Rapid Way of Circumcision: Bipolar Diathermic Knife

Sünnetin Hızlı Yolu: Bipolar Diatermik Bıçak

Aykut AYKAÇ,[a]
Onur YAPICI,[b]
Ural OĞUZ,[c]
Bülent Alper AYGÜN,[d]
Özer BARAN,[e]
Cemil AYDIN,[f]
Reşit Oğuz YILANOĞLU[g]

[a]Clinic of Urology, Orhangazi State Hospital, Bursa
[b]Clinic of Urology, Acıpayam State Hospital, Denizli
[c]Department of Urology, Giresun University Faculty of Medicine, Giresun
[d]Clinic of Urology, Karadeniz Ereğli State Hospital, Zonguldak
[e]Clinic of Urology, Karabük University Training and Research Hospital, Karabük
[f]Clinic of Urology, Diyarbakır Gazi Yaşargil Training and Research Hospital, Diyarbakır
[g]Clinic of Urology, Dörtyol State Hospital, Hatay

Geliş Tarihi/*Received:* 13.01.2015
Kabul Tarihi/*Accepted:* 11.04.2015

Yazışma Adresi/*Correspondence:*
Aykut AYKAÇ
Bursa Orhangazi State Hospital, Clinic of Urology, Bursa, TÜRKİYE/TURKEY
aykutdr@gmail.com

ABSTRACT Objective: Circumcision is a world wide surgical procedure but still gold standard approach not defined. For such a common procedure there are many methods described for circumcision. There is literature about methods such as gomko clamp, mogan clamp, shang ring, plastibell, dorsal slit, etc. We aimed to evaluate results and complications of circumcision with bipolar diathermic blade. **Material and Methods:** 702 pediatric patients younger than 16 years circumcised with bipolar diathermic blade between May 2012 and July 2013, the data from 623 patients who returned for check-ups were retrospectively evaluated. Circumcision performed under local and/or sedation anesthesia. At the end of the circumcision, no patient was given any dressing and antibiotic treatment. Patients were called for check-up after the second day. Patients with full skin bonding between two sutures were accepted as having wound fully healed. The circumcision healing time and complication rates were evaluated. Cost analysis was completed. **Results:** The average age of 623 patients was 6.7±5,3 years (6 days-16 years). The average operation duration and healing time of patients was 5.45±1,16 minutes and 4.3±0,8 days, respectively. Slight edema lasting 2-3 days was observed in 153 (24%) patients defined as minor complication. There was no major complication such as hemorrhage, burning and infection. The cost analysis found that each circumcision with bipolar diathermic blade had an average saving of 5.6 dollars. **Conclusion:** Circumcision with bipolar electrocautery is reliable, fast, does not involve hemorrhage and provides good cosmetic results.

Key Words: Circumcision, male; child; electrocoagulation

ÖZET Amaç: Sünnet dünya genelinde uygulanan cerrahi bir prosedür olmasına rağmen altın standart yaklaşım halen tanımlanmamıştır. Bu kadar yaygın olan prosedüre yönelik pek çok yöntem uygulanmaktadır. Gomko klemp, mogan klemp, shang ring, plastibell, dorsal slit vb yöntemler literatürde mevcuttur. Biz de bipolar diatermik bıçak ile yapılan sünnetin sonuç ve komplikasyonlarını değerlendirmeyi amaçladık. **Gereç ve Yöntemler:** Mayıs 2012 ve Temmuz 2013 tarihleri arasında bipolar diatermik bıçak ile sünnet işlemi uygulanan 16 yaşından küçük 702 çocuk hastadan düzenli takibe gelen 623 hastanın verileri retrospektif olarak değerlendirildi. İşlem lokal ve/veya sedasyon anestezisi altında uygulandı. Sünnet işleminin sonunda hiç bir hastaya pansuman yapılmadı ve antibiyotik tedavisi verilmedi. Hastalar ikinci günden sonra kontrole çağrıldı. İki sütür arasındaki doku kaynaması tam olan hastaların yara yeri iyileşmiş kabul edildi. Sünnet iyileşme zamanları ve komplikasyon oranları değerlendirildi. Maliyet analizi yapıldı. **Bulgular:** 623 hastanın yaş ortalaması 6,7±5,3 yıl (6 gün-16 yaş) idi. Ortalama operasyon süresi ve iyileşme süresi sırasıyla 5,45±1,16 dk ve 4,3±0,8 gün idi. 2-3 gün süren hafif dereceli ödem hastaların 153 (%24) ünde görülen minor komplikasyondu. Kanama, yanık ve enfeksiyon gibi major komplikasyon gelişmedi. Yapılan maliyet analizinde bipolar diatermik bıçak ile her sünnet uygulamasında ortalama 5.6 dolar maliyet kazancı olduğu görüldü. **Sonuç:** Bipolar diatermik bıçak eşliğinde yapılan sünnet güvenilir, hızlı, kanamasız ve iyi kozmetik sonuç sağlamaktadır.

