

What is the best anesthesia method for circumcision? Comparison of local and general anesthesia: Prospective clinical study

Sünnet cerrahisi için en uygun anestezi yöntemi nedir? Lokal ve genel anestezinin karşılaştırılması: Prospektif klinik çalışma

Emre Kandemir¹, Kenan Toprak², Ahmet Tahra³, Özgür Efiloğlu³, Gökhan Atış³, Asif Yıldırım³

¹ Karamanoğlu Mehmetbey University, Faculty of Medicine, Department of Urology, Karaman, Turkey

² Muş State Hospital, Department of Urology, Muş, Turkey

³ İstanbul Medeniyet University, Faculty of Medicine, Department of Urology, İstanbul, Turkey



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Yazışma / Correspondence

Emre Kandemir

Üniversite, İbrahim Öktem Cd., 70100

Karaman Merkez / Karaman

Email: emrekandemir@kmu.edu.tr

Tel: +90 542 788 06 36

ORCID

E.K. 0000-0002-9601-8007

K.T. 0000-0002-8243-6777

A.T. 0000-0002-5158-5630

Ö.E. 0000-0003-4757-803X

G.A. 0000-0002-9065-6104

A.Y. 0000-0002-3386-971X



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Özet

Amaç: Sünnet öncesi ve sonrası kapsayan sünnet çalışması anketi ile lokal anestezi ve genel anestezi yöntemlerinin karşılaştırılması amaçlandı.

Gereç ve Yöntemler: Haziran ve Aralık 2021 tarihleri arasında sünnet için başvuran ve çalışmaya katılmayı kabul eden 0-12 yaş arası çocukların ebeveynlerinin sünnet çalışması anketini doldurmaları sağlandı. Tüm hastalar aynı cerrah ve aynı cerrahi yöntem ile opere edildi. Uygulanan anestezi şekline göre hastalar lokal ve genel anestezi olarak iki gruba ayrıldı ve veriler karşılaştırıldı.

Bulgular: Çalışmamıza anket verileri tamamlanan 282 hasta dahil edildi. 132 hastaya (%48,9) genel anestezi, 144 hastaya (%51,1) lokal anestezi uygulandı. Lokal anestezi uygulanan hastaların yaş ve kilo ortalamaları, sünnet için uygun yaş tercihleri genel anestezi uygulanan gruptan anlamlı olarak düşük bulundu ($p<0,001$). Her iki gruptaki ebeveynlerin sosyoekonomik düzeyleri, eğitim durumları ve sünnet yaptırma sebepleri arasında anlamlı fark görülmedi ($p\geq 0,05$). Hastaların işlem sonrası bakım ihtiyacı ve iyileşme süresi, lokal anestezi uygulanan grupta anlamlı olarak daha düşük bulundu ($p<0,001$).

Sonuç: Sünnet lokal veya genel anestezi ile güvenle yapılabilen bir cerrahi işlemdir. Erken aylarda sünnet yaptırmak isteyen ebeveynler daha çok lokal anesteziyi tercih etmektedir. Bu grupta iyileşme süresi daha kısadır. Cinsel gelişim dönemi de kapsayan ileri yaşlarda, anestezi tercihinin genel anestezi lehine değiştiği görülmüştür. Toplumumuzun sünnet ile ilgili hassasiyeti ve bilinç düzeyi geçmiş yıllara göre artmıştır.

Anahtar Kelimeler: sünnet, genel anestezi, lokal anestezi, üriner sistem enfeksiyonu

Abstract

Objective: It was aimed to compare the methods of local anesthesia and general anesthesia with circumcision study questionnaire applied before and after circumcision.

Material and Methods: Parents of children aged 0-12 years who applied for circumcision between June and December 2021 who agreed to participate in the study were asked to fill out the circumcision study questionnaire. All patients were operated with same surgeon and surgical method. Patients were divided into local and general anesthesia groups, and data were compared.

