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What is the ideal age of circumcision for wound healing time?

Aykut Aykac[1], Onur Yapici[2], Ozer Baran[3], Ural Oguz[4], Murat Cakan[5]

[1]Department of Urology, Orhangazi State Hospital, Bursa, Turkey
[2]Department of Urology, Acipayam State Hospital, Denizli, Turkey
[3]Department of Urology, Karabuk University School of Medicine, Karabuk, Turkey
[4]Department of Urology, Giresun University School of Medicine, Giresun, Turkey
[5]Department of Urology, Diskapi Yildirim Beyazit Training and Research Hospital, Ankara, Turkey

ABSTRACT

Objective. Circumcision is practiced worldwide. Currently, the effect of age at the time of circumcision on wound healing is not fully known. This study aimed to determine the effect of age at the time of circumcision on wound healing. ***Methods.*** The study included 382 male patients aged ≤16 years that were circumcised between January 2014 and December 2014. Data for 345 patients that were followed-up regularly were evaluated retrospectively. Circumcision was performed using a bipolar diathermic knife. Circumcision wounds were considered healed when the 2 suture lines were observed to be completely apposed. Wound healing time was analyzed according to age at the time of circumcision. ***Results.*** Mean age of the patients was 7.2 years (range; 6 days-16 years). Mean duration of surgery was 327.5 sec and mean healing time was 4.3 days. The patients were classified according to age as group 1 (0-2 years; n=114; 32.9%), group 2 (3-6 years; n=60; 17.3%), and group 3 (7-16 years; n=171; 49.8%). Mean duration of surgery in groups 1-3 were 280.9 sec, 320.2 sec and 356.5 sec; respectively, and healing times were 4.1, 4.2 and 4.5 days; respectively. Healing time was significantly longer in group 3 than in groups 1 and 2 ($p<0.05$). There was no significant difference in healing time between groups 1 and 2 ($p>0.05$). ***Conclusion.*** Wound healing time was shorter in the patients aged 0-6 years than in those aged 7-16 years.

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Keywords: Circumcision; wound healing; age; pediatric; penis

Introduction

Circumcision, which is perceived to step of being a man in Turkey, is among the most commonly performed surgical procedures worldwide. Circumcision is known to protect against urinary tract infections in children and HIV infection in adults. Circumcision is commonly performed in newborns in western countries, whereas it is commonly performed in children in eastern countries and in adults in African

Address for correspondence:
Aykut Aykac, MD., Orhangazi State Hospital, Department of Urology, Bursa, Turkey
E-mail: aykutdr@gmail.com
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countries in which sexually transmitted diseases are common [1. However, the ideal age for circumcision remains a matter of debate.

Currently, the effect of age at the time of circumcision on wound healing is not fully elucidated. As such, the present study aimed to determine the effect of age at the time of circumcision on wound.

Methods

The study included 376 male patients aged ≤16 years that were circumcised between January 2014 and December 2014 at Orhangazi State Hospital by a single surgeon. Data for 345 patients that were followed-up regularly were evaluated retrospectively. Circumcision was performed under sedation anesthesia (IV ketamine HCl, 2 mL kg–1) following penile block with prilocaine in patients aged 1-16 years, whereas in those aged <1 year only penile block was used. The prepuce was suspended in the 12 o'clock and 6 o'clock lines by using a clamp after the adherence of prepuce had been released. Excess prepuce was excised using a bipolar diathermic knife over the clamp, while preserving the glans. Excessive tissue on the mucosa and skin was removed using a bipolar knife when necessary. Mucosa and skin were sutured using 4.0 rapid vicryl. Duration of surgery was considered the time from the onset of local anesthesia to the last suture.

Dressing was not applied post-surgery and antibiotic prophylaxis was not given. Patients hospitalized about two hour after the circumcision for controlling any bleeding or side effects of anesthesia. Patients were discharged with prescriptions for an analgesic drug and topical epithelizing cream. Wound healing time was recorded hospital database when patient came to control about one week later. Circumcision wounds were considered healed when the two suture lines were observed to be completely apposed (Figure 1A-D).

