UDC 616.411-089-053.31-036(567)

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Assessment of Plastibell device safety for circumcision in Iraq: a retrospective study

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Paediatric Surgery (Ukraine). 2026. 1(90): 82-87. doi: 10.15574/PS.2026.1(90).8287

For citation: Alhasani AA. (2026). Assessment of Plastibell device safety for circumcision in iraq: a retrospective study. Paediatric Surgery (Ukraine). 1(90): 82-87. doi: 10.15574/PS.2026.1(90).8287.

The Plastibell® device is the most commonly used technique for routine male circumcision all over the globe.

Aim – to assess the Plastibell® device utilization safety for circumcision procedures in Iraq, its applicability across different age groups, and the incidence of associated complications.

Materials and methods. This is a retrospective study involving children who underwent circumcision using Plastibell® devices at the pediatric surgery clinic in Al Moosawi Private Hospital. The study was extended for 11 years and included 2041 boys. Three age groups were studied: neonates, infants 1–3 months old, and those older than three months.

Results. In the cohort of 2041 children, the mean age was 38.65 days (range 1 day to 3.5 years). The majority of participants were neonates (72.7%), followed by infants aged 1–3 months (19.5%) and older infants (> 3 months, 7.8%). Most cases originated from Basrah city center (56.1%), followed by peripheral districts (43.2%) and other governorates (0.7%). Complications were encountered in 3.6% of cases, with bleeding being the most prevalent (1.4%), followed by delayed ring separation (1.1%), incomplete circumcision (0.7%), proximal ring migration (0.2%), and infection (0.2%). A significant association between age and complication rates was found, with older infants experiencing higher rates of complications compared to neonates and infants aged 1–3 months. Six patients (0.29%) were reported to have incomplete circumcision.

Conclusion. This study underscores the safety of circumcision using Plastibell® rings in children, with minor complications being easily manageable. However, clinicians should be vigilant, particularly when performing the procedure in older infants, as they are at higher risk of experiencing complications.

The study was performed in accordance with the principles of the Declaration of Helsinki. The study protocol was approved by the Local Ethics Committee of the institution mentioned in the work.

The author declares no conflict of interest.

Keywords: Plastibell, neonate, circumcision, surgical safety, infants.

Оцінка безпеки пристрою Plastibell для обрізання в Іраку: ретроспективне дослідження

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Пристрій Plastibell є найпоширенішим методом для рутинного чоловічого обрізання в усьому світі.

Мета – оцінити безпеку використання пристрою Plastibell® для процедур обрізання в Іраку, його застосовність для різних вікових демографічних груп та частоту пов'язаних із ним ускладнень.

Матеріали та методи. Це ретроспективне дослідження за участю дітей, які перенесли обрізання з використанням пристроїв Plastibell® у клініці дитячої хірургії приватної лікарні Аль-Мусаві. Дослідження тривало 11 років і охопило 2041 хлопчика. Досліджено три вікові групи: новонароджені, немовлята віком 1–3 місяці та ті, хто старше трьох місяців.

Результати. У когорті з 2041 дитини середній вік становив 38,65 днів (від 1 дня до 3,5 років). Більшість (72,7%) учасників становили новонароджені, далі – немовлята віком 1–3 місяці (19,5%) та старші немовлята (>3 місяців, 7,8%). Більшість (56,1%) випадків трапилась у центрі міста Басра, потім у периферійних районах (43,2%) та інших губернаторствах (0,7%). Ускладнення виникли у 3,6% випадків, причому кровотеча була найпоширенішою (1,4%), за нею слідували затримка відокремлення кільця (1,1%), неповне обрізання (0,7%), проксимальна міграція кільця (0,2%) та інфекція (0,2%). Виявлено значний зв'язок між віком та рівнем ускладнень, причому у старших

немовлят частота ускладнень була вищою порівняно з новонародженими та немовлятами віком 1–3 місяці. Повідомлялося про шістьох пацієнтів (0,29%), які перенесли неповне обрізання.