Results: Our study included 282 patients; general anesthesia was applied to 132 patients (48.9%), and local anesthesia was applied to 144 patients (51.1%). Age and weight averages of patients who were administered local anesthesia and age preferences suitable for circumcision were significantly lower than those in general anesthesia group ($p<0.001$). There was no significant difference between socioeconomic levels, educational status and reasons for circumcision in both groups ($p\geq 0.05$). Patients' need for postoperative care and recovery time was significantly lower in the local anesthesia group ($p<0.001$).

Conclusion: Circumcision is a surgical operation that can be performed safely with local or general anesthesia. Parents who want circumcision in the early months of life mostly prefer local anesthesia. Postoperative recovery time is shorter in this group. Preference for anesthesia has changed in favor of general anesthesia in advanced ages, including the sexual development period. The knowledge and awareness level of our society about circumcision has increased compared to previous years.

Keywords: circumcision, local anesthesia, general anesthesia, urinary tract infection

The study was approved by Ethics Committee of Karamanoğlu Mehmetbey University (Approval No: 04-2021/05, Date: 25/05/2021). All research was performed in accordance with relevant guidelines/regulations, and informed consent was obtained from all participants.

INTRODUCTION

Circumcision is a surgical operation that has been widely practiced since the first periods of written records in human history. The earliest evidence of human circumcision dates back to 4000 BC in Egypt (1). Basically, it is the removal of the prepuce covering the glans penis by cutting. According to the World Health Organization (WHO) research, approximately 30% of men worldwide are circumcised, and two-thirds are Muslims (2). Circumcision is practiced in every society for different reasons. Religious and cultural habits, medical necessity, and hygienic reasons can be shown among these reasons. Nearly 100% of men in our country have had circumcision surgery. It is still one of the most frequently performed surgical operations in our country and the world (3).

Although it has been applied millions of times over the years, the debates continue until today. A comprehensive report on circumcision published by the American Academy of Pediatrics (AAP) in 2012 has sparked controversy (4). A multidisciplinary working group consisting of the AAP board of directors and special region representatives, members of the disease control and prevention center, gynecology and obstetrics specialists, and related branch physicians performing circumcision surgery prepared the report. The report emphasized that the medical benefits of circumcision outweigh the potential risks and harms. Circumcision is protective against diseases such as urinary tract infections, sexually transmitted diseases, HIV, penile cancer, phimosis, paraphimosis, balanitis, and lichen sclerosis. It has been stated that the complication rates after circumcision performed in health institutions and by experienced surgeons are very low. It has been shown that most complications can be resolved with minor interventions. In addition, there was no adverse effect on glans penis sensitivity, sexual pleasure, and satisfaction. It is recommended that clinicians inform parents about circumcision impartially during pregnancy and in the early postpartum period. (4). There are also medical opinions advocating that argue the opposite of these results. Some opinions argue that the medical benefits of circumcision are not certain, the possibility of complications is higher, and the

operation should be postponed until the child can give informed consent (5, 6).

All these ongoing discussions about circumcision blur the process for parents who plan circumcision for their children. It does not seem possible to expect the parents to make a clear decision on whether to perform the operation, the appropriate time, the type of anesthesia, and the method to be used in a matter for which a decision has not been reached even by the medical authorities. Mainly, the choice of general or local anesthesia to be applied before the operation, the method to be used, the surgical branch that will perform the operation, the operation's recovery time, its complications, and possible psychological effects on the child are wondered by the parents. In addition, the impact of all these details on the recovery period after surgery is essential for physicians.

In our study, parents were provided with detailed information about circumcision before the operation with the circumcision study questionnaire covering the periods before and after circumcision. Based on the preferred anesthesia method for the operation, all parents' preferences about circumcision were recorded. By comparing the anesthesia methods, it was studied whether there was a significant difference in the parameters of the pre-and post-operation.

