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Investigating Normal and Abnormal Features of Plastibell Ring Circumcision: Case Report and Review of Evidence

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Abstract

Plastibell ring circumcision may be associated with some complications. In this article, we aimed to illustratively address the abnormal and normal features of plastibell ring circumcision. PubMed and Embase were searched for plastibell ring circumcision. Pictures were taken of circumcised children with plastibell rings. The normal post-procedure course of healing, may resemble abnormal complications such as infection and dehiscence. It was revealed that subcutaneous hematoma, blister, and crust on glans, inflammatory penile shaft erythema and swelling, inflammatory penile discharge, and skin-mucosa gap are normal post-circumcision features of plastibell ring circumcision. In contrast, infectious penile shaft erythema, swelling, and discharge, as well as ring impaction, preputial adhesion, and meatal adhesion, were found to be abnormal features. Adverse events of the plastibell ring circumcision are rarely noticed by parents. Therefore, the necessary measures are not taken, and the child suffers serious complications as a result of circumcision. Sometimes, natural features are observed after circumcision, causing parents' anxiety due to ignorance. Providing a pamphlet illustrating common normal and abnormal features of plastibell ring circumcision will decrease family stress, emergency referrals, and preventable complications in this common procedure.

Keywords: Circumcision, plastibell ring, complication

Introduction

Circumcision, as with any other surgery, carries the risk of complications (1). However, there are also some features of the normal healing process that can mimic complications. Approximately 25% of emergency visits immediately after circumcision are due to concerns attributed to normal healing (2). These appearances may cause intense parental anxiety, highlighting the importance of parental education.

On the other hand, there are easily missed abnormal healing features in ring circumcision, which may result in additional procedures (1). In this article, we aimed to present the most common features of a normal and abnormal course of plastibell ring circumcision to decrease unnecessary referrals, additional procedures, and parental concerns.

Materials and Methods

The PubMed and Embase databases were searched up to March 2022 for relevant articles regarding plastibell ring circumcision. Only manuscripts about the complications of plastibell circumcision were used. Pictures of ring-circumcised children were taken by their parents and were sent to the authors to monitor the child's health. The parents consented to have images used anonymously for educational purposes and publishing.

Results

Based on the findings of previous studies, acute complications of circumcision include bleeding, infection, loss of penile skin, and proximal migration of the ring. Delayed complications consist of meatal stenosis, incomplete circumcision, and preputial adhesion of the glans (3).

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Complication rates have been reported from 7% to 20% for the plastibell ring (3), which is higher than conventional circumcision, with complication rates averaging 1.5% (range 0 to 16%) (4). However, not only has the popularity of the plastibell ring increased (5), but it has also been shown in some studies that the plastibell ring reduces circumcision complications (6). These inconsistencies may be due to over- or under-diagnosis of adverse outcomes (3).

Cases Presentations

Local Anesthesia Injection Hematoma

The incidence of this complication is highly worrisome to parents and is common to all types of circumcision (7). This happens when a vessel is injured inadvertently during injection, and the injury appears immediately. Most of these hematomas (Picture 1) spontaneously resolve, but occasionally they require a pressure dressing.

Crust- and vesicle-like lesions (blisters), (Picture 2) on the glans have been reported in 3% of cases (2). They are skin erosions caused by the ring and do not need any treatment.