Висновок. Це дослідження підкреслює безпеку обрізання з використанням кілець Plastibell® у дітей, причому незначні ускладнення легко контролювати. Однак клініцисти повинні бути пильними, особливо під час проведення процедури у старших немовлят, оскільки вони мають вищий ризик виникнення ускладнень.

Дослідження проведено відповідно до принципів Гельсінської декларації. Протокол дослідження був схвалений локальним етичним комітетом установи, згаданої у роботі.

Автор заявляє про відсутність конфлікту інтересів.

Ключові слова: Plastibell, новонароджений, обрізання, хірургічна безпека, немовлята.

Introduction

Male circumcision (removal of the redundant foreskin) has been practiced for more than 5000 years [35], and it is one of the most frequently performed surgical procedures in the world [6]. There is wide variability in the rate of circumcision among different populations. In Islamic countries, circumcision is considered traditional and usually done in infancy, but generally without strict age limits. It is done on the eighth day in the Jewish faith [20,22], with the increased rate of incidence of newborn circumcision in the USA [9,21]. On the other hand, routine circumcision is rare in Europe, Asia, and Central and South America [33].

The benefit of circumcision has been described in numerous studies, such as in the reduced risk of penile and cervix uteri cancer [3,6,19,30,], urinary tract infections (UTIs) [25], sexually transmitted diseases (STDs), and lower Human Immunodeficiency Virus (HIV) prevalence [3,6]. The American Academy of Pediatrics (AAP) task force on circumcision, in its latest policy statement, affirms that the health benefits of newborn male circumcision outweigh the risks, and the procedure's benefits justify access for families [1]. A large retrospective analysis of infants suggested that uncircumcised infants have a 12-fold increased risk for UTI as compared with circumcised infants [18,23,31].

Circumcision, a practice spanning centuries, aims to appropriately remove the prepuce to expose the glans, address or prevent phimosis, and avert the risk of paraphimosis. Male circumcision in children and neonates can be performed using a variety of methods and technologies, each with advantages and drawbacks. The Gomco clamp is a popular approach that provides a clean cut and reduces bleeding; nevertheless, it requires trained personnel to use it appropriately and can cause greater discomfort to the neonate than other methods [15]. Similarly, the Mogen clamp is known for its rapidity and clean circumcision line, with some research indicating that it is less painful, but it is more likely to cause unintentional glans injury if not handled carefully [15]. The Shang Ring is valued for its simplicity, minimum bleeding, and speedy treatment, but its availability is limited and can cause some discomfort while the ring is in place [34,36]. The AccuCirc device is meant to be safe and precise, reducing the likelihood of glans injury while creating a precise cut. It is simple for healthcare personnel to use with little training; however, it is a newer device that costs more than conventional methods [5].

The Plastibell device is often regarded as the best alternative for routine neonatal circumcision. The Plastibell device is well-known for its safety profile and low complication rates, which include negligible risks of bleeding and infection. Its simple use makes it accessible for healthcare providers with little training, which is especially useful in situations where expert surgeons are not available. The Plastibell device does not require sutures, which allows for natural separation of the foreskin and reduces the need for follow-up care [28,19]. Furthermore, the device successfully prevents blood flow to the foreskin, resulting in minimal bleeding during the surgery, which is critical for babies with low blood volumes. It frequently delivers cosmetically acceptable outcomes, with a neater appearance due to the gradual separation of the foreskin [11].

Traditional methods of circumcision, which are frequently performed using basic instruments, are acceptable and trustworthy in certain cultures, but they are associated with higher risks of complications like infection and bleeding due to their use in non-medical settings. The effects vary greatly depending on the practitioner's competence and experience. Each method has advantages and disadvantages, while the Plastibell device is ideal for routine infant circumcision, it is critical to consider individual conditions, such as the child's age, cultural norms, and family preferences, when determining the optimal technique of circumcision. Moreover, the surgeons' proficiency and familiarity with the procedure are crucial to achieving a minimal complication rate [3].