Anahtar Kelimeler: Sünnet, erkek; çocuk; elektrokoagülasyon

Turkiye Klinikleri J Urology 2015;6(1):15-9

doi: 10.5336/urology.2015-43558

Circumcision, throughout history based on religious beliefs, over time has gained its own medical indications as it has been understood to have protective functions against urinary infections, sexually trans-

mitted diseases and penile cancer.[1-3] The World Health Organization estimates that 30-33% of all males aged 15 years and above are circumcised. It is thought that on average every year throughout the world 20 million males are circumcised, again nearly one out of every 6 males is thought to be circumcised.[4] For such a common procedure there are many methods described for circumcision. There is literature about methods such as gomko clamp, mogan clamp, shang ring, plastibell, dorsal slit, etc. The desired gold standard for the circumcision procedure has not been found. Bipolar electrocautery has become widely used in surgical interventions. Especially in penile surgery, bipolar electrocautery proves its safety and reliability. In this study we evaluate circumcision with a bipolar diathermic blade.

MATERIAL AND METHODS

702 pediatric patients younger than 16 years circumcised between May 2012 and July 2013, the data from 623 patients who returned for check-ups were retrospectively evaluated. An informed consent form was signed by the families of all patients before circumcision. The circumcision procedure began in children younger than 1 year after prilocaine injection in the sufficiently visible penis root; in other patients the procedure began after penile block was formed under sedation anesthesia (ketamine HCL, 2 ml/kg iv). Marking the trace of the glans on the prepuce, the tissue planned for excision was determined. The adhesion to the prepuce was opened and after smegma was cleaned clamps positioned at 12 and 6 o'clock were used to suspend the prepuce (Figure 1). Protecting the penis glans with the left hand a modified straight clamp was position obliquely at about a 30 degree angle. After the clamp was positioned the excess prepuce skin was removed with the bipolar diathermic blade (Figure 2). If necessary, mucosa and excess skin tissue were excised by the bipolar diathermic blade. The adhesion between mucosa and skin was opened and possible hemorrhage areas were cauterized with the bipolar electrocautery. The mucosa and skin was sutured with 4.0 rapid vicryl (Figure 3). Patients hospitalized about two hour after the circumcision for controlling any bleeding or side effects of anesthesia. No patient was given any dressing and antibiotic treatment. The patients were given only analgesic medications and topical epithelializing cream and discharged. Patients were called for first check-up after the second day and called for daily up to see wound healing. Patients with full skin bonding between two sutures were accepted as having wound fully healed. The circumcision healing time and complication rates were evaluated. Cost analysis was completed.

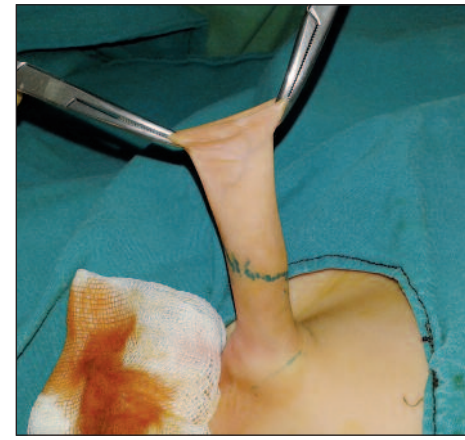

FIGURE 1: Marking the tissue planned for excision was determined and clamps positioned at 12 and 6 o'clock were used to suspend the prepuce.

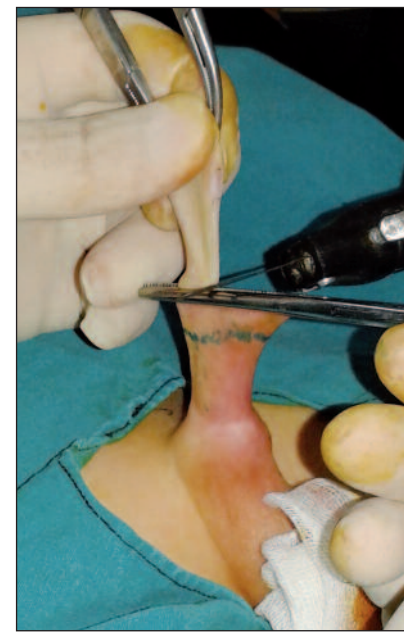

FIGURE 2: Prepuce skin was excised with the bipolar diathermic blade.

