

Circumcision in Neonates and Infants Using Different Techniques: A Comparative Study

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ABSTRACT

Background: The most frequent operation done throughout history is circumcision. Surgeons were worried about improved circumcision equipment that can reduce problems and are simple to use while also considering how cost-effective they are.

Objective: The aim of the current work was to compare the postoperative outcomes between four groups of patients treated with conventional, bone cutter with thermal cautery, plastibell and gomco techniques of circumcision.

Patients and methods: This randomized clinical trial study included a total of 220 infants who have undergone circumcision at the Department of Pediatric Surgery, Zagazig University Hospitals. According to the method of circumcision used; infants were divided into 4 groups, (55 infants each) Group A: Bone cutter with thermal cautery technique; Group B: Conventional technique; Group C: Plastibell device technique and Group D: Gomco clamp technique. The outcomes were assessed intra-operatively and post-operatively.

Results: There were significant differences between the studied groups as regards the need for stitches and the number of stitches. There were significant differences between studied groups regard length of targe mucosal cut off. There was a significant higher percent of infants suffering from bleeding at recovery in Gomco clamp technique group compared to other groups. There were significant differences between studied groups regard Parents' satisfaction ($p < 0.001$). There were significant differences between studied groups regard cosmetic score. There were significant differences between studied groups regard beer assessment score ($p < 0.001$).

Conclusion: It could be concluded that circumcision using thermal assisted device is found to be significantly superior to the other methods in terms of operative time and post- circumcision hemostasis. Generally, complications are minor among all groups.

Keywords: Circumcision, Bone Cutter with Thermal Cautery, Plastibell and Gomco, Neonates.

INTRODUCTION

In addition to being a medical operation with clear risks and advantages, circumcision is a religious tradition. Most often, circumcision is done for religious rather than medical reasons ⁽¹⁾. Neonatal and infant circumcision can be performed using a variety of methods, such as the standard method, the Plastibell device, the Gomco clamp, and the Mogen clamp ⁽²⁾.

It is simple to circumcise both newborns and young children. Most of the time, healing is finished within the first two weeks following surgery. There is a 1 to 15% chance of surgical problems with it ⁽³⁾. In the present day, using a Plastibell gadget has become the technique of choice for babies younger than a year old. Hollister released the Plastibell circumcision tool in the 1950s. According to various research, the Plastibell device (PD) has a 2.0–3.0% reported complication rate. Plastibell circumcision is mostly performed under vision, is practically bloodless, is the least painful and easiest to complete, and has no terrible side effects like urethro-cutaneous fistula or traumatic amputation of the glans ⁽⁴⁾.

General practitioners frequently perform circumcisions using the bone cutter procedure. In Pakistan, the most popular procedure for circumcision is still the bone cutter method. General practitioners are hesitant to use the plastibell circumcision device over the bone cutter approach since there are so few randomized research available on its effectiveness and safety ⁽⁵⁾. Egyptian male circumcision practices still

frequently involve the use of bone-cutting forceps, and many pediatric surgeons prefer to use thermal cautery rather than a knife to remove superfluous skin since it reduces the likelihood of bleeding ⁽⁶⁾. Circumcision is frequently performed using the Gomco technique. The Gomco procedure is still a popular circumcision technique in Saudi Arabia. In Saudi Arabia, there are not much research on the effectiveness and safety of this method ⁽⁷⁾.

The aim of this work was to compare the postoperative outcomes of four groups of patients treated with conventional, bone cutter with thermal cautery, plastibell and gomco techniques of circumcision.

PATIENTS AND METHODS

This randomized clinical trial study included a total of 220 infants who have undergone circumcision at the Department of Pediatric Surgery, Zagazig University Hospitals.

According to the method of circumcision used; infants were divided into 4 groups, (55 infants each) Group A: Bone cutter with thermal cautery technique; Group B: Conventional technique; Group C: Plastibell device technique and Group D: Gomco clamp technique.