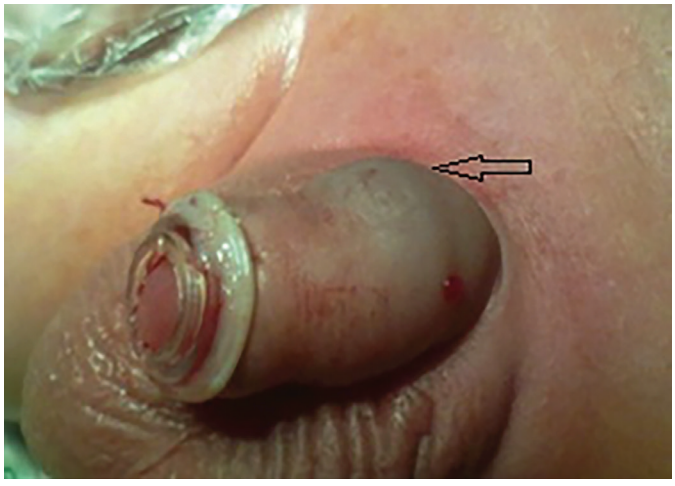
Swelling and Redness of Penile Shaft

The most challenging subject in the postoperative care of circumcision is the diagnosis of infection. Due to the rich blood supply of the penis, the infection rate is very low in circumcision (1), with the incidence estimated between 0.4% and 1.42% according to several studies (6,8). However, the rate of swelling and redness has been reported to be as high as 37.1% and 25.7%, respectively. This may result in the false diagnosis of infection in an emergency setting in up to 26% of boys who will then receive unnecessary antibiotics (2).

The mechanism of falling off the ring is based on pressure necrosis by the firm ligature of skin in the plastic device. Relative ischemia in the distal portion of skin near the ring produces inflammatory reactions, such as redness and swelling, which are fairly common (Picture 3).

Significant pain on palpation of a red or swollen area, fever, and systemic symptoms are important factors that can differentiate infection from inflammation (1,9). The presence of these symptoms necessitates immediate antimicrobial therapy to avoid necrotizing fasciitis (1).

However, redness and swelling without warning symptoms do not need antimicrobial treatment. Improper antibiotic use for circumcision has been reported to increase bacterial resistance, allergic reactions, and diarrhea (10).



Picture 1. Subcutaneous hematoma after local anesthetic injection

Picture 2. Crust, blister, and vesicles at 3 and 6 o'clock of Glans

Picture 3. Swelling and redness of penile shaft

Penile Discharge

A physiologic yellow discharge is visible after the 3rd day of the ring placement up to 2 days after it falls off (Picture 4). As mentioned earlier, skin inflammation proximal to the plastibell ring is responsible for this exudate and has been reported in 6% of cases (2). This only requires irrigation. This inflammatory discharge can be differentiated inflammatory discharge from an infectious type using the above-mentioned criteria. Because of the contaminated diaper environment and the microbial flora in the genital region, swab cultures from the discharge rarely help in this situation (1).

Non-epithelialized Gap Between Skin and Mucosa Immediately After Ring Fall Off

The plastibell ring induces necrosis by putting pressure on the prepuce against the plastic device, which causes gradual sloughing (6). When the ring starts to separate, a gap (Picture 5) will appear between the mucosal cuff, and the penile shaft skin. This defect will be filled in 48 hours by secondary intention.

Picture 4. Normal penile discharge following ring circumcision

Picture 5. Non-fused skin and mucosa after ring fall off

Ring Impaction

According to the literature, 70% of rings fall spontaneously in the first 10 days following plastibell circumcision (6). In cases where spontaneous improvement does not occur, the child should be evaluated for possible interventions to break and remove the rings.

There are two causes for delayed ring falling, including impaction (with the ring extruding distally onto the glans) (Picture 6) and delayed separation due to older age, with a prevalence of 2.2% and 0.7%, respectively (5).

The ring is more useful in younger infants when the foreskin is thin and can be easily compressed by a ligature (6). Older boys have thick skin, and the necrosis, therefore, takes longer.

With timely diagnosis, the impacted ring is removed, leaving only an indentation on the glans, which gradually improves. However, if left undiagnosed, it can cause irreversible injuries, such as disfigurement (5), complete or partial necrosis of glans, and urethrocutaneous fistulae (11).

Preputial Adhesion

During healing, the incised portion of skin can adhere to the glans and create an epithelialized skin bridge. The mild and fresh adhesions (Picture 7) can be separated by the physician easily with minimal pain. However, severe cases or missed adhesions that turn into an epithelialized bridge require a urological referral and surgery (1). Skin bridges are mostly a cosmetic matter that can sometimes be bothersome due to smegma entrapment, penile curvature, and painful erections (12).

