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The Relationship Between Preoperative Examination and High Phimosis Complication in Thermocautery Assisted Circumcision in Infancy

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Abstract

Objective: To this study, we presented our experience with thermocautery assisted guillotine/clamp (TAG) method circumcisions on infant age and to share high rate of penile adhesions/phimosis complications that we found at the end of study.

Methods: A retrospective review between July 2020 and October 2022, 80 patients under the age of 1 who were circumcised by a single surgeon using the thermocautery assisted guillotine/clamp method, under the local anesthesia were included in the study (Thermo-Med TM 802B device; Thermo Medikal, Adana, Turkey).

Results: 80 patients were divided into 2 groups. Group 1 was 0-6 months old, group 2 was 6-12 months old. According to the weight percentile in group 1, 44.4% of the patients were above 75. percentile (p), in group 2, 34% of the patient were 25-50.p. In the preoperative evaluations, the presence of pubic fatty tissue was found in 24% of the patients in group 1 and 30% in group 2. Early complications occurred in 7 patients. Late complications were seen in 22 patients (27,5%). The presence of excess penile tissue was observed in 12 of them.

Conclusion: The TAG method is cheap, fast operation time and has a very good bleeding control. However, its use in infant group affects complication rates due to infant anatomical features. In the decision of circumcision in infant age, if there is a pubic fatty tissue in the preoperative examination, the high probability of complications should be taken into account when choosing the TAG method.

Keyword: Thermocautery, Circumcision, İnfant, Complication, Phimosis

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INTRODUCTION

Circumcision is an operation that has been practiced mostly on boys since ancient times, for religious, cultural and personal reasons. The World Health Organization recommends circumcision in early infancy age because of the rapid recovery, low complication rate and low cost (1). Considering the complication rates of circumcision performed in the infant period, there are studies in the literature ranging from 1.5% to 71%. The most common early period problems are minor bleeding, infections, urinary retention, pain, allergic reactions and the most common late period is penile adhesions/phimosis, removal of excessive or inadequate foreskin, meatal stenosis. Late complications (circumcision revision) are the most serious problem in all infant circumcision data (2,3,4).

Thermocautery is a U-shaped device that does not directly transmit electricity to the tissue, but only incision the foreskin with the high-temperature technique. Thermocautery device cutting tip consists of chromium-nickel alloy. The working principle of the device is to cut the tissue by converting electrical energy to thermal energy. When the metal bar on the device is pressed, the device becomes active and the cautery tip starts to heat up. The temperature of the thermocautery device was used as low and high energy modes nearly $100C^0$ and $250C^0$ in all patients as a standard. This method is an assistant technique to the classical guillotine circumcision method. The most important reason why circumcision incision is frequently preferred with this method is that, it has very good bleeding control, easy to use, the circumcision time is 5 to 10 minutes on average, and it can be done easily under local anesthesia (5). Thermocautery device have been also used for dermatological excisions (6). It has been shown to be superior to bipolar and monopolar cautery in histological evaluation in terms of cellular damage, wound healing and burn formation on circumcision (7).

In this study, age/weight, percentile ratio, preoperative pubic fatty tissue examination (PPFT)and penile adhesions/phimosis, postoperative early and late complications in infants who circumcised with thermocautery assisted guillotine/clamp (TAG) method between July 2020 and October 2022, complications, treatment and analysis were planned.

METHODS

This study was established between July 2020 and October 2022, using the retrospective cohort method. In the study, male gender, under 1 age old who were circumcised by a single surgeon, under the local anesthesia, assisted thermocautery device (fig.1) guillotine/clamp method circumcision patient files were

scanned. Oral and written consent forms were obtained from all patients before the procedure.