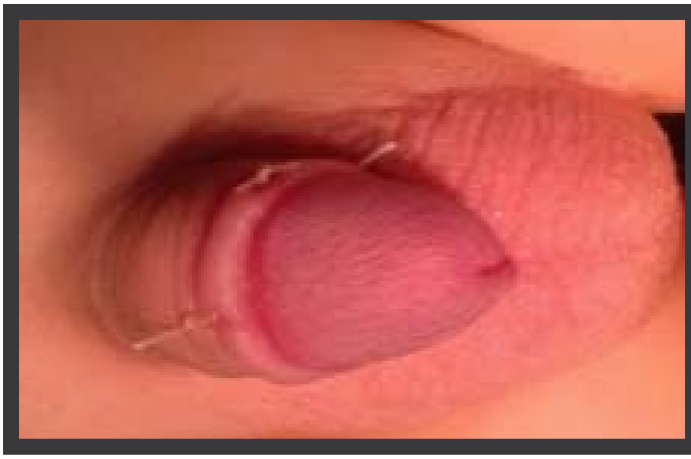

Figure 1A. Postoperative circumcision wound

Figure 1B. Circumcision wound at 2nd day

Figure 1C. Circumcision wound at 3rd day

Figure 1D. Wound healing completed at 4th day

Families of the patients were informed about taking daily photograph of circumcision wound area and pictures were checked by surgeon. Written informed consent was obtained from all the patient's families. The study protocol was approved by the local Review Board.

The patients were classified according to age as group 1 (0-2 years), group 2 (3-6 years), and group 3 (6-16 years). Wound healing time was compared between the 3 age groups. Complication rates were also evaluated.

Statistical Analysis

Data were analyzed using IBM SPSS v.20.0 for Windows (IBM Corp., Armonk, NY, USA). Correlation analysis was used to determine the association between variables and the Kruskal-Wallis H test was used for inter-group comparisons. *p* value less than 0.05 was considered as statistically significant.

Results

Mean age of 345 patients was 7.2 years (range; 6 days-16 years). Mean duration of surgery was 327.5±70.1 seconds and mean healing time was 4.3±0.9 days. Groups number of patients, operation time, healing time and statistical results shown in Table 1.

There was a significant and moderate correlation between surgical duration and age at the time of circumcision (p=0.0001); duration of surgery increased with patient age. There was a significant but low degree of correlation between age and recovery time (p=0.003). Healing time was significantly longer in group 3 (p<0.05), whereas as healing time did not differ significantly between groups 1 and 2 (p>0.05). Mild edema 2-3 days in duration was the most common complication and was noted in 82 (24%) patients. In all, 19 (5.6%) patients had edema for >3 days and all had symptomatic recovery following topical steroid treatment. None of the patients had burn, infection or inadequate tissue resection.

Discussion

The ideal age for circumcision remains a contentious issue. The procedure is primarily performed in newborns in Western countries, versus primarily in children in Eastern countries and in adults in African countries in which sexually transmitted diseases are common [1]. Any procedure done to the body of a child during the phallic period (aged 2-6 years) is thought to be potentially perceived as a threat to body integrity and negatively affect a child's psychology; therefore, circumcision is not recommended in this age group unless medically indicated. But time of circumcision decision mostly given by the parents regarding the psychological affects. Sahin *et al.* [2] studied 411 children and reported that age at the time of circumcision in Turkey varies between 2 years and 11 years (mean: 7 years), and that 15% of children undergo circumcision at age <1 year, 8% at age 1-3 years, 35% at age 3-6 years, and 41% at age >6 years. A Turkish study performed by Sivasli *et al.* [3] reported that circumcision before age 1 year was preferred because of rapid recovery and the child is thought to not experience any pain or fear and that circumcision after age 2 years was preferred because of the belief that undergoing circumcision at a younger age may be harmful. In the present study mean age at the time of circumcision was 7.2 years, which is consistent with Sahin *et al.* [2], and 32.9% of the patients were aged 0-2 years (group 1), 17.3% were aged 3-6 years (group 2), and 49.8% were aged 7-16 years (group 3). We think that group 2 was

Table 1. Outcomes of the patients related to operation time and healing time

	Patients (n=345)	Operation time (Seconds)	Healing time (Days)
Group 1 (0-2 years)	114 (32.9%)	280.9±70.1	4.1± 0.9
Group 2 (3-6 years)	60 (17.3%)	320.2±53.8	4.2± 0.8
Group 3 (7-16 years)	171 (49.8%)	356.5±74.0	4.5± 0.9
Kruskall-Wallis H		H=164.04*	H=11.51**

Data are shown as mean±standard deviation or number (percent), * p=0.0001: group 1 vs group 2, group 1 vs group 3 and group 2 vs group 3, ** p=0.003: group 2 vs group 3

proportionally the smallest because of the information we gave.