Inclusion Criteria:

Male infants aged ≤ 2 years, presented at the

Department of Pediatric Surgery, Zagazig University Hospitals for routine circumcision.

Exclusion Criteria:

Patient's age \geq 2 years. Patients with hypospadias or epispadias, chordee or concealed penis, phimosis or incomplete prepuce, penoscrotal web, inguinoscrotal anomalies, balanitis or inflammatory process around the penis were excluded.

A. Pre-operative Evaluation:

All patients were evaluated by clinical examination for any of the exclusion criteria described above. Randomization using sealed envelope method was done. No other preoperative investigations were required.

B. Intra-operative assessment:

The operation was carried out in the operating room. ECG leads and pulse oximetry were both used to monitor the patient. Face masks containing oxygen and sevoflurane were used to induce anesthesia, and sevoflurane and spontaneous breathing were used to sustain it. Five minutes before to the surgery, 2% Lidocaine HCL was injected to provide local anesthetic with dorsal penile nerve block. 4 mg/Kg of the dosage is diluted in an equivalent amount of sodium chloride 0.9% (8).

Following local anesthetic delivery, 10 mg/kg of paracetamol was given. Using an ink pen, the proper level of the foreskin that has to be removed was marked. Using sterile gauze, the pubic region was sterilized using bovidine-iodine (Betadine®). The prepuce was then fully retracted, exposing the coronal sulcus on both sides, after which the smegma was completely removed. Betadine® is then used to re-sterilize the region.

Operative procedures:

• Bone cutting forceps technique (Group A):

Two mosquito forceps were used to grasp the foreskin. The glans penis was squeezed to avoid its injury. After that, bone cutting forceps was applied to the foreskin for 3 minutes, at the level of the mark, then the foreskin was excised at the same level. Bleeding points were coagulated with bipolar diathermy. Then, a dressing was applied (9).

• Gomco clamp technique (Group B):

The prepuce was grasped using two hemostats applied at 2 and 10 o'clock. A dorsal slit at 12 o'clock was made, and then the bell was applied gently to the glans. The base plate was placed over the bell. The foreskin then was protracted back over the bell with the clamps still attached. The foreskin was drawn evenly through the hole bilaterally using the ink mark as a guide. The clamp then was tightened and left in place for 5 minutes to squeeze the prepuce between the bell and the clamp to make it blood free before a circumferential incision was made. The clamp then was removed and dressing was applied (10).

• Plastibell device technique (Group C):

The prepuce was grasped using two hemostats applied at 2 and 10 o'clock. A dorsal slit at 12 o'clock was made, appropriate-sized bell was placed over the glans, and the foreskin was brought over its top. The string was placed around the foreskin and the Plastibell device at the level of the mark in a groove that acted as the string placement guide. The string was then tightened and tied in a simple square knot. The excess foreskin was trimmed from around the bell using iris scissors. The handle was then broken off the device (11).

• Thermal assisted circumcision (Group C) :

The skin was held by two hemostats to elevate the foreskin, and then the bone-cutting forceps applied at the level of the skin to be removed for circumcision. Excess foreskin will be cut using the heated thermal cautery. The skin retracted proximally after cutting the excess foreskin to expose the glans.

Post-operative prescription:

In groups A and B and D, the baby was put in a warm bath the day after the procedure, and the dressing was removed. Topical antibiotic-containing cream was applied by the parents 3 times daily for 1 week after the procedure. Mother was allowed to feed the patient two hours after the procedure. Acetaminophen suppositories (40 mg/Kg /dose) were given only on demand if the patients cried extensively, felt restless, agitated, or refused feeds.

Recovery period assessment:

Patients were observed for 2 hours post-operatively to assess presence of significant bleeding (Significant bleeding was considered if the dressing was completely soaked).