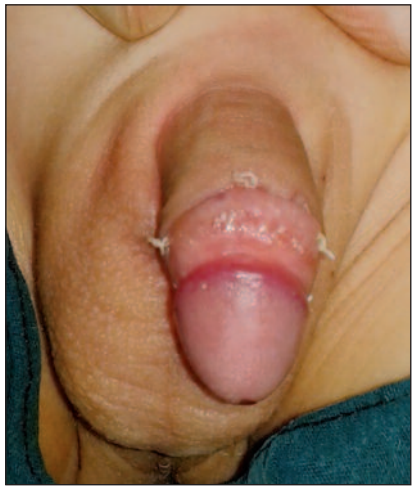

FIGURE 3: The mucosa and skin was sutured with 4.0 rapid vicryl.

RESULTS

The average age of 623 patients was 6.7±5,3 years (6 days-16 years). The average operation duration was 5.45±1,16 minutes. The average healing time of patients was 4.3±0,8 days. Slight edema lasting 2-3 days was the most frequently observed complication and was observed in 153 (24%) patients. For all 35 (5.6%) patients with edema lasting more than 1 week, after 3 days topical steroid treatment resolution of symptoms was observed. One patient returned with a complaint of bleeding after trauma to the penis on the 3rd day after circumcision and opening of the incision line was present. The patient had daily dressing for the wound and the incision line was left to heal with secondary granulation. Apart from this patient, no other patient applied to the hospital for hemorrhage. No patient had burning, infection or insufficient tissue resection in the penis area (Table 1). The cost analysis compare to sleeve technique found that each circumcision with bipolar diathermic blade had an average saving of 5.6 dollars except the operation room cost savings.

TABLE 1: Complication rates.

Patients (n)	623
Patients age	6 days to 16 years
Slight edema	153 (24%)
Prolonged edema	35 (5.6%)
Infection	0
Hemorrhagia	0
Glans injury	0
Burning	0

DISCUSSION

Circumcision is the most common surgical intervention in pediatric groups. Not only religious beliefs also circumcision has medical indications for protecting urinary infections, sexual transmitted disease and penile cancer.[1-3] There are a lot of technique defined for circumcision and each techniques have some superiorities and deficiencies. With the development of technology, various devices and apparatus has been used to find gold standard approach for circumcision. One of the devices is bipolar electrocautery. It has become widely used in surgical interventions. The most important advantage compared to monopolar electrocautery is that the electrical current does not spread through the body but remains between the two cautery tips. As a result effective cutting and cauterization can be applied with a controlled current. In 1995 for the first time Marshs and Archer published the first data on circumcision using bipolar electrocautery.[5] Later Peters and Kass reported that after circumcision, circumcision revision and excision of skin bridges of 346 patients between the ages of 14 to 38 months, bipolar electrocautery could be safely used for penile surgery procedures in children.[6] In the literature there are many papers on the reliability of circumcision with bipolar electrocautery.[7,8] Complications in the literature are related to monopolar electrocautery.[9,10]

One of the most frequently-seen complications after circumcision is hemorrhage. The incidence of hemorrhage is observed to be between 0.2-5%.[11] Hemorrhage may be sourced in open vein endings or the edge of the mucosa. Methods of treating hemorrhage may involve pressure dressing, epinephrine tampon especially chosen for mucosa hemorrhage or tying or cauterizing vein endings requiring the patient to return to the operating room. During excision of tissue with bipolar electrocautery, veins and mucosa that may cause possible hemorrhage are cauterized simulta-

neously reducing this risk to minimum levels. In a study by Karaman et al. biopsy after incision did not reveal any harmful effects on deep tissue, nerves or veins.[12] When our data is investigated, 1 patient returned with a complaint of self-limiting hemorrhage after trauma not linked to the circumcision.