Researchers have investigated the differences between fetal wound healing and adult wound healing. Inflammation in fetuses was reported to be less severe than in adults [4]. Furthermore, fetal wounds were observed to heal without scarring [4, 5]. Whereas platelet-derived growth factor (PDGF) was not noted in fetal skin tissue, a moderate increase was observed after 12 h and 1 d of the onset of wound healing [5]. It was also reported that hyaluronic acid and platelet growth factor-β3 (PGF-β3) levels are higher in fetal wounds, and that interleukin 6, interleukin 8, PGF-β1, and tumor necrosis factor-alpha (TNF-α) levels are higher in adult wounds [6], indicating that the inflammatory reaction in adults is stronger than that in fetuses. The high levels of these cytokines in adult wounds play a role in scar formation. Additionally, it was reported that an elevation in the PGF-β level leads to granulation tissue formation [7]. The role of hormonal factors in wound healing during the prepubertal period and post-pubertal period has also been investigated [8]. Androgens are known to play a role in pro-inflammatory and anti-inflammatory pathways, both on a systemic level and cellular level [9]. These metabolic differences indicate that wound healing differs according to age. In the present study mean healing time in groups 1-3 was 4.1 days, 4.2 days, and 4.5 days, respectively, and was significantly longer in group 3 than in groups 1 and 2 ($p< 0.05$); healing time increased with age. In our knowledge, this is the first study that evaluate age distribution effects on wound healing time at circumcision

Environmental factors should also be considered when evaluating wound healing after circumcision. A stable penis position associated with diaper use facilitates the integrity of the 2 suture lines post circumcision, whereas the degree and duration of erections can negatively affect apposition of the suture lines. Kelly *et al.* [10] suggested wound dehiscence in adult circumcision patients was caused by penile erection when tissue adhesive was used for wound closure. In the present study the duration of surgery increased significantly as patient age increased, perhaps because the number of sutures required increased along with penile length, which increased with age. In addition, we think surgery was prolonged in some cases due to the need for additional tissue excision associated with inadequate prepuce excision.

The Limitations of the Study

The present study has some limitations due to its retrospective design. Metabolic changes during the wound healing period, and cellular responses and the role of hormones during inflammation were not evaluated. Additionally, the effect of steroid treatment (administered for edema) on wound healing was not evaluated.

Conclusions

The ideal age for circumcision and its effect on wound healing remain unclear. The present findings show that wound healing time following circumcision increased with age. Additional research is required to clearly delineate the ideal age for circumcision (a very common surgical intervention) with regard to its surgical and psychological effects.

Informed consent

Written informed consent were obtained from families of the patients for the publication photographes used in this study.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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References

[1] World Health Organization. Traditional male circumcision among young people: a public health perspective in the context of HIV prevention. Geneva. 2009. pp:10-5.

[2] Sahin F, Beyazova U, Akturk A. Attitudes and practices regarding circumcision in Turkey. Child Care Health Dev 2003;29:275-80.

[3] Sivasli E, Bozkurt AI, Ceylan H, Coskun Y. [Knowledge, attitude and behavior of parents regarding circumcision in Gaziantep]. Cocuk Sagligi ve Hastaliklari Dergisi 2003;46:114-8. [Article in Turkish]

[4] Ferguson MW, O'Kane S. Scar-free healing: from embryonic mechanisms to adult therapeutic intervention. Philos Trans R Soc Lond B Biol Sci 2004;359:839-50.

[5] Song HF, Chai JK, Lin ZH, Chen ML, Zhao YZ, Chen BJ, et al. A comparative study of PDGF and EGF expression in skin wound healing between human fetal and adult. Zhonghua Zheng

Xing Wai Ke Za Zhi 2003;19:199-202.
[6] Bermudez DM, Canning DA, Liechty KW. Age and pro-inflammatory cytokine production: wound-healing complications for scar-formation and the timing of genital surgery in boys. J Pediatr Urol 2011;7:324-31.
[7] Al-Attar A, Mess S, Thomassen JM, Kauffman CL, Davison SP. Keloid pathogenesis and treatment. Plast Reconstr Surg 2006;117:286-300.
[8] Zouboulis CC, Degitz K. Androgenaction on human skin from basic research to clinical significance. Exp Dermatol 2004;13(Suppl 4):5-10.
[9] Ashcroft GS, Mills SJ. Androgen receptor-mediated inhibition of cutaneous wound healing. J Clin Invest 2002;110:615-24.
[10]. Kelly BD, Lundon DJ, Timlin ME, Sheikh M, Nusrat NB, D'Archy FT, et al. Pediatric sutureless circumcision - an alternative to the standard technique. Pediatr Surg Int 2012;28:305-8.