Follow-up visit assessment:

Three follow-up visits were arranged, next day, 1 week and 1 month after the operation. The first visit was just to ensure absence of any early complications, such as bleeding after dressing removal in groups A and B and D, and early proximal migration of the device in group C. In last follow up, the patients were assessed for any of the following complications as bleeding, infection, urinary retention, phimosis, paraphimosis or device problems such as proximal migration or retaining of the Plastibell device.

Parental satisfaction:

The parents were asked to answer questionnaire 1 in the second follow-up visit after 1 week, and questionnaire 2 in the third follow-up visit after 1 month (12).

Ethical Consideration:

This study was ethically approved by Zagazig University's Research Ethics Committee. and submitted them to Zagazig University (ZU-

IRB#6659). Written informed consent of all the participants' parents was obtained. The study protocol conformed to the Helsinki Declaration, the ethical norm of the World Medical Association for human testing.

Statistical analysis

Utilizing IBM SPSS Statistics for Windows, version 23.0, for data management. IBM Corp., Armonk, New York The mean, standard deviation, or median (range) were used to summarise quantitative data, and absolute frequencies (number) and relative frequencies were used to describe qualitative data (percentage). To compare between more than two groups of normally distributed variables, the ANOVA test was used. When comparing more than two groups

of non-normally distributed data, the Kruskal-Wallis test is appropriate. Using the Chi-square test, categorical variable percentages were compared. P value less than 0.05 was regarded as significant.

RESULTS

The present study showed that there were no significant differences between studied groups as regard age ($p>0.05$). There was a significant difference between studied groups as regard operation duration ($p<0.001$). Operation conventional technique" group B" had longer duration, followed by plastibell device technique "Group C", then Gomco clamp technique" Group D". While shorter duration was bone cutter with thermal cautery technique" group A" (Table 1).

Table (1): Infants age at circumcision & Operation duration of studied groups

Item	Studied groups				KW-Test	p
	Group A n.55	Group B n.55	Group C n.55	Group D n.55		
Age (months) Mean ±SD (range)	4.2± 2.2 (3 d -11.4)	3.6± 2.1 (3 d -12)	3.5±2.3 (5 d-12)	4.2± 1.9 (4 d-11.9)	6.8	0.076
Operation duration /min Mean ±SD (range)	5.6± 1.5 (2- 8)	13.7± 2.9 (8 -19)	11.7±2.2 (7-17)	10.9± 2.2 (8-18)	125.3	0.0001 (HS)

There were significant differences between studied groups as regard needs for stitches and the number of stitches ($p<0.001$). Operation "conventional technique" group B" needed stitches for all infants, followed by Gomco clamp technique" Group D". Then bone cutter with thermal cautery technique. While plastibell device technique did not need stitches to approximate the outer skin to the mucosal cuff (Table 2).

Table (2): Comparison between the four groups as regard the need for stitches and the number of stitches to approximate the outer skin to the mucosal cuff

Variables			Studied groups				χ^2	p-value
			Group A n.55	Group B n.55	Group C n.55	Group D n.55		
Stiches	Yes	n	3	55	0	10	168	0.0001 (HS)
		%	5.4%	100.0%	0.0	18.2%		
	No	n	52	0	55	45		
		%	94.6%	0.0	100.0%	81.8%		
Number of stiches	1.00	N	2	0	0	0	66.5	0.0001 (HS)
		%	66.7%	0.0%	0.0%	0.0%		
	2.00	N	1	4	0	3		
		%	33.3%	7.3%	0.0%	30.0%		
	3.00	N	0	11	0	7		
		%	0.0%	20.0%	0.0%	70.0%		
	4.00	N	0	40	0	0		
		%	0.0%	72.7%	0.0%	0.0%		

χ^2 Chi square test (HS) $p<0.001$: highly significant

There were significant differences between studied groups as regard length of targe mucosal cut off ($p < 0.001$). Plastibell device technique "Group C" had lengthier of targe mucosal cut off followed Gomco clamp technique" Group D". then bone cutter with thermal cautery technique" group A". Least targe mucosal cut off /mm in conventional technique" group B" (**Table 3**).