Figure 1 A.Thermocautery Device, B. Handle of the device

In the technique we used in circumcision; dorsal penile nerve block was prepared with bupivacaine 0.5%, dosed 2mg/kg and diluted 1ml. to 1ml. with saline in all patients. Waited half an hour after the injection. All operations were started with anesthesia pain control. Additional doses were given to the patients who felt pain and waited after injection. İn the sterile conditions, after the foreskin retracted and cleaned, it was clamped at a suitable placewithprotection of glans and cut through the clamp over with a thermocautery device (Thermo-Med TM 802B device; Thermo Medikal, Adana, Turkey).In all the patients except the neonatal period, the device was operated in high energy mode. It was sutured at 4 or 6 corner lines with using 5.0polyglactin 910 (Vicrly) sutures. Circumcision operation time in all patients 5-10 minutes on average.

80 patients were included in the study. There were 54 patients in group 1 and 26 patients in group 2. Group 1 consists of infants under 6 months, group 2 consists of infants between 6-12 months. The age, weight, child's weight percentile based on age (p), PPFT, early (pain, bleeding, dysuria, infection, allergic reactions) and late complications (penile adhesions/phimosis, meatal stenosis, excess penile tissue), penile adhesion grades (Table 1), treatment for complications and results were evaluated.

Statistical Analysis

SPSS program (SPSS version 25.0; IBM, NY, USA) was used for statistical evaluation. The chi-square test was used to measure the statistical difference between the 2 groups of PPFT, phimosis relation. A p value < 0.05 was considered statistically significant.

Ethical approval was obtained with the decision of Ordu University clinical research ethics committee with the decision number 2022/229.

Table 1: Lee Ponsky et. al Penile Adhesion Grades (4)

Grade 0	**No adhesion**
Grade 1	Preputium is connected to the corona by a thin film.
Grade 2	Adhesion covers less than 50% of the glans.
Grade 3	Adhesions develop when the preputium is not peeled off the glans or is incompletely excised during the circumcision

Local 2% mupirocin pomade was recommended to be used twice a day for 1 week after circumcision. Starting on the 3rd day after circumcision, warm sitz bath was recommended, 3 times a day for 10 minutes for 1 week. Parents were taught to perform gentle backward massage in their post-circumcision care advice. All patients were evaluated at the outpatient clinic controls at the 10th day, 1st month and 6th month after circumcision.

PPFT examination data were noted by the same surgeon. In this examination, if the majority of the visible part of penis consists of the foreskin, it was accepted that there was excess pubic fatty tissue (Figure 2). The possibility of high complication risk was discussed with the family in all patients with a positive examination. Before the procedure in these patients, the importance of postoperative care was explained to the families against the risk of penile adhesions.