Considering this, the current study ***aims*** to evaluate the safety of utilizing the Plastibell® device, its appropriateness across diverse age groups, and the incidence of associated complications in neonates and children in Iraq.

Fig. Plastibell device approach for circumcision procedure

Materials and methods of the study

Study design and setting. This is a retrospective study, which was conducted at the pediatric surgery clinic in Al Moosawi Private Hospital over an extended period from July 2009 to July 2020.

Study participants and inclusion and exclusion criteria. Over 11 years, 2500 children were enrolled in this study; 459 boys were excluded due to inadequate data and loss of follow-up, and the remaining 2041 infants were included in the study who underwent circumcision for religious reasons. Exclusion criteria ensured the focus on circumcisions without prophylactic or therapeutic medical indications or absolute/relative contraindications.

Age stratification. Participants were categorized into three age groups: Group A (neonates, <1 month), Group B (1–3 months), and Group C (older infants >3 months). This stratification allowed for age-specific analysis of outcomes.

Circumcision procedure. Circumcision was performed on all patients by the hands of one consultant pediatric surgeon under local anesthesia, specifically, ring infiltration using a 1% Lidocaine solution. The procedure involved making an incision at the top of the foreskin, followed by the placement of a Plastibell® ring over the glans, with the foreskin pulled over the ring. A suture was then tied around the foreskin over the tying groove in the ring. Any excess skin beyond the suture was trimmed away, and the detachable handle of the Plastibell® was removed (Figure). Following the procedure, infants underwent a brief reevaluation after 5 minutes before being discharged home. They were prescribed oral Paracetamol and topical antibiotic ointment.

Follow-up care. Parents were advised that the Plastibell ring typically separates within 5 to 11 days and were informed about potential complications and proper care for the ring. They were instructed to keep the area clean and dry, avoid submersion in water until the ring fell off, and monitor for signs of infection, such as redness, swelling, or discharge. Apply the protective ointment as recommended, and if the Plastibell ring does not fall off as expected or if there are any concerns about the healing process, immediately consult your care provider for further guidance.

Complication management. Infants who experienced a minor, non-expanding hematoma near the ring or whose rings slipped or separated underwent management involving removing the ring or applying a simple dressing. In such cases, the Plastibell® ring was viewed as a «template» and not categorized as a complication. Bleeding was defined as an expanding hematoma below the ring or continuous blood oozing. Delayed ring separation was defined as the ring remaining intact beyond 11 days after the circumcision. Incomplete circumcision may be reported as a complication, and it happens when the glans penis is not completely exposed, and this might mandate completing the circumcision by removal of the access preputial tissue (redo Circumcision). Families received guidance on post-procedure care, including expectations for ring separation and possible complications.

Ethical considerations and approval. Informed consent was obtained from parents before performing the procedure. Confidentiality and privacy of participants' data were ensured throughout the study period. The study was approved by the Ethical Committee at the University of Basrah, College of Medicine (Ref. 616 on 4 Aug. 2024).

Table 1
Demographic distribution of the study's participants

Variables	Characteristics		Geographics			Total
			Basrah city center	peripheries	other governorates	
Age groups	Group A (neonates)	N	830	643	10	1483
		%	40.7	31.5	0.5	72.7
	Group B (1–3 months)	N	216	178	5	399
		%	10.6	8.7	0.2	19.5
	Group C (> three months)	N	98	61	0	159
		%	4.8	3.0	0.0	7.8
Total		N	1144	882	15	2041
		%	56.1	43.2	0.7	100.0

Table 2
Incidence of complications with the Plastibell procedure

Complications	Characteristic	N	% (out of complications)	% (out of total cohort)
No	None	1774	90.1	86.9
	Template	194	9.9	9.5
Total		1968	100.0	96.4
Yes	Bleeding	28	38.4	1.4
	Delay Separation	22	30.1	1.1
	Incomplete circumcision	15	20.6	0.7
	Proximal Migration	5	6.8	0.2
	Infection	3	4.1	0.2
Total		73	100.0	3.6