Table (3): Comparison between the Length of targe mucosal cut off per mm of studied groups

Item	Studied groups				F Test	p
	Group A n.55	Group B n.55	Group C n.55	Group D n.55		
Targe mucosal cut off /mm Mean \pmSD	3.8 \pm 0.81	3.3 \pm 0.80	5.2 \pm 1.1	4.1 \pm 1.0	21.4	0.0001 (HS)

f : Anova test (HS) $p < 0.001$: highly significant

There was a significantly higher percentage of infants suffering from bleeding at recovery in Gomco clamp technique group compared to other groups ($p = 0.003$) (**Table 4**).

Table (4): Comparison between the four groups regard bleeding at recovery

Variables			Studied groups				χ^2	p-value
			Group A n.55	Group B n.55	Group C n.55	Group D n.55		
Bleeding at recovery	Yes	n	0	3	0	7	13.8	0.003 (S)
		%	0.0	5.4 %	0.0	12.7%		
	No	n	55	52	55	48		
		%	100.0%	94.6%	100.0%	87.3%		

χ^2 Chi square test (S), $p < 0.05$: significant

There were significant differences between studied groups as regard Parents' satisfaction ($p < 0.001$). Parents' satisfaction more in bone cutter with thermal cautery technique" group A followed by operation conventional, then Gomco clamp technique" Group D". While least Parents' satisfaction in plastibell device technique "Group C" (**Figure 1**).

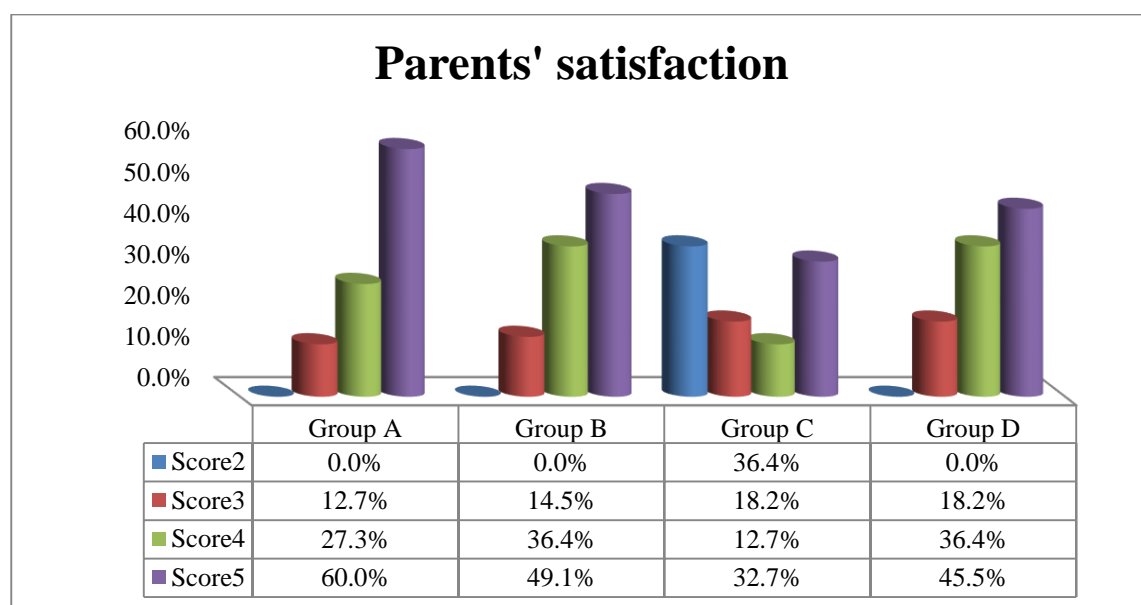


Figure (1): Frequency of parents' satisfaction of studied groups.