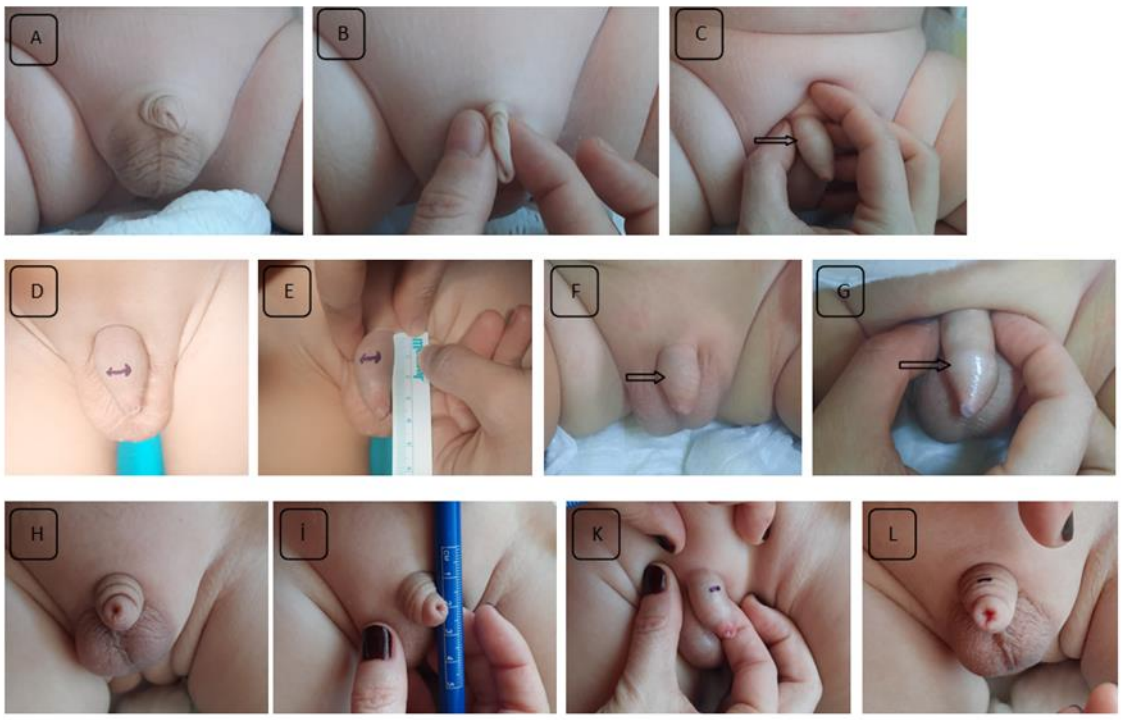

Figure 2: A, B, C was the same patients penile view, PPFT (+). B. Almost all of the visible tissue consists of foreskin. C, the arrow was the line where the foreskin started. D, E was the same patients penile view, PPFT (+). D, the marked line was where the foreskin begins. E, when the penis was retracted, the foreskin was 3cm. and the penile skin was 1cm. F, G was the same patients penile view, PPFT(-). The foreskin and penile skin levels appear to be almost equal in length. H, I, K, L was the same patients view, PPFT (+). I, the length of the foreskin was 2 cm, and the penile skin length was 1 cm. K, marked line was foreskin line when the penis retracted. L, marked line was foreskin line, natural appearance.

RESULTS

The mean age of the patients was 4.86 months old. The average circumcision operation time was 7,5 minutes. The mean weight of these patients was 7 kilograms. According to the child's weight percentile based on age scale, it was found that mostly seen above 75p. in group 1 (44%) and 25-50p. in the group 2 (38%). The number of patients who

were found to have PPFT was 21(%26). Of these patients, 13 were from the first group (%16) and 8 were from the second group (10%). Early complications occurred in 7 patients (8,75%). İt was observed that early complications were significantly higher in group 1 patients. Five of these complications were oozing bleeding, and all of them were in the 1 month old newborn group. Allergic rash was observed in 2 patients, both from group 2. None of the patients had dysuria, infection, or serious pain.

Late complications (penile adhesions/phimosis, skin bridges, meatal stenosis, excess penile tissue) were observed 22 patients (27,5%), 14 were group 1 (25,9%) and 8 were group 2 patients (30,7%). When we looked at 22 cases with secondary phimosis, it was seen that the statistical relationship between percentile and seconder phimosis was not significant. Penile adhesion grading was performed (Table.1), it was observed that 8 of 22 patients were grade 2 adhesion and 14 were grade 3 adhesion. Postoperative phimoses were observed in 12 (%57) of 21 patients who were examined preoperatively and had a pubic fatty tissue. Phimosis complication was observed in 10 (16,9%) of 59 patients who did not have preoperative pubic adipose tissue examination. This relationship was found to be significant in statistical data analysis with the chi-square test. The p-value was0.00396. Significant at $p < .05$. (Table. 2)

Of the patients with secondary phimosis, 14 were dilated with a gentle backward massage, 2 with massage after using prednisone cream for 10 days, twice a daily and 6 were dilated with the help of clamps under local anesthesia and their phimosis was corrected. Penile adhesions, which were treated with gentle backward massage, recurred in 3 patients and were treated with massage for the second time. Of the 22 patients with secondary phimosis, 12 had the appearance of excess penile tissue as a long-term complication (15%).

Table 2: The Chi-square statistics for the contribution of patients with preoperative fatty tissue to the complication of secondary phimosis was significant

	Phimosis +	Phimosis -	*Marginal Row Totals*
preoperative pubic excess fatty tissue +	12 (5.78) [6.71]	9 (15.22) [2.55]	21
preoperative pubic excess fatty tissue -	10 (16.23) [2.39]	49 (42.78) [0.91]	59
Marginal Column Totals	22	58	80 (Grand Total)

*The chi-square statistic is 12.5495. The p-value is .000396. Significant at <.05.
*The chi-square statistic with Yates correction is 10.6145. The p-value is .001122. Significant at p<.05.