Picture 6. Ring impaction after 10 days

Meatal Adhesion

Post-circumcision erythema and inflammation of the external meatus can cause meatal adhesion (Picture 8) and meatal stenosis in 0.2 to 20% of cases. With early diagnosis and simple dilation, other surgical procedures can be avoided (13). Applying an ointment such as petroleum jelly to the meatus after circumcision decreases the incidence of complications (14).

Normal and abnormal features of plastibell ring circumcision are summarized in Table 1.

Discussion

This study aimed to present the normal and abnormal features of plastibell ring circumcision. It was revealed that subcutaneous hematoma, blister and crust on glans, inflammatory penile shaft erythema and swelling, inflammatory penile discharge, and skin-mucosa gap are normal post-circumcision features of plastibell ring circumcision. In contrast, infectious penile shaft erythema and swelling, infectious penile shaft discharge, ring impaction, preputial adhesion, and meatal adhesion were found to be abnormal features.

Picture 7. Preputial adhesion after ring circumcision

Picture 8. Meatal adhesion after ring circumcision

The clinical applications of this study include providing information on the normal and abnormal features of plastibell ring circumcision. By identifying and categorizing these features, healthcare professionals can better assess and diagnose post-circumcision complications. This knowledge can aid in distinguishing between normal healing processes and abnormal conditions, allowing for timely intervention and appropriate management. The study's findings can contribute to improving patient care by helping healthcare providers make informed decisions regarding treatment options and potentially reducing the need for unnecessary surgical procedures. Additionally, the study serves as a valuable resource for educating both medical professionals and patients about the expected post-circumcision outcomes and potential complications associated with the plastibell ring technique.

The unfamiliarity of parents with the misleading appearances of the normal post-procedure course of plastibell ring circumcision results in higher referrals to hospitals and emergency departments. On the other hand, silent progression of abnormal features that are not noticed early can lead to additional procedures.

The strengths of your study include the combination of conducting a case series and reviewing previous studies, which allows for a comprehensive analysis of the normal and abnormal features of plastibell ring circumcision. Including multiple cases and reviewing existing literature can enhance the reliability and generalizability of our findings. However, it is important to consider that the generalizability of the findings of this case series to larger populations may be limited, as it primarily focuses on a specific group of patients. Further research, such as prospective studies or randomized controlled trials, may be necessary to validate and expand our findings, as well as to address any potential confounding factors.

Table 1. Normal and abnormal features of plastibell ring

	Condition	Timing	Description	Recommendation
Normal conditions	Subcutaneous hematoma	Immediately during procedure	Blue swelling after anesthetic injection	Reassurance
	Crust, blister, and vesicles on glans	24 hours after ring placing to 48 hours after falling	Adjacent to ring edges on gland	Reassurance
	Inflammatory Penile shaft erythema and swelling	24 hours after ring placing to 48 hours after falling	Without pain, fever or restlessness	Reassurance
	Inflammatory penile discharge	72 hours after ring placing to 48 hours after falling	Without pain, fever or restlessness	Reassurance
	Skin-mucosa gap	After ring falling to 48 hours	Visible only with skin retraction	Reassurance
Abnormal conditions	Infectious penile shaft erythema and swelling	From ring placing to 48 hours after ring falling	With pain, fever and restlessness	Antibiotics
	Infectious penile shaft discharge	From ring placing to 48 hours after ring falling	With pain, fever and restlessness	Antibiotics
	Ring impaction	More than 10 days after ring placing	Significant portion of glans out of ring	Ring cutting
	Preputial adhesion	48 hours or more after ring falling	After-glans deflection is not visible	Office based separation
	Meatal adhesion	48 hours or more after ring falls	Meatal erythema, none-separable edges	Meatal calibration

Conclusion

We recommend providing a pamphlet to the parents containing information about these conditions to educate them about circumcision. This will decrease family stress, emergency referrals, and preventable complications in this common procedure.

Footnotes

Authorship Contributions

Concept: H.A., A.G., Design H.A., A.G., Data Collection or Processing: H.A., A.G., Analysis or Interpretation: H.A., A.G., Literature Search: H.A., A.G., Writing: H.A., A.G.

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