There were significant differences between studied groups as regard cosmetic score, ($p < 0.001$). Cosmetic score more in Gomco clamp technique" Group D", followed by bone cutter with thermal cautery technique" group A then operation conventional, While least cosmetic score in plastibell device technique "Group C" (Table 5).

Table (5): Comparison between the four groups regard cosmetic score

Variable		Studied groups				Test of sig	p-value	
		Group A n.55	Group B n.55	Group C n.55	Group D n.55			
Cosmetic score	Median (range)	5(3-5)	4(2-5)	3(2-5)	5(4-5)	KW 47.9	0.0001	
Cosmetic grade	2	N	0	3	18	χ^2 79.1	0.0001 (HS)	
		%	0.0%	5.5%	32.7%			0.0%
	3	N	3	12	15			0
		%	5.5%	21.8%	27.3%			0.0%
	4	N	22	18	10			22
		%	40.0%	32.7%	18.2%			40.0%
5	N	30	22	12	33			
	%	54.5%	40.0%	21.8%	60.0%			

KW: Kruskal wallius test χ^2 **Chi square test (HS) $p < 0.001$:** highly significant

There were significant differences between studied groups regard beer assessment score ($p < 0.001$). Beer assessment more in bone cutter with thermal cautery technique" group A followed by Gomco clamp technique" Group D", then operation conventional B, While least beer assessment score in plastibell device technique "Group C" (Table 6).

Table (6): Comparison between the four groups regard beer assessment score

Variable		Studied groups				χ^2	p-value	
		Group A n.55	Group B n.55	Group C n.55	Group D n.55			
Beer assessment score	Median (range)	4(3-4)	4(2-4)	3(2-3)	4(3-4)		0.0001 (HS)	
Beer assessment grade	2	N	0	8	20	χ^2 96.6	0.0001 (HS)	
		%	0.0%	14.5%	36.4%			0.0%
	3	N	13	14	35			14
		%	23.6%	25.5%	63.6%			25.5%
	4	N	42	33	0			41
		%	76.4%	60.0%	0.0%			74.5%

KW: Kruskal wallius test χ^2 **Chi square test (HS) $p < 0.001$:** highly significant.

DISCUSSION

Circumcision is regarded as the first surgical surgery, and evidence of it dates back to 2300 BC in Egypt. Around 30 to 33% of males had their circumcisions, and over 70% of them were Muslims⁽¹³⁾. Although there is no precise data on the prevalence of male circumcision in Egypt, it is thought to be as high as 80% of the population^(13,14).

It's possible to disagree on the ideal period for circumcision. Various studies found that the ages at circumcision varied. According to a research conducted in Nigeria, 84% of circumcisions took place during the first month of birth⁽¹⁵⁾. According to a survey research carried out in Cameroon, the average age of circumcision was 5.5 years⁽¹⁶⁾. Jewish custom dictates that it be done during the first few days of birth⁽¹⁷⁾. In many African nations, circumcision is routinely performed throughout puberty as a symbol of masculinity⁽¹⁸⁾.

Despite the heated controversy, circumcision during infancy may offer a "window of opportunity" since it may be linked with reduced expenses, a decreased risk of complications when carried out in a suitable setting by a skilled practitioner, and a less negative psychological impact on the kid. Additionally, because infants are less active than adults, the treatment may be done on them while they are under local anesthetic⁽¹¹⁾. Additionally, male circumcision during the first year of life was advised by **El Bcheraoui et al.**⁽¹⁹⁾ and **Bicer et al.**⁽²⁰⁾ because to the very low occurrence of adverse effects, which may increase up to 10- 20 folds when performed beyond infancy.

The difficulties associated with circumcision were assessed in a previous thesis at our institution, along with the relationship between their frequency and the practitioner—whether general or pediatric surgeon, general physician, paramedical or non-medical employees. Additionally, it addressed how the location of the procedure—whether a private clinic, hospital, or somewhere else—relates to the likelihood of complications from circumcision⁽²¹⁾. In this study, we assess the aesthetic outcomes, parent satisfaction, and complications of four of the most popular procedures for circumcision.

