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ORIGINAL ARTICLE

Comparison of Outcomes of Circumcisions among Children 0-4 years by using Gomco Versus Plastibell Techniques

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ABSTRACT

Objective: We aimed to compare the rate of complications of Gomco and Plastibell circumcision techniques ininfants.

Study design: Prospective Randomized Clinical TrialStudy.

Place and duration of study: Department of Pediatric Surgery, Sheikh Zayed Hospital, Rahim Yar Khanfor six months from August 2020 to July 2021.

Patients and method: A total of 80 patients were enrolled in the study, equally divided into two groups. Group 1 included patients undergoing circumcision via the Gomco technique, while group 2 circumcised with the Plastibell method. All healthy male patients aged one day old to 4 years of age were included. Patients with any congenital abnormalities, e.g., urethral or penile shaft abnormality, local infection, hypospadias. Jaundice and bleeding disorders were excluded. All procedures weredone under local anesthesia, postoperatively topical antibiotic was prescribed to each patient. Data was entered and analyzed using SPSS 25.0. Frequencies and percentages were expressed for qualitative variables like gender and postoperative outcomes, i.e., bleeding, penile edema, and redundant skin. Mean ± S.D represented quantitative variables like age, weight, and BMI. A Chi-square test was used to compare the complication rate between both groups. A p-value ≤0.05 was considered significant.

Results: In the Gomco technique, there was no Penile edema, surgical site infection, hematoma, and need for Repeat surgery/manipulation. We found that bleeding was more common in Gomco compared to Plastibell. On the other hand, penile edema, reductant skin, slipped ring, and the need for repeated surgery/manipulation was more often in the Plastibell technique.

Conclusion: We propose using the Gomco method for circumcision because of its lower rate of complication and better aesthetic outcome than the Plastibell method.

Keywords: Circumcision, Gomco, Infant, Plastibell.

INTRODUCTION

When it comes to medical procedures, circumcision is one of the oldest and most often used. Many Jewish, Islamic communities and indigenous tribes in Africa and Australia practice circumcision religious or cultural rituals. Circumcision has been shown in Egyptian wall sculptures for at least 6,000 years, and mummies have been found with evidence of the procedure. [1]Circumcision is sometimes necessary for medical reasons, such as when the foreskin cannot be retracted over the glans. Circumcision is suggested for men in some circumstances, notably in regions of Africa, to lower the risk of STDs. [2]

Circumcision plays an essential role in decreasingUTI, HIV, and penile cancers that may develop later in advanced ages. Additionally to the benefits described above, it repressed the penile sensation of sexual desire and any potential complications associated with the treatment. [3-4] Circumcision is contraindicated in preterm, bleeding disorders, congenital penis issues such as hypospadias and epispadias, and any other disease whose continued treatment might be complicated by earlier circumcision. [5]

In Pakistan, most newborns are circumcised during their first year of life by medical and non-medical practitioners. Circumcisions performed by surgeons are performed at a rate of 5-10% in Pakistan. [6] Circumcision of newborns is associated with fewer difficulties and dangers than circumcision of young males, adolescents, or adults. As a result, governments should consider how to promote circumcision in newborn newborns in a safe, culturally acceptable, and sustainable way. [7] The majority of research concluded that the safest stage for circumcisionis in infancy or neonatal age.[8]

Many circumcision procedures were discussed, including the Gomco clamp, Plastibell, bone cutter method, Mogen clamp, dorsal slit (open cut) method, and PrePex device, to name a few examples. [7]Plastibell and Gomco, on the other hand, are the most widely employed approaches. Goldstein Medical Company, the original producer of the clamp used in this treatment, is abbreviated as "Gomco" in this instance. It is extensively employed in children under one year in modern nations, and it is called the Plastibell technique. In Saudi Arabia, the Gomco procedure is still the method of choice for circumcision, and it is used on a large scale. [6]

In the 1950s, Hollister created the Plastibell circumcision instrument. The Plastibell circumcision device is a transparent plastic ring with various diameters and handles used to circumcise males. A deep furrow runs circumferentially around the ring, which is available in a variety of sizes. When compared to traditional circumcision, ring circumcision showed a reduced incidence of bleeding. It does, however, carry the potential of problems, particularly those relating to the ring. [9]The percentage of problems reported after using the Plastibell device (PD) varied from 2.0 to 3.0% in various research. Bell impaction, dysuria, localized infection, excessive skin loss, insufficient skin removal, proximal displacement of the ring below the prepuce with glans prolapse over the ring, and incomplete separation of the Plastibell device are all complications Plastibell circumcision. [6, 10] In most parts of the globe, Gomco and Plastibell are the most often utilized procedures for neonatal circumcision. There is minimal research in Pakistan comparing the two techniques in terms of postoperative results. This study will help determine which method is the best and safest for neonatal circumcision, and it may serve as a model for future studies in the field.