MATERIAL AND METHODS

The study was planned prospectively and ethics committee approval was obtained. All study steps were carried out in accordance with the Declaration of Helsinki (Ethics Committee of Karamanoğlu Mehmetbey Faculty of Medicine, Date: 25.05.2021. Approval No: 04-2021/05).

The study included healthy boys between the ages of 0-12, who applied to the outpatient clinic with a request for circumcision between June and December 2021, had no medical contraindications for the operation, and whose parents agreed to participate in the survey. Before the examination and informed about the operation, the parents were asked to answer the first ten questionnaire questions concerning the pre-operative period. General information about the operation, possible complications, applied anesthesia, and circumcision methods were explained. The type

of anesthesia used was decided by the parents' preference, except for absolute contraindications. Complete blood count and coagulation parameters of all patients were seen. The anesthesiologist evaluated the patients who will undergo General Anesthesia/Sedation before the operation. Informed consent was obtained from all patients before the operation. Local anesthesia was applied as dorsal penile block and circumferential infiltration to the penile radix using lidocaine and bupivacaine. All operations were performed by the same surgeon using the dorsal slit and excision technique. The patients who were followed up after the operation were discharged on the same day. It was ensured that the parents answered the last four questionnaire questions about the postoperative period 15 days after the operation.

All data were recorded and statistical analysis was done with SPSS (IBM Version 20, New York, USA). Compliance of numerical data with normal distribution was tested with the Shapiro-Wilk test. Continuous variables are expressed as mean (SD) or, if variables were not normally distributed, as median (minimum-maximum) and categorical variables as the number of cases and percentage. The sample was divided into general and local anesthesia groups according to the type of anesthesia applied and compared with each other. While the t-test and Mann-Whitney U test were used to compare independent variables, the Chi-square test was used to compare categorical variables.

RESULTS

Our study included 282 patients who fulfilled the stated conditions and completed questionnaire data. General anesthesia was applied to 48.9% (n=132) of the patients, and local anesthesia was applied to 51.1% (n=144) of them. The mean age and weight of the patients administered local anesthesia were significantly lower than those in the general anesthesia group (p:0.001). The frequency of urinary tract infection was also higher in the patients administered general anesthesia (p:0.001). There was no significant difference between the two groups in terms of the socioeconomic income level of the parents, the education level, the reasons for having the operation, the reasons for fear-anxiety about the operation, and who can perform the operation

(p≥0.05). While 47.2% of parents who preferred local anesthesia for circumcision were between 0-1 years old, 26% of parents preferred general anesthesia were between 2-5 years old (p:0.001). Demographic data are shown in Table 1 in detail.

When the postoperative data were analyzed, post-operation recovery time, need for care, and suture absorption time were significantly lower in the local anesthesia group (p:0.001). There was no significant difference between the two groups in the post-operation behavioral changes (p≥0.05). Postoperative data are shown in Table 2 in detail.

DISCUSSION

Circumcision is a surgical operation performed for religious, cultural or medical reasons throughout history. Management of pain perception that may occur during and after the operation is necessary. Societies have also accepted this operation as a sacred ceremony in which the individual proves his resilience to pain. Today, many anesthetics and analgesia methods are used for the operation. These are local anesthesia, regional anesthesia, sedoanalgesia, and general anesthesia (7,8). Among these techniques, local anesthesia and sedoanalgesia/general anesthesia are commonly used in our country. Patients and physicians must analyze the frequency of use of these techniques and their superiority against each other.