In terms of operation time, the thermal assisted method significantly reduced the amount of time required for circumcision, with a mean time of 6.6 minutes as opposed to 13.7 minutes, 11.7 minutes, and 10.9 minutes when the plastibell, gomco, and bone cutting forceps were used, respectively (P value 0.001). There are several discrepancies between the current study and what is written in the literature. In a 2012 research in Iraq, where 121 newborns were surgically circumcised using bone-cutting forceps while under general anaesthesia, the average procedure took six minutes⁽⁹⁾. Another research that compared Plastibell to Mogen found that the latter required almost twice as much time (20 min. vs. 12 min)⁽²²⁾. According to a 2015

American survey, the average operating time for Gomco was 7.00 ± 2.97 ⁽²³⁾. According to an Egyptian research, heat assisted circumcision took a median of 6 minutes throughout the operation⁽⁶⁾.

The margins of the skin and mucous membrane are unlikely to separate at this young age (2 years), which may be related to their subpar erectile function, hence the sutures are not regularly removed in our study. If there is any bleeding, however, sutures should be applied. Compared to all patients (100%) in group B and 10 patients (18.2%) in group D, only 3 patients (5.4%) in group (A) required sutures. However, none of the patients in group (C) needed stitches once the Plastibell device was removed. There was statistical significance here (P 0.001). As a result, it appears that the need for stitches is inversely related to the length of time that the inner and outer skin are crushed, which can range from days in the case of Plastibell to minutes in the case of the Gomco clamp and Bone Cutting Forceps. Plastibell, however, has a high risk of infection due to its crushing effect. An Indian study of 200 babies between the ages of 2 weeks and 7 months found that 3.5% (7 instances) required suturing with a Gomco device⁽²⁴⁾.

In our investigation, the optimal mucosal cuff length was set at 3-5 mm. In the literature, there is disagreement over the optimal length of the inner preputial collar left. Europeans choose a collar that is less obvious since they conduct neonatal circumcision less frequently. Some prefer not to use a mucosal collar at all, whether they are doing infant circumcisions or hypospadias repair circumcisions. The role of the mucosal cuff is also a topic of discussion. No discernible difference was discovered in the length of the mucosal cuff in males who prematurely ejaculated and those who did not^(25,26).

The most typical circumcision consequence is post-circumcision bleeding⁽²⁷⁾. The heat aided technique and Plastibell seems to have high hemostatic value in our investigation. A 2017 research with an overall post-operative bleeding rate of 2% demonstrated the advantages of heat assisted circumcision in terms of hemostasis⁽⁶⁾. Additionally, 12.7% of Gomco patients experienced rapid postoperative hemorrhage, according to our study (7 cases). This may raise questions regarding the effectiveness of the Gomco blades' hemostatic function without the application of bipolar diathermy, particularly in older babies.

Similar to this, a 2001 research from the USA that evaluated the safety of Gomco found that in 32 patients with a mean age of 6.5 months, the rate of bleeding necessitating suture repair or fulguration was 30% (12 instances), as opposed to 0% in a younger group with a mean age of 17 days⁽²⁸⁾. This study came to the conclusion that there is significant morbidity associated with using the Gomco clamp to circumcise male infants after early infancy (three months of age).

Regardless of the effectiveness of the intraoperative anaesthetic approach, circumcision is accompanied with some degree of postoperative discomfort, as with any surgical procedure. Unexpectedly, the discomfort associated with newborn or infant circumcision lasts longer and is more intense than in older kids.

This might be explained by the glans' naturally remaining rough surface, which results from their forced separation from the inner skin. This unprotected skin is subjected to chemical attacks from urine and faeces in addition to mechanical irritants from the diaper. Consequently, when considering newborns, discomfort from skin incisions is not the primary factor⁽²⁹⁾.