MATERIALS AND METHODS

A Randomized Control Trial study was performed at the Pediatric Surgery Department of Sheikh Zayed Hospital, Rahim Yar Khan, for 12 months from August 2020 to July 2021. The sample size of 120 (60 in each group) was calculated using a 90% confidence level with 80% power of study with an expected complication rate of Penile edema 0.24% in the Gomco group and 10.6% in the

Plastibell group. [6]But we limited our sample size to 40 in each group for our convenience and completion of study in due time.

Inclusion criteria: All healthy male patients aged one day old to 4 years of age coming in the department for circumcision during the study period were included by getting their parents' informed consent form.

Exclusion criteria:

- Patients more than one year of age
- Patients with any congenital abnormalities (e.g., urethral or penile shaft abnormality, local infection, hypospadias. jaundice, bleeding disorder, issues diaper rash, etc.).
- The study did not include patients who had undergone any other genital procedure before or had a family history of abnormal bleeding.
- Patients whose parents or guardians didn't give consent.

METHODOLOGY

The study was carried out after receiving ethical permission from the institution's Ethical Committee. The patient's parents/guardians gave their written consent. The subjects were divided into two groups using the lottery method. A pediatric surgeon conducted a complete physical examination to rule out any urogenital anomalies. Before the procedure, the infant was strapped to a circumcision board, and the genital region was washed with chlorhexidine.Thesurgery was performed under local anesthesia using 2.5% lidocaine plus 2.5% prilocaine cream.

The Plastibell is a disposable plastic ring with a handle designed for male circumcision. It comes in a variety of diameters ranging from 1.1 to 1.7 cm. The plastic bell, which rolls over 2/3 of the glans penis, was placed beneath the foreskin and above the glans surface during circumcision. A cotton thread included with the Plastibell gadget was used to secure the device. If the bell detaches eight days following the procedure, the parents were advised to contact the hospital again. All newborns who had Gomco circumcision had their wounds bandaged with Promed gauze and tape, which their parents removed after two days, and antibiotic (polymyxin B, sulfate, and bacitracin zinc) cream was used as local wound care. Before discharge, all children were observed for an hour and evaluated for post-operation hemorrhage, penile edema, and excess skin following the treatment.If the baby continued to cry and refuse meals, postoperative analgesia (acetaminophen 15 mg/kg/dose) was only given on demand. For the patient's convenience, a single follow-up appointment was scheduled after two weeks. If they had any problems, they were advised to arrive earlier.

Statistical Data Analysis: Data was entered and analyzed using SPSS 25.0. Frequencies and percentages were expressed for qualitative variables like gender and postoperative outcomes, i.e., bleeding, penile edema, and redundant skin. Mean ± S.D represented quantitative variables like age, weight, and BMI. The complication rate was compared using a Chi-square test between the two groups. A t-test was utilized to assess the quantitative variables. A p-value of 0.05 or below was deemed statistically significant.

RESULTS

In our study, we had a total of eighty cases (forty in each group). All of the babies were checked for immediate issues, and a follow-up appointment was scheduled for two weeks later. In the Gomco group, 9 (22.5 %) babies had complications, whereas, in the Plastibell group, 18 (45 %) had difficulties.The Gomco method had more significant bleeding (4 %) than the Plastibell approach, which had 1 (2.5 percent) (P-Value 0.001). There was considerable penile edema 5 (12.5%) and ring slippage 2 (5%) with the Plastibell method, and this result was statistically significant (P 0.001).Only one neonate had skin left in Gomco and three in Plastibell (P< 0.001). Surgical site infection was only observed in 2 (5%) who had Plastibell operation. In contrast, excessive mucosa 1 (2.5 %) was only observed in the Gomco group. In the Gomco technique, there was no Penile edema, surgical site infection, hematoma, and need for Repeat surgery/manipulation. We found that bleeding was more common in Gomco compared to Plastibell. On the other hand, penile edema, reductant skin, slipped ring, and the need for repeated surgery/manipulation was more often in the Plastibell technique.

Table 2: complication observed in both techniques. n= 40 each group.