Table 3
The distribution of complications according to age groups

Age groups	Complications N (%)					Total
	bleeding	infection	incomplete circumcision	delayed ring separation	proximal migration	
Group A (neonates) (n=1483)	4 (0.3)	0 (0.0)	8 (0.5)	13 (0.9)	2 (0.1)	27 (1.8)
Group B (1–3 months) (n=399)	16 (4.0)	0 (0.0)	4 (1.0)	6 (1.5)	1 (0.3)	27 (6.8)
Group C (> three months) (n=159)	8 (5.0)	3 (1.9)	3 (1.9)	3 (1.9)	2 (1.3)	19 (12.0)

Statistical analysis. Data collection and management were conducted utilizing REDCap electronic data capture tools hosted at the University of Basrah. Statistical analysis was performed using SPSS software, Chi-Square Tests was used for comparison between groups with a significance threshold set at $P<0.05$.

Results of the study

The study encompassed 2041 children, with an average age of 38.65 days, ranging from 1 day to 3.5 years. Group A (neonates) constituted the majority of participants, accounting for 72.7% of the cohort, followed by Group B (infants aged 1–3 months), which constituted 19.5%, and Group C (older infants >3 months) constituted 7.8%. Geographically, most cases originated from Basrah city center 56.1%, while 43.2% hailed from peripheral districts, and a minor fraction of 0.7% came from other governorates, as shown in Table 1.

Complications were encountered in 73 boys, representing 3.6% of the total cohort. The most prevalent complication was bleeding 1.4%, followed by delayed ring separation 1.1%, incomplete circumcision 0.7%, proximal ring migration 0.2%, and circumcision site infection 0.2%. Conversely, the majority, comprising 194 (9.5%) cases, experienced uneventful circumcisions utilizing Plastibell® rings safely as templates, as depicted in Table 2.

Among those experiencing bleeding, the majority, 78.6%, were managed conservatively with simple compression, while 21.4% necessitated suture ligation. Additionally, three cases of circumcision-related infection were encountered, all resolving satisfactorily with topical antibiotic ointment. Furthermore, 6 out of 15 incomplete circumcisions underwent re-circumcision using Plastibell® rings, while older patients were subjected to the procedure under general anesthesia.

In the distribution of reported complications across different age groups, neonates (Group A) exhibited minimal complications, with only 27 cases reported. Among these, delayed separation was the most prevalent, accounting for 13 (0.9%) cases, followed by incomplete circumcisions with 8 (0.5%) cases, bleeding with 4 (0.3%) cases, proximal ring migration with 2 (0.1%) cases, and no reported cases of infection. Infants aged 1–3 months (Group B) experienced a higher incidence of complications, with a total of 27 cases reported. Among these, bleeding accounted for 16 (4.0%) cases, followed by incomplete circumcisions with 4 (1.0%) cases, delayed ring separation with 6 (1.5%) cases, proximal ring migration with 1 (0.3%) case, and no reported cases of infection. In contrast, older infants (Group C) exhibited the highest rate of complications, with 19 cases reported in total. Among these, bleeding accounted for 8 (5.0%) cases, in-

fection for 3 (1.9%) cases, incomplete circumcisions for 3 (1.9%) cases, delayed ring separation for 3 (1.9%) cases, and proximal ring migration for 2 (1.3%) cases. These percentages reflect the distribution of complications within each age group, with Group C demonstrating the highest rate of complications compared to Groups A and B, as represented in Table 3. Age-stratified analysis unveiled a noteworthy association between age and complication rates (P<0.001). As age increased, so did complication rates, reaching a peak in Group C (12.0%). Bleeding emerged as the most common complication in Groups B and C (4.0% and 5.0%, respectively), whereas delayed ring separation was predominant in Group A (0.9%).