The anesthesia method to be applied for circumcision and the age and weight of the patients are essential in terms of patient and physician preference. In our study, the mean age and weight of the local anesthesia group were significantly lower than the general anesthesia group (p=0.001). In our country, the age of circumcision is mostly between 0-12 years old. Although the local anesthesia method was explained in detail in patients over a certain age and weight, it was observed that the concern that the patient might try to act with a feeling of discomfort and complicate the operation was the common thought among the parents. It was observed that the parents' preferences were commonly general anesthesia for patients of relatively higher age and weight. Therefore, in our study, it was impossible to provide a homogeneous distribution in age and weight in patients in both anesthesia groups. 144 pa-

Table 1. Pre-operative evaluation data

	General anesthesia(n=138)	Local anesthesia(n=144)	p value
Age (median (min-max)) (months)	56 (6-110)	14 (1-90)	0.001*
Weight (mean± S.D.) (kg)	16.1 ± 5.4	10.3 ± 2.5	0.001
Number of UTIs (in last one year) (median (min-max))	2 (1-3)	1 (1-3)	0.001*
Socioeconomic status			0.249+
0-2800 ₺	29 (%21)	26 (%18)	
2801-5600 ₺	47 (%34)	49 (%34)	
5601-10000 ₺	41 (%29.7)	43 (%29.9)	
>10000 ₺	21 (%15.3)	26 (%18.1)	
Mother Educational status			0.254+
Illiterate	5 (%3.6)	7 (%4.8)	
Elementary-Middle School	48 (%34.7)	33 (%23)	
High school	53 (%38.5)	58 (%40.2)	
University	32 (%23.2)	46 (%32)	
Father Educational status			0.478+
Elementary-Middle School	44 (%31.9)	35 (%24.3)	
High school	52 (%37.7)	59 (%41)	
University	42 (%30.4)	50 (%34.7)	
Reason for procedure			0.466+
Religious reasons	75 (%54.3)	60 (%41.6)	
Tradition	46 (%33.4)	35 (%24.4)	
Environmental oppression	4 (%2.8)	9 (%6.2)	
Medical reasons	13 (%9.5)	40 (%27.8)	
Fear-Restraint			0.224+
Infection	52 (%37.7)	31 (%21.5)	
Penile damage	20 (%14.5)	16 (%11.2)	
Late recovery	12 (%8.7)	30 (%20.8)	
Pain	24 (%17.3)	44 (%30.6)	
Inability to urinate	9 (%6.5)	7 (%4.8)	
All	13 (%9.5)	12 (%8.3)	
None	8 (%5.8)	4 (%2.8)	
When is the appropriate age for circumcision?			0.001+
0-1 (age)	10 (%7.2)	68 (%47.2)	
1-2 (age)	27 (%19.6)	39 (%27)	
2-5 (age)	36 (%26)	18 (%12.6)	
5-7 (age)	35 (%25.4)	6 (%4.2)	
7 (age)	30 (%21.8)	13 (%9)	
Who can perform the circumcision?			0.748+
Pediatric surgeon / Urologist	116 (%84)	115 (%79.9)	
Pediatric surgeon / Urologist and other healthcare providers	22 (%16)	29 (%20.1)	

* : Mann-Whitney U Test,t-test, + : Chi-square test

UTI: Urinary tract infection

S.D. : standard deviation, Min: Minimum, Max: Maximum

Table 2. Post-operative evaluation data

	General anesthesia(n=138)	Local anesthesia(n=144)	p value
Healing time (days)(mean± S.D.)	7.4 ± 2.6	5.4 ± 2.1	0.001*
Time for care (days)(mean± S.D.)	4.4 ± 2.1	3.6 ± 1.4	0.001*
Suture absorption time (days)(mean± S.D.)	10.3 ± 2.3	8.91 ± 1.2	0.001*
Was there any beahvioral changes?			0.124+
Yes	59 (%42.7)	81 (%56.2)	
No	79 (%57.3)	63 (%43.8)	

* *T test + Ki-square testi**S.D.* : standard deviation

tients (51.1%) were operated on under local anesthesia, and 138 patients (48.9%) were operated on under general anesthesia. It was observed that the number of urinary tract infections in the last year was significantly higher in the general anesthesia group. It was thought that this result was caused by the significant age difference between the groups, not the type of anesthesia or the surgical operation. In our study, the median age and mean weight were 14 months and 10.3 kg in the local anesthesia group and 56 months and 16.1 kg in the general anesthesia group. In a study conducted in 2004 on the subject, 411 circumcised children aged between 2 and 11 were evaluated and the average age of circumcision was calculated as 7 years (9).