The most frequent complication we observed related to bipolar electrocautery was edema on the penis incision line. For edema lasting longer than 1 week there was an efficient response to topical steroid application. In a study by Gallart et al., postoperative edema was seen more common in bipolar scissor group than conventional circumcision group. They explain the reason of edema, excessive thermal damage to the foreskin during bipolar cutting.[8] Using local anesthesia is also another factor of edema. In the literature even if transdermal application also cause an edema.[13] Modified one cut circumcision technique defined by Li et al. reported bandage application after the circumcision reduces the edema complication.[14]

As the clamp is positioned by observing the glans, a straight cut is obtained forming cosmetically satisfying results.[14] As time is not spent on hemorrhage control the duration of the operation is very short. This situation provides a great advantage for collective circumcision procedures. Arslan et al. reported successful results in the short term after a collective circumcision of 5871 children in Sudan.[15] While the gomko clamp method is especially chosen in the newborn period, its applicability reduces with increasing age. There are papers reporting increased complication rates in children above 3 months of age with gomko clamp.[16] The shang ring and plastibell methods require a second visit to remove the circumcision apparatus. The bipolar electrocautery method can be completed in a single session. As a result of no dressing required, children traumatized by the circumcision will not have fear and pain when the dressing is removed on the following day. In addition there is no negative effects that may be caused by disturbing the epithelization surface when removing the dressing material from the line of incision. As the bipolar electrocautery device can be reused there is no extra cost of the circumcision procedure and the costs of cautery and dressing reduce. In the cost analysis in our study the average reduction in costs for circumcision was 5.6 dollars compare to sleeve technique because of saving disposable cautery divece, cautery plaque and bandage expenses. Also Karaman et al. in a study comprising 147 hemophiliac children reported the bipolar electrocautery reduced costs.[17]

In light of our data while the use of bipolar electrocautery during circumcision reduces the rate of hemorrhage compared with the literature, we observed it increased the rate of postoperative edema. Circumcision with bipolar electrocautery is reliable, does not involve hemorrhage and provides good cosmetic results in the long term.

REFERENCES

1. Morris BJ, Wiswell TE. Circumcision and lifetime risk of urinary tract infection: a systematic review and meta-analysis. J Urol 2013;189(6):2118-24.
2. Rosario IJ, Kasabwala K, Sadeghi-Nejad H. Circumcision as a strategy to minimize HIV transmission. Curr Urol Rep 2013;14(4):285-90.
3. Hayashi Y, Kohri K. Circumcision related to urinary tract infections, sexually transmitted infections, human immunodeficiency virus infections, and penile and cervical cancer. Int J Urol 2013;20(8):769-75.
4. Malone P, Steinbrecher H. Medical aspects of male circumcision. BMJ 2007;335(7631): 1206-90.
5. Marsh SK, Archer TJ. Bipolar diathermy haemostasis during circumcision. Br J Surg 1995;82(4):533.
6. Peters MK, Kass EJ. Electrosurgery for routine pediatric penile procedures. J Urol 1997:157(4);1453-5.
7. Fraser ID, Tjoe J. Circumcision using bipolar diathermy scissors: a simple, safe and acceptable new technique. Ann R Coll Surg Engl 2000;82(3):190-1.
8. Méndez-Gallart R, Estévez E, Bautista A, Rodríguez P, Taboada P, Armas AL, et al. Bipolar scissors circumcision is a safe, fast, and bloodless procedure in children. J Pediatr Surg 2009;44(10):2048-53.
9. Uzun G, Ozdemir Y, Eroglu M, Mutluoglu M. Electrocautery-induced gangrene of the glans penis in a child following circumcision. BMJ Case Rep 2012;29:2012.
10. Ince B, Gundeslioglu AO. A salvage operation for total penis amputation due to circumcision. Arch Plast Surg 2013;40(3): 247-50.

11. Kaplan GW. Complications of circumcision. Urol Clin North Am 1983;10(3):543-6.
12. Karaman MI, Zulfikar B, Caskurlu T, Ergenekon E. Circumcision in hemophilia: a cost-effective method using a novel device. J Pediatr Surg 2004;39(10):1562-4.
13. Plank RM, Kubiak DW, Abdullahi RB, Ndubuka N, Nkgau MM, Dapaah-Siakwan F, et al. Loss of anatomical landmarks with eutectic mixture of local anesthetic cream for neonatal male circumcision. J Pediatr Urol 2013;9(1):e86-90.
14. Li G, Li Q, Fu WJ, Hong BF, Luo J, Xu FQ, et al. Modified one-cut circumcision technique by clamp: reports of 2000 cases. Chin Med J (Engl) 2010;123(19):2732-5.
15. Arslan D, Kalkan M, Yazgan H, Ünüvar U, Şahin C. Collective circumcision performed in Sudan:Evaluation in terms of early complications and alternative practice. Urology 2013;81(4):864-7.
16. Bhat NA, Hamid R, Rashid KA. Bloodless, sutureless circumcision. Afr J Pediatr Surg 2013;10(3):252-4.
17. Karaman MI, Zülfikar B, Öztürk MI, Koca O, Akyüz M, Bezgal F. Circumcision in bleeding disorders: improvement of our cost effective method with diathermic knife. Urol J 2014;11 (2):1406-10.