Discussion

Neonatal circumcision is an old act with many social, religious, and health-related aspects. In Iraq, the vast majority of boys are circumcised routinely as a part of the Islamic faith, in which circumcision is highly recommended. Plastibell circumcision is increasingly used in circumcision prevalence nations; it is a simple, safe, and quick technique, especially in younger-aged boys [7,12,17]. This kind of procedure is still used infrequently in Iraq and has never been reviewed or studied.

In this study, it was clear that routine circumcision at neonatal age was more than two and a half times higher than older age groups (72.7%), and that is consistent with the Islamic faith and Sunnah (Prophet's tradition), [4] which recommends an early age of circumcision. The rest of the study population spanned from 30 days to three and a half years old. This finding was characteristic of the Islamic opinion about the age of circumcision, which is entirely different from Judaism [22].

Safe routine neonatal circumcision is widely practiced not only by surgeons but by numerous trained healthcare personnel, particularly in the rural community and city peripheries [16,24]. This could explain why children from the city center (where this study was conducted) were more predominant.

The complication rate is an integral aspect of any procedure, and according to this, surgeons could adopt their technique of choice. Generally, circumcision was extensively studied regarding its complications, which could be mild or severe, ranging from 0.0008% to 3.6% [8]. However, many of these studies enrolled relatively small patient samples [32].

The complication rate was significantly related to boys' age and consistent with the earlier range. According to our data, there was a proportional increase in all types of complications with age, possibly due to the prepuce's normal development (perpetual thickness and vascularity). No complications were reported in this study when the Plastibell ring was used as a template (removal of the ring and wound dressing). This approach was described in the literature [26]. Overall, our data showed that the most commonly reported complication was bleeding. This finding was also seen in many studies by B.K. Hamza et al. [10], B.M. Jimoh et al. [12], and A.J. Krill et al. [14].

On the other hand, a study from Pakistan found delayed separation (retained ring) to be the most frequent complication [29]. In agreement with their findings, our study showed this complication in neonatal age groups. The reported circumcision-related superficial surgical infections were self-limiting, as they ultimately resolved within 48 hours after ring detachment. It might be a foreign body reaction against the ring and the cotton thread, similar to the findings by S. Razzaq et al. [27]. Severe infection complications were sparsely found in the literature [2,29,33].

In this study, incomplete circumcision accounted for approximately 15 cases of complications across the three groups. Similar findings were observed by A. Samad et al. [29] and F.A. Moosa et al. [17], and it was seen mainly in the first year of experience that the improper selection of the ring size could explain. In the present study, redo circumcision using the Plastibell technique was successful in six patients; this approach needs further evaluation. Other complications, including infection and bleeding, were successfully managed with the topical application of an antibiotic and simple compression and suture ligation, respectively.

Conclusions

This study sheds light on the outcomes and consequences of male circumcision in a cohort of 2,041 children from Basrah, Iraq. The majority of patients were newborns, and bleeding was observed as the most common problem. Older infants exhibited higher rates of complications compared to neonates and younger infants. The findings emphasize the need to take age-related factors into account when performing circumcisions, as well as the need for close monitoring and timely management of problems. Furthermore, the study underlines the importance of proper surgical technique and postoperative care in reducing adverse outcomes. More research into optimizing circumcision techniques and addressing age-related risk factors is needed to improve procedural safety and results in this population.

The author declares no conflict of interest.

References/Література

1. American Academy of Pediatrics Task Force on Circumcision. (2012). Circumcision policy statement. Pediatrics. 130(3): 585–586. doi: 10.1542/peds.2012–1990.