It was observed that the question "What is the most appropriate age for circumcision surgery?" asked the parents participating in our study. While the local anesthesia group mostly preferred the 0-1 age group, the general anesthesia group preferred the 2-5 age group. ($p=0,001$). When all patients were evaluated, it was seen that 0-1 age (27.6%) response was given in the first place. Compared to previous studies, it can be said that parents have preferred circumcision at a younger age in recent years. In another study involving 98 people related to age preference, it was seen that parents answered 3-6 years old (36.7%) in the first place (10). This study stated that circumcision performed in the newborn period is the most appropriate because it prevents many physical and psychological problems. In addition, it has been stated that circumcision performed in 2-6 years, called the sexual development period, may cause castration anxiety and should not be done (10-12).

This view has not been scientifically substantiated by a high-evidence meta-analysis or a placebo-controlled, double-blind, prospective, randomized study. Therefore, circumcision between 2-6 years of age cannot be accepted as an absolute contraindication. With the increasing use of the internet and social media in recent years, it has been observed in our study that most of the parents in our country have concerns that circumcision surgery is absolutely contraindicated in the 2-6 years old period. There are also scientific studies that argue the opposite of this view. In a study by Schlossberger et al., the effects of circumcision on child mental health were examined and stated that the operation did not have a significant negative impact on body images in terms of anxiety (13). In addition, although circumcision has been practiced frequently for years between the ages of 2 and 6 in our country, castration anxiety is not a common health problem (14,15). Circumcision may be sanctified by society, seen as the first step towards masculinity, and encouraging the person to do so may contribute to this. As a result, it can be said that parents' knowledge in our country is increasing for this age group due to their research. When the data in our study were examined in detail, it was seen that parents did not give up circumcision between the ages of 2-6, but general anesthesia was more preferred for this age group.

When the reasons for circumcision were analyzed, it was seen that religious reasons came first in both groups that were administered general or local anesthesia. Although circumcision surgery is not defined as a pillar of Islam, it has become an obligatory ritual

in practice (16). Medical reasons are in second place in the local anesthesia group. In the surveys conducted in our study, it was seen that the parents, who primarily considered the medical benefits of circumcision, mostly preferred the 0-2 age group to obtain the possible benefits at an earlier age, and therefore local anesthesia was more preferred. In another study, it was stated that the rate of circumcision for medical reasons was 15.3%. It has been reported that families prefer circumcision to prevent smegma accumulation, urinary system infection, balanitis, and phimosis (17). The desire to undergo circumcision for traditional reasons was in second place in the group performed under general anesthesia. Considering circumcision as the "first step towards masculinity" in our country is a traditional and cultural reason for circumcision. It was seen that social pressure was the last reason for circumcision in both groups. In a study conducted by Kavaklı et al., it was observed that due to social pressure, some children stated that they did not feel male unless they were circumcised (18).

In our study, it was observed that the education and socioeconomic levels of the parents did not significantly change the anesthesia preference. In today's information age and communication, the ease of access to information at all levels may have led to similar tendencies in patient preferences. In another study on the subject, 74 mothers who applied for the circumcision operation were evaluated, and it was seen that the educational status of the mothers did not significantly affect the circumcision decision, the appropriate age selection, and the person to be circumcised, but only the reason for circumcision (10).