Complication	Gomco technique	Plastibell technique	p-value
Penis edema	0 (0 %)	5 (12.5)	0.001
Bleeding	4 (10%)	1 (2.5%)	0.001
Skin left	1 (2.5 %)	3 (7.5%)	0.01
Excessive mucosa	1 (2.5 %)	0 (0 %)	0.23
Ring slipped	0 (0 %)	2 (5%)	0.01
Skin bridge	1 (2.5%)	0 (0 %)	0.13
Surgical site infection	0 (0 %)	2 (5%)	0.01
Hematoma	0 (0%)	2 (5%)	0.01
Dehiscence	1 (2.5%)	0 (0 %)	0.23
Inclusion cyst	1 (2.5 %)	0 (0 %)	0.23
Repeat surgery/manipulation	0 (0 %)	3 (7.5%)	0.001
Total	9 (22.5%)	18 (45%)	0.001

P value < 0.05 is significant.

DISCUSSION

Circumcision is the most frequent surgical procedure performed on children. The word "circumcision" comes from the Latin words circum (meaning "around") and cdere (meaning "to cut"). According to the World Health Organization (WHO) data, 30 % of males are circumcised. Out of this 30 % majority is Muslims (68%). The American Association of Pediatrics (AAP) published a paper in 2012 claiming that the health advantages of elective newborn circumcision outweigh the dangers. [2]

Circumcision of a newborn boy is an elective medical operation involving removing the foreskin covering the glans penis. The three most often used procedures for circumcision of newborn males are the Mogen clamp, the Gomco clamp, and the Plastibell device. However,infrequent complications can include bleeding, penis damage, adhesions, excessive skin removal, phimosis, and meatal stenosis. [10-11] Though in a few studies, it was abnormally high. Linus discovered that 20 % of complications occurred in babies in a retrospective analysis. [12] Numerous examples have been documentedthat medical staff at highly trained facilities have caused significant damage and even penile destruction. [13]

The choice of circumcision technique depends mainly on the surgeon's preference. The Gomco circumcision procedure is the most popular technique for baby circumcision in the U.S. [14] Several studies indicate that Gomco circumcision is safe and has a remarkable aesthetic effect. It does, however, necessitate a lengthy operational duration and frequent postoperative analgesics. It is related to an increased risk of postoperative bleeding; our investigation reported comparable findings, with postoperative bleeding occurring in 4 (10%) individuals. [15-16] Conversely, another author wrote that Plastibell circumcision is safe and can be done under local anesthesia. It has got superior cosmetic results, and parental acceptance is very high. [17]

Horowitz et al. recommended the Gomco technique for males less than one month of age. They did not suggest it for babies older than three months for circumcision due to the threat of postoperative bleeding. [14]Conversely, we performed this procedure in babies upto 4 years of age and found excellent outcomes. According to a randomized controlled trial study done in 2017, Gomco is the most commonly performed procedure for circumcision in Saudi Arabia. They concluded that bleeding is more frequent with the Gomco technique. However, it is accompanied by a low rate of other complications, i.e., infection (0.5%), penile edema (0.2%), and more excess skin (1.22%). Similarly, we found infection (0 %), penile edema (0 %), and more excess skin (2.5%) of patients. [6]

A drawback of the Plastibell method is that retention of the device could result in necrosis of the glans in the absence of a

follow-up. [18] However, the follow-up was 100%, and there was not a single case reported with necrosis in our study. The main reason for a reasonable follow-up rate was that most people were educated and from the same city as the hospital. In another study, it was observed that complications could also occur if the Plastibell is missized. [19] Freeman et al. reported significantly higher postoperative pain undergoing Plastibell procedure as compared to Gomco. [20] The most complication in our study associated with the Plastibell technique was penile edema in 5 (12.5%) patients, followed by reductant skin and the need for a repeat procedure in 7.5%. However, Plastibell clearly shows a decreased rate of postoperative bleeding.

Another study found that 196 patients (80.00 %) had successful plastibell circumcisions with no problems, whereas 49 patients (20.00 %) had complications. Delay in ring separation occurred in 17 cases, bleeding occurred in 12 cases, and infection occurred in 12 cases. [21] According to the results of our research, the Plastibell group had a 5% infection rate, whereas the Gomco group had none. This figure is much lower than that reported by Mak et al., who found that the infection rate in Plastibell was 13.7 percent. [22] In retrospective research conducted in Karachi, it was discovered that the ratio of problems associated with plastibell circumcision is substantially greater in babies than in neonates. It is, however, a simple, quick, and safe procedure. [21]

According to several research, the total rate of adverse events was unaffected by the approach. [23-24] However, the overall complication rate of the Gomco approach was lower than that of the Plastibell method in our study.

CONCLUSION

We concluded that the Gomco method proved superior compared to almost all complications except postoperative bleeding, which was less common in the Plastibell technique. Therefore, we recommend the Gomco method because of its lower complication rate and better cosmetic results.

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