

The effect of circumcision on voiding functions in healthy children

The effect of circumcision

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Abstract

Aim: In this study, we aimed to assess whether the circumcision procedure in healthy children without any clinical problems or complaints after circumcision makes a difference in voiding functions.

Material and Methods: The sample group of 90 people was formed, consisting of three groups of thirty people, whose demographic characteristics were statistically the same, were provided. The patients were divided into 3 groups of thirty people in each: those circumcised while wearing diapers, circumcised at school age, and uncircumcised patients. Urine volume, voiding time, maximum voiding rate and mean voiding rate values were recorded and evaluated.

Results: The mean urination volume in the volunteer group was 323.9±30.8 ml. The mean flow rate was 9.0±1.3 ml/s, mean Qmax was 19.1±1.3 ml/s. The mean voiding time in the volunteer group was 36.4±6.2. In the Kruskal-Wallis test, it was observed that the urination volume was different between the groups ($p=0.028$).

Discussion: In conclusion, circumcision, done while using a diaper, was seen to increase the voiding volume in our volunteer population. Apart from this finding, there was no significant difference in urinary function between circumcisions performed when diapers are used or in diaper-free time and uncircumcision.

Keywords

Circumcision, Pediatric, Uroflowmetry, Voiding Functions

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Introduction

Circumcision is one of the most common surgeries performed on boys [1]. Circumcision may be performed for medical, traditional, religious and cultural reasons [2-4]. In some societies, the rate of male circumcision accounts for 99% [5]. As in any surgical procedure, during circumcision, complications such as early bleeding and infection may occur [1, 6, 7]. Glans injuries, urethral injuries and glans or penile amputations are among the complications reported in the literature [1, 6, 7]. One of the most common complications is urethral meatal stenosis and web formation [6].

Urethral meatal stenoses are also seen in uncircumcised patients [6]. However, their frequency increases in circumcised patients [8]. It has been shown that the frequency of meatal stenoses in patients circumcised in the neonatal period, increases even more [8].

Patients with significant meatal stenosis are admitted to the hospital with clinical complaints. In particular, urethral meatal strictures that do not change voiding thickness and pattern are often considered normal among patients. There are many studies on patients with meatal stenosis [1, 6, 8].

It is worth examining whether circumcision, which is such a commonly performed procedure, has other consequences besides the known complications. There is a limited number of studies on the changes that circumcision produces in patients without clinical complaints. Typically, these are studies on sexual functions and cosmetic outcomes or studies comparing circumcised and uncircumcised patients in the community [9–13]. An epidemiological study from Denmark furthered the view on the consequences of circumcision, concluding that the incidence of autism increases 2.3-fold in patients circumcised before the age of 2 years [14].

In the study, we did not aim to assess the complications of circumcision, we aimed to assess whether the circumcision procedure and circumcision performed with or without the use of a diaper in healthy children without any clinical problems or complaints after circumcision make a difference in voiding functions.

Material and Methods

After the approval of the local Ethics Committee (protocol code KEAK-2022-101 and date of approval: 2 November 2022), the volunteer population was informed about the study. The 620 participants who agreed to participate in the study were assessed for eligibility. Seventy-eight participants with previous urinary system surgeries, significant urinary system problems, active or recurrent complaints related to the urinary system, motor mental function disorders, whose age and weight did not fit the study group, or whose urethral meatal vertical length was less than 5 millimeters were excluded from the study. Of the remaining participants, the sample group of 90 people was formed, consisting of three groups of thirty people, whose demographic characteristics were statistically the same, so that statistically 0.5 effect power, 0.05 alpha value and 95% power were provided.

The study group consisted of 10-year-old boys with a body mass index between 19-24, who had been circumcised at least 24 months ago or were uncircumcised. The study group

was standardized for age and body mass index. All patients underwent urogenital examination. Patients in the study group did not have meatal stenoses and external urethral webs with or without a clinical presentation.

The patients were divided into 3 groups of thirty people in each: those circumcised while wearing diapers, circumcised at school age, and uncircumcised patients.

The voiding patterns of the patients were measured with a uroflowmetry device under the supervision of a pediatric surgeon or a urologist. During the voiding of uncircumcised patients, the foreskin was retracted and the urethral meatus was fully opened. Urine volume (V), voiding time (t), maximum voiding rate (Qmax) and mean voiding rate (Qavr) values were recorded by making two measurements in which they urinated at least 250cc.

Statistics

IBM SPSS program version 26 was used for all statistical operations. Descriptive data were presented as numerical value ratio, percentage, mean, median, minimum, maximum and standard deviation values. The Chi-square test was used to compare qualitative variables. Since the groups were composed of thirty volunteers and normality could not be achieved for all of the variables in the Shapiro-Wilk test and histogram evaluations, the Kruskal-Wallis test was used in the analysis of quantitative data. The significance level was accepted as $p < 0.05$ in all statistical evaluations.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

All volunteers were selected from 10-year-old children. There was no statistical difference in terms of height, weight and body mass indexes ($p > 0.05$). The mean urination volume in the

Table 1. Urine volume, voiding time, maximum voiding rate and mean voiding rate values of the groups.