When we analyzed the fears and reservations of parents about circumcision based on all patients, it was seen that the first concern was the possibility of infection. It was observed that the fact that the penis was in a closed area and contact with urine and stool increased the concerns of the families on this issue. After completing the questionnaire, detailed information was given to the parents. It was explained that the contact of urine with the wound does not increase the possibility of infection. Information was provided about antibiotic pomade treatments and wound care. Giving this information to the families before the op-

eration may help reduce the pre-circumcision anxiety of the parents. When both groups were evaluated separately, it was seen that the families in the local anesthesia group had the most pain concerns before the operation. It was observed that the reasons such as the possibility of not providing adequate analgesia in local anesthesia and the inability of children to be inactive during the operation increased these concerns. It was thought that providing more effective analgesia during the operation in general anesthesia reduced pain anxiety in this group. For this reason, circumcision with general anesthesia can be offered to parents who experience significant anxiety due to pain. In a small number, the families were worried about penile damage, delayed recovery and inability to urinate. In the literature, it is seen that there are serious complications such as urethral injury and glans amputation during circumcision (19, 20). It was stated that the likelihood of complications decreased in operations performed in health centers by urologists or pediatric surgeons.

When the postoperative data of the questionnaire were analyzed, it was seen that the recovery time, the need for care and the suture absorption time were significantly lower in the local anesthesia group. This situation may be related to the younger patient population in this group rather than the type of anesthesia. Accordingly, faster wound healing may cause this result. Some of the parents stated that they thought that having the penis in the diaper provides faster wound healing. For this reason, they said that they wanted to have circumcision before toilet training was given. When the studies on this subject are analyzed, it has been reported that rapid wound healing is not related to the use of diapers, and circumcision performed at younger ages heals faster (21). As a result of our study, the shorter healing time and time of care in the local anesthesia group may be due to the younger age of the patients in this group, not because of the type of anesthesia. But also, local anesthesia provides the opportunity or obligation to perform circumcision in younger age groups; it provides an advantage indirectly, if not directly.

When the families were asked to evaluate the behavioral changes in children after the operation, there was no significant difference between the two groups. However, it was observed that there was a higher rate

of behavioral changes in the local anesthesia group. This may be related to the more substantial analgesic effect of general anesthesia in the early postoperative period and the more anxiety experienced during the operation in local anesthesia.

It was observed that the answer to the question of who can perform the circumcision was mostly urologists or pediatric surgeons in both groups. In a study conducted by Ceylan et al. in 2007, it was reported that the rate of circumcision performed by specialist doctors in the hospital was meager (22). In another study conducted by Çelik et al. in 2021 on this subject, 85.3% of parents stated that a specialist doctor circumcised their child. This situation shows that the knowledge level of Turkish society about circumcision has increased over the years.

When the results of our survey study are analyzed, there are some limitations. In comparison to the anesthesia method, it was impossible to obtain similar groups in terms of age and weight due to parental preferences. Data such as the recovery and care periods of the patients and behavioral changes were obtained with the information obtained from the parents. Multicenter prospective studies with a more significant number of patients and longer patient follow-ups are needed.

CONCLUSION

In conclusion, circumcision is a surgical operation that can be performed safely with the help of local or general anesthesia. General information about circumcision and the knowledge about the person who should do the operation has increased in our society. In circumcision surgery performed in the early months, local anesthesia is preferred and a shorter recovery time is observed. However, it is seen that the preference for general anesthesia increases between the ages of 2-6, which is called the sexual development period. Multicenter prospective studies with a larger number of patients and longer patient follow-ups are needed.

Conflict of Interest

The authors declare to have no conflicts of interest.

Financial Disclosure

The authors declared that this study has received no financial support.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Ethical Approval

The study was approved by Ethics Committee of Karamanoğlu Mehmetbey Faculty of Medicine (Date: 25.05.2021. Approval No: 04-2021/05) and written informed consent was received from all participants. The study protocol conformed to the ethical guidelines of the Helsinki Declaration.

Author Contributions

Conception and design; Kandemir E., Data acquisition; Kandemir E, Data analysis and interpretation; Kandemir E, Efiloğlu Ö, Drafting the manuscript; Kandemir E, Efiloğlu Ö, Critical revision of the manuscript for scientific and factual content; Kandemir E, Toprak K, Tahra A, Efiloğlu Ö, Atış G, Yıldırım A, Statistical analysis; Toprak K, Tahra A, Supervision; Yıldırım A.

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