermore, longer operating time is required for wound closure, either with sutures or tissue glue. In our study, the mean time taken for circumcision was about 7 minutes. Elmore and colleagues reported that their standard suturing time was approximately 10 minutes; and using 2-OCA yielded a time savings of 7 minutes per case.[6] Therefore, it represents a significant time-saving advantage. Reducing the operating time might reduce the circumcision cost. Therefore, cost-effectiveness, time savings, and acceptable results make this method very suitable in some communities.

We could find no applicable validated questionnaire to accurately evaluate parental satisfaction with circumcision results. However, the results from non-validated postoperative questionnaire used in the present study indicated very good or excellent parents' satisfaction.

In Iran, about two generations ago, circumcision was being performed by traditional method without suturing to appose the skin edges. Nowadays, in our country, there are millions of middle-aged men who have been circumcised with the above-mentioned traditional method with very good or excellent cosmetic results. This was the rational for performing the present study.

To the best of our knowledge, sutureless circumcision without using tissue glue has not been reported previously. Sutureless circumcision without wound closure appears to be a reliable, cost-effective, and safe method of circumcision that significantly reduces the operative time. This method provides very good or excellent cosmetic results and can be recommended for some communities.

CONFLICT OF INTEREST

None declared.

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APPENDIX

Non-validated parents' questionnaire used at follow-up evaluation 12 months postoperatively.

1. Are you pleased with the results of the circumcision/surgery?
- ☐ Very satisfied
- ☐ Moderately satisfied
- ☐ Satisfied
- ☐ Dissatisfied
- ☐ Very dissatisfied

2. How would you evaluate this technique?
- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Negative

3. Would you like your next son undergo this operation?
- ☐ Yes
- ☐ No