2. Bliss DP Jr, Healey PJ, Waldhausen JHT. (1998). Necrotizing fasciitis after Plastibell circumcision. J Urol. 159(4): 1408. doi: 10.1016/S0022–5347(01)63577–5.
3. Christakis DA, Harvey E, Zerr DM, Feudtner C, Wright JA, Connell FA. (2000). A trade-off analysis of routine newborn circumcision. Pediatrics. 105; Suppl 2: 246–249. PMID: 10617731
4. Dabbagh H. (2022). Is circumcision necessary in Islam? J Relig Health. 61(6): 4871–4886. doi: 10.1007/s10943–022–01514–9.
5. Davis SM, Bailey RC. (2022). Can the ShangRing bring us closer to endorsing early infant male circumcision? Lancet Glob Health. 10(10): e1377-e1378. doi: 10.1016/S2214–109X(22)00376–4.
6. Drain PK, Halperin DT, Hughes JP, Klausner JD, Bailey RC. (2006). Male circumcision, religion, and infectious diseases: an ecologic analysis of 118 developing countries. BMC Infect Dis. 6: 172. doi: 10.1186/1471–2334–6–172.
7. Duncan ND, Dundas SE, Brown B, Pinnock-Ramsaran C, Badal G. (2004, Jan). Newborn circumcision using the Plastibell device: an audit of practice. West Indian Med J. 53(1): 23–26. PMID: 15114889.
8. Freedman A, Lerman SE, Bergman J. (2012). Complications of circumcision. In: Surgical Guide to Circumcision: 45–57.
9. Frisch M, Earp BD. (2018). Circumcision of male infants and children as a public health measure in developed countries: a critical assessment of recent evidence. Glob Public Health. 13(5): 626–641. doi: 10.1080/17441692.2016.1184292.
10. Hamza BK, Ahmed M, Bello A et al (2020). Comparison of the efficacy and safety of circumcision by freehand technique and Plastibell device in children. Afr J Urol. 26(66):1–6. https://doi.org/10.1186/s12301–020–00076-z.
11. Javed A, Mumtaz H, Ambreen S et al. (2022). Comparison of duration of surgery: dissection vs plastibell. Pak Biomed J. 5(1): 108–111. https://doi.org/10.54393/pbmj.v5i1.168.
12. Jimoh BM, Odunayo IS, Chinwe I, Akinfolarin OO, Oluwafemi A, Olusanmi EJ. (2016, Feb 9). Plastibell circumcision of 2,276 male infants: a multi-centre study. Pan Afr Med J. 23: 35. doi: 10.11604/pamj.2016.23.35.7841. PMID: 27200140; PMCID: PMC4856486.
13. Kalyanaraman M, McQueen D, Sykes J et al. (2015). Urosepsis and renal failure after Plastibell circumcision. Korean J Pediatr. 58(4): 154–156. doi: 10.3345/kjp.2015.58.4.154.
14. Krill AJ, Palmer LS, Palmer JS. (2011). Complications of circumcision. Sci World J. 11: 2458–2468. doi: 10.1100/2011/373829.
15. Labban M, Menhem Z, Bandali T, Hneiny L, Zaghal A. (2021, Feb). Pain control in neonatal male circumcision: A best evidence review. J Pediatr Urol. 17(1): 3–8. doi: 10.1016/j.jpurol.2020.09.017.
16. Mavhu W, Larke N, Hatzold K, Ncube G, Weiss HA, Mangenah C et al. (2016, Jul 13). Safety, Acceptability, and Feasibility of Early Infant Male Circumcision Conducted by Nurse-Midwives Using the AccuCirc Device: Results of a Field Study in Zimbabwe. Glob Health Sci Pract. 4; Suppl 1: S42–54. doi: 10.9745/GHSP-D-15–00199. PMID: 27413083; PMCID: PMC4944579.
17. Moosa FA, Khan FW, Rao MH. (2010, Aug). Comparison of complications of circumcision by 'Plastibell device technique' in male neonates and infants. J Pak Med Assoc. 60(8): 664–667. PMID: 20726200.
18. Morris BJ. Neonatal urinary tract infections. (details incomplete; doi not available).
19. Mousavi SA, Salehifar E. (2008). Circumcision complications associated with the Plastibell device and conventional dissection surgery: a trial of 586 infants of ages up to 12 months. Adv Urol. 2008: 606123. Epub 2008 Nov 4. doi: 10.1155/2008/606123. PMID: 19009030; PMCID: PMC2581731.