Circumcision time	V (ml)	t (s)	Qmax (ml/s)	Qavr (ml/s)	
Circumcised at the age when diapers are used (n=30)	Mean	331,1	38,2	19	8,9
	Std. Deviation	32,2	7,8	1,6	1,5
	Median	335	37	19	9
	Minimum	250	26	17	7
	Maximum	383	54	22	12
Circumcised at school age (n=30)	Mean	313,2	35	19,1	9,1
	Std. Deviation	31,3	5,6	1,4	1,4
	Median	315,5	37	19	9
	Minimum	251	21	17	7
	Maximum	375	41	22	12
Uncircumcised (n=30)	Mean	327,4	36	19,2	9,2
	Std. Deviation	26,7	4,7	1,1	1,1
	Median	328	36	19	9
	Minimum	276	27	17	7
	Maximum	375	47	21	11
Total (n=90)	Mean	323,9	36,4	19,1	9,1
	Std. Deviation	30,8	6,2	1,3	1,3
	Median	326,5	37	19	9
	Minimum	250	21	17	7
	Maximum	383	54	22	12

Table 2. Comparison of urine volume, voiding time, maximum voiding rate and mean voiding rate values of the groups

	V (ml)	t (s)	Qmax (ml/s)	Qavr (ml/s)
Kruskal-Wallis Test	7,133	1,599	0,669	1,341
df	2	2	2	2
Asymp. Sig.	0,028	0,45	0,716	0,511

Table 3. Comparison of voiding patterns of groups

Circumcision time	Flow Pattern		Total	p
	Bell-Shaped	Flat		
Circumcised at the age when diapers are used (n=30)	22	8	30	0,094
Circumcised at school age (n=30)	26	4	30	
Uncircumcised	28	2	30	
Total	76	14	90	

volunteer group was 323.9±30.8 ml. The mean flow rate was 9.0±1.3 ml/s, mean Qmax was 19.1±1.3 ml/s. The mean voiding time in the volunteer group was 36.4±6.2. Values according to volunteer groups are given in Table 1.

In the Kruskal Wallis Test, it was observed that the urination volume was different between the groups (p=0.028). There was no difference in Qmax, Qavr and voiding times (Table 2).

There were no volunteers with staccato flow patterns in the evaluated flow patterns. Fourteen volunteers had a flat flow pattern (Table 3).

No numerical disorder was detected in voiding functions in any of the volunteers.

Discussion

The benefits and harms of circumcision, which has been practiced since ancient times, are still being discussed in the 21st century [1,2,15]. Since these discussions have not been concluded yet, the physiological effects remain in the background. According to the recommendations made by the American Academy of Pediatrics as a result of current studies and meta-analyses, the benefits of circumcision are seen in terms of individuals and society [16].

The effects of such a frequent procedure on normal physiology have been little studied. Considering this point in our study, we excluded the complications of circumcision and evaluated voiding functions in healthy volunteers. When comparing uroflowmetry results before and after circumcision, it was observed that circumcision increased the maximum flow rate and mean flow rate [17]. However, this study evaluated the same patients before and after circumcision [17]. In our comparison with different volunteers, there was no difference in flow rates. In the study by Sancar and Egemen, in the evaluation before and after circumcision, it was not indicated whether foreskin patency was achieved [17].

We think that the difference in the pre- and post-circumcision flow is due to the measurements made after the foreskin patency was achieved in our study. Especially in young children, the foreskin in front of the urethral meatus will change the flow evaluations as a secondary obstruction.

In addition, we saw that diaper use, which we determined as the dependent variable, did not change the current values. In a study that included approximately 1700 circumcised children from our country, it was shown that the diaper did not increase the number of complications [18]. There is no significant difference between circumcisions performed at the age when diapers are used and circumcisions performed at a later age.

We detected a flat voiding pattern in 14 patients who looked completely healthy. We had no volunteers with staccato or intermittent urination. We did not find a significant difference in the distribution of patients with flat voiding patterns to groups, therefore we do not think that circumcision or circumcision time is effective in this situation. Similarly, in the meta-analysis by Morris et al., they found no difference between the circumcision procedure and voiding patterns [6].

Urine volumes were statistically different between the groups in our study. Urine volume can be affected by many factors. However, we think that the greater bladder capacity of the volunteers who were circumcised at an early age may result from the elongation in epithelialization due to the pH changes during the diaper use period.

In our study, no difference was observed between circumcised and uncircumcised patients in terms of voiding functions. Our important conclusion here is that circumcision does not have a negative effect. In addition to the positive effects known in the current literature, the absence of a negative effect that we could show reveals that there is no obstacle in terms of voiding functions in the application of circumcision [4,19–21].

The exclusion of complications and patients with urinary system problems is a limitation of our study. Contrary to the belief that circumcision should not be performed on children due to possible complications, especially advocated in anti-circumcision articles, conducting similar studies on fully randomized controlled groups will reveal stronger scientific results.

Conclusion

In conclusion, circumcision, done while using a diaper, was seen to increase the voiding volume in our volunteer population. Apart from this finding, there was no significant difference in urinary function between circumcisions performed when diapers are used or in diaper-free time and uncircumcision.

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Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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