DISCUSSION

The rate of circumcision operation in the male population reached 80% and 56% of them was newborn age period in the USA (8). In circumcisions performed in the infant period, assistant devices such as gomco clamp, plastibell, and mogen clamp are used due to the preference of local anesthesia (3). In a study comparing plastibell, gomco clamp and TAG methods in the neonatal period, showed that the thermocautery method was superior in terms of hemostasis, operative time, and parent satisfaction, with less pain in the postoperative period (9). In Turkey, circumcisions performed with local anesthesia, TAG method, Ali'sclamp, dorsal slit is generally used (10). We prefered to use TAG method because of good hemostasis, easy to use, fast circumcision time and no need to use any dressing.

When the relationship between weight and complications was evaluated, the study by Storm et al., in which they examined the relationship between neonatal obesity and complications, also supports the data of our study. Storm et al. emphasized that the measurement of preoperative fat tissue as percentile or BMI is important in reducing possible complications (11). In our study, it was shown that the surgeon's determination of pubic fatty adipose tissue in the preoperative examination had a significant statistical result in the long-term complication relationship.

Surgical results and high complication rates are discussed, especially in groups that prefer infant circumcision. Considering the complication rates in circumcision, it has been shown that the average is 4 in 1000, this rate increases 10 to 20 times in infants (12). We know that the most common complication in infancy is minor bleeding and the most common late complication is penile adhesions/phimosis. However, excessive skin removal, penile injury or amputation, infections, and development of meatal stenosis are other complications that can be considered. Ponsky et al. reported the complication rate of penile adhesion and phimosis as 71% in their study with 61 patients under the age of 1(4). Akyüz et al., on the other hand, found the risk of penile adhesion and phimosis to be 1.6%, especially in babies under 6 months of age, in the study they published using the thermocautery assisted circumcision method (13).

In our study, we reported 2 groups as 0-6 to 6-12 month intervals, primarily because we were wondering if there was a difference in complication rates in early and late infants. When we look at the total complication rates, no significant difference was found in the 2 groups (35%, 32%). But it was observed that all of the minor bleedings were seen in infants 1 month and younger. Penile adhesions/phimosis

complication was observed with 27.4% rates in the total group. Excess penile tissue complication was 16%in group 1, 11,5% in group 2.

Among the reasons for the high complication rates in our study, it was thought that the use of clamps at a safe level was primarily due to the risk of glans amputation in the guillotine method. These cond reason was subcutaneous adipose tissue which is tends to increase rapidly in thickness during the babies first nine months following birth (14).This rise in fatty tissue in the infant period, increases the appearance of the buried penis. Therefore, the risk of penile adhesions/phimosis complications was increased in the infant group in our study compared to older ages. At the same time, we have also shown that the examination we performed in the preoperative period penil tissue has a statistically significant relationship with the probability of phimosis.

A limited number of studies on tissue damage of TAG circumcision support that nerve damage or tissue necrosis does not occur even when used at high temperatures (13).In addition, there are also studies suggesting thermocautery circumcision, especially in newborn circumcisions, due to the good control of minor bleeding(15). Based on this result, we do not think that the high rate of phimosis in our TAG circumcision series was due to thermocautery alone. We think that this result may have been due to the preoperative pubic fatty tissue and the long prepuce due to the safety of the guillotine method.

CONCLUSION

The fastest technique, the least complications and the best wound healing are the predicted targets in infant circumcision. Various techniques are studied in this age group. We think that this study is important in the search for the optimum technique and the risk of minor complications due to the increasing trend in infant circumcision. As a result, preoperative examination performed before circumcision in infant age is very important in the choice of circumcision technique.

Ethics Committee Approval: Ethics Committee Approval: Ethics approval for this study was obtained from the Diyarbakır Gazi Yaşargil Education and Research Hospital Clinical Research Ethics Committee (ethics committee date: 09/12/2022, ethics committee number:254).

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