20. Munzer SR. (2018). Examining nontherapeutic circumcision. Health Matrix. 28: 1. URL: https://philarchive.org/archive/MUNDRP.
21. Nabavizadeh B, Li KD, Hakam N, Shaw NM, Leapman MS, Breyer BN. (2022). Incidence of circumcision among insured adults in the United States. PLoS One. 17(10): e0275207. doi: 10.1371/journal.pone.0275207.
22. Naudé JA. (2022). Emergence of the Tyndale – King James Version tradition in English Bible translation. HTS Teologiese Studies/Theological Studies. 78(1): a7649. https://doi.org/10.4102/hts.v78i1.7649.
23. Nayir A. (2001). Circumcision for the prevention of significant bacteriuria in boys. Pediatr Nephrol. 16: 1129–1134. doi: 10.1007/s004670100026.
24. Okeke LI, Asinobi AA, Ikuerowo OS. (2006). Epidemiology of complications of male circumcision. BMC Urol. 6: 7. doi: 10.1186/1471–2490–6–7.
25. Peng YF, Cheng Y, Wang GY et al. (2008). Clinical application of a new device for minimally invasive circumcision. Asian J Androl. 10(3): 447–454. doi: 10.1111/j.1745–7262.2008.00353.x.
26. Peterson AC, Joyner BD, Allen RC Jr. (2001). Plastibell template circumcision. Urology. 58(4): 603–604. doi: 10.1016/S0090–4295(01)01330–9.
27. Razzaq S, Mehmood MS, Tahir TH, Masood T, Ghaffar S. (2018, Sep-Oct). Safety of the plastibell circumcision in neonates, infants, and older children. Int J Health Sci (Qassim). 12(5): 10–13. PMID: 30202402; PMCID: PMC6124829.
28. Refaat DO, Tantawy IM, Mokhtar MM et al. (2023). Circumcision in neonates and infants using different techniques. Egypt J Hosp Med. 90(2): 2662–2669. https://doi.org/10.21608/ejhm.2023.286424.
29. Samad A, Khanzada TW, Kumar B. (2010). Plastibell circumcision. J Pediatr Urol. 6(1): 28–31. doi: 10.1016/j.jpurol.2009.02.006.
30. Shabbir M, Hughes B, Watkin N. (2009). Penile cancer and associated dermatoses. In: Men's Health. Boca Raton: CRC Press: 98–105.
31. Simforoosh N, Tabibi A, Khalili SAR et al. (2012). Neonatal circumcision reduces the incidence of asymptomatic urinary tract infection. J Pediatr Urol. 8(3): 320–323. doi: 10.1016/j.jpurol.2011.05.009.
32. Weiss HA, Larke N, Halperin D, Schenker I. (2010, Feb 16). Complications of circumcision in male neonates, infants and children: a systematic review. BMC Urol. 10: 2. doi: 10.1186/1471–2490–10–2. PMID: 20158883; PMCID: PMC2835667.
33. WHO. (2008). Male circumcision: global trends and determinants of prevalence, safety and acceptability. Geneva: World Health Organization.
34. Wu X, Wang Y, Zheng J, Shen W, Yan JA, Ji H et al. (2013, May). A report of 918 cases of circumcision with the Shang Ring: comparison between children and adults. Urology. 81(5): 1058–1063. Epub 2013 Mar 7. doi: 10.1016/j.urology.2012.11.046. PMID: 23465168.
35. Yegane RA, Kheirollahi AR, Salehi NA, Bashashati M, Khoshdel JA, Ahmadi M. (2006). Late complications of circumcision in Iran. Pediatr Surg Int. 22: 442–445. doi: 10.1007/s00383–006–1672–1.
36. Zhang Q, Gao L, Liu D, Song G, Gao P, Zhang S et al. (2022, Dec 23). Comparative analysis on the outcomes in circumcising children using modified Chinese ShangRing and conventional surgical circumcision. Pediatr Surg Int. 39(1): 59. doi: 10.1007/s00383–022–05343–4.

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Стаття надійшла до редакції 11.02.2026 р., прийнята до друку 16.03.2026 р.