In our study, individuals who had been circumcised using the Plastibell device cumulatively consumed the most analgesics with statistical significance. In this sense, there was no statistically significant difference between groups A, B, and D. Other studies have compared the level of discomfort experienced during circumcision using various methods. Similar to this, while requiring less time during surgery, a research found that Plastibell was linked to more intra-operative pain and suffering than Mogen clamp⁽²²⁾.

As regard parent struggling with wound care, the parents of group's C cases seemed to suffer more than the parents of the other three groups, probably because of the higher rate of infection in this group, or demand for re-intervention in some patients in whom the device was retained. However, no statistical significance between groups A, B and D in terms of wound care score.

With no discernible difference, group C (three instances) had the largest demand for re-intervention. In the three cases of group C, the plastibell was retained and did not come off on its own after 12 days following the treatment, therefore the purpose of the re-intervention was to break and remove the device. This might be a very serious problem. Neonates suffering bladder perforation, urosepsis, and necrosis of the penile skin due to the Plastibell circumcision device's impaction⁽³⁰⁾. Our investigation did not uncover any other issues, but more research is required.

CONCLUSION

It could be concluded that circumcision using thermal assisted device is found to be significantly superior to the other methods in terms of operative time and post-circumcision hemostasis. Generally, complications are minor among all groups.

Thermal assisted circumcision, together with Gomco clamp, had statistically significant better scores than bone cutter and plastibell, in terms of parent assessment of the cosmetic result of circumcision. Gomco circumcision is feasible with excellent cosmetic outcome. However, it caused post-operative significant bleeding more than those of Group A, B and D.

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REFERENCES

1. **Abdulwahab-Ahmed A, Mungadi I (2013):** Techniques of male circumcision. *Journal of Surgical Technique and Case Report*, 5(1): 1-7.
2. **Abbas M, Liard A, Elbaz F et al. (2007):** Outcome of surgical management of concealed penis. *Journal of Pediatric Urology*, 3(6): 490-494.
3. **Freeman J, Spencer A, Drongowski R et al. (2014):** Newborn circumcision outcomes: are parents satisfied with the results?. *Pediatric Surgery International*, 30: 333-338.
4. **Jimoh B, Odunayo I, Chinwe I et al. (2016):** Plastibell circumcision of 2,276 male infants: a multi-centre study. *Pan African Medical Journal*, 23(1): 35. doi: 10.11604/pamj.2016.23.35.7841
5. **Larke N, Thomas S, dos Santos Silva I et al. (2011):** Male circumcision and human papillomavirus infection in men: a systematic review and meta-analysis. *Journal of Infectious Diseases*, 204(9): 1375-1390.
6. **El-Asmar K, Abdel-Kader H, El-Shafei E et al. (2017):** Comparison between the bone cutter with thermal cautery, Gomco, and Plastibell for circumcision in neonates and infants: a prospective randomized trial. *The Egyptian Journal of Surgery*, 36(1): 27-32.
7. **Alawamlh O, Kim S, Li S et al. (2018):** Novel devices for adolescent and adult male circumcision. *European Urology Focus*, 4(3): 329-332.
8. **Wang X, Dong C, Beekoo D et al. (2019):** Dorsal penile nerve block via perineal approach, an alternative to a caudal block for pediatric circumcision: a randomized controlled trial. *BioMed Research International*, 19:6875756. doi: 10.1155/2019/6875756.
9. **Kamil M (2012):** Bone cutter circumcision in neonates. *AL-Kindy College Medical Journal*, 8(1): 119-121.
10. **Wan J (2002):** Gomco circumcision clamp: an enduring and unexpected success. *Urology*, 59(5): 790-794.
11. **Morris B, Eley C (2011):** Male circumcision: An appraisal of current instrumentation. *Biomedical Engineering, University of Rijeka, Rijeka*, Pp. 315-354. DOI: 10.5772/18543.
12. **Voznesensky M, Mutter C, Hayn M et al. (2015):** Pediatric sutureless circumcision: an effective and cost efficient alternative. *The Canadian journal of urology*, 22(5): 7995-7999.
13. **Izgi M (2015):** Ethical Evaluation of Non-Therapeutic Male Circumcision. *Turkish Journal of Psychiatry*, 26(3): 204-12.
14. **Fahmy M (2013):** The spectrum of genital median raphe anomalies among infants undergoing ritual circumcision. *Journal of Pediatric Urology*, 9(6): 872-877.
15. **Okeke L, Asinobi A, Ikuerowo O (2006):** Epidemiology of complications of male circumcision in Ibadan, Nigeria. *BMC Urol.*, 6: 21-25.
16. **Morris B, Kennedy S, Wodak A et al. (2017):** Early infant male circumcision: systematic review, risk-benefit analysis, and progress in policy. *World Journal of Clinical Pediatrics*, 6(1): 89-102.

