Circumcision-related complications in male children presenting to the University of Uyo Teaching Hospital, Uyo

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ABSTRACT

Background: Circumcision is a common surgical procedure performed in male children in our environment and is often associated with varied complications. **Objectives:** This research aims to study the pattern and outcomes of circumcision-related complications seen in male children at the University of Uyo Teaching Hospital. **Methods:** This is a retrospective review of all circumcision injuries/complications presenting to the Paediatric surgical outpatient clinic between January 2007 and December 2023. Data collected included ages at presentation and circumcision, clinical features, the cadre of healthcare providers who performed the procedure, the facility where the procedure was performed and the outcome of treatment. Data was analysed in Microsoft Excel 365 as counts, figures and percentages. **Results:** Fifty-seven cases were documented during this period. The age at presentation ranged from 13 days to 15 years with a median of 15 months (IQR 6 months – 2.5 years). Most children were circumcised as neonates (49, 86.0%). The commonest complications were urethral injuries including urethra-cutaneous fistulas (13, 22.8%), avulsion of ventral penile tissue (11, 19.3%) and meatal stenosis (6, 10.5%). Most circumcisions were performed by nurses (35, 61