17. **Rizvi S, Naqvi A, Hussain S *et al.* (1999):** Religious circumcision: a Muslim view. *BJU International*, 83(): 13-16.
18. **Mogotlane S, Ntlangulela J, Ogunbanjo B (2004):** Mortality and morbidity among traditionally circumcised Xhosa boys in the Eastern Cape Province, South Africa. *Curatiosis*, 27(2): 57-62.
19. **El Bcheraoui C, Zhang X, Cooper C *et al.* (2014):** Rates of adverse events associated with male circumcision in US medical settings, 2001 to 2010. *JAMA pediatrics*, 168(7): 625-634.
20. **Bicer S, Kuyruklyildiz U, Akyol F *et al.* (2015):** At what age range should children be circumcised?. *Iranian Red Crescent Medical Journal*, 17(3): e26258. doi: 10.5812/ircmj.26258
21. **Simpson E, Carstensen J, Murphy P (2014):** Neonatal circumcision: new recommendations & implications for practice. *Missouri Medicine*, 111(3): 222-30.
22. **Van Howe R (2007):** Neonatal circumcision and penile inflammation in young boys. *Clinical Pediatrics*, 46(4): 329-333.
23. **Weiss H, Larke N, Halperin D *et al.* (2010):** Complications of circumcision in male neonates, infants and children: a systematic review. *BMC Urology*, 10(1): 1-13.
24. **Bhat N, Hamid R, Rashid K (2013):** Bloodless, sutureless circumcision. *African Journal of Paediatric Surgery*, 10(3): 252-54.
25. **Snodgrass W, Khavari R (2006):** Prior circumcision does not complicate repair of hypospadias with an intact prepuce. *The Journal of Urology*, 176(1): 296-298.
26. **Hosseini S, Khazaeli M, Atharikia D (2008):** Role of postcircumcision mucosal cuff length in lifelong premature ejaculation: a pilot study. *The Journal of Sexual Medicine*, 5(1): 206-209.
27. **Hinkle L, Toledo C, Grund J *et al.* (2018):** Bleeding and blood disorders in clients of voluntary medical male circumcision for HIV prevention—eastern and southern Africa, 2015–2016. *Morbidity and Mortality Weekly Report*, 67(11): 337-39.
28. **Horowitz M, Gershbein A (2001):** Gomco circumcision: when is it safe?. *Journal of pediatric Surgery*, 36(7): 1047-1049.
29. **Paix B, Peterson S (2012):** Circumcision of neonates and children without appropriate anaesthesia is unacceptable practice. *Anaesthesia and Intensive Care*, 40(3): 511-6.
30. **Sripathi V, Padankatti L, Shad J (2012):** Urethral transection following neonatal circumcision using a Plastibell device. *Journal of Indian Association of Pediatric Surgeons*, 17(2): 87. doi: 10.4103/0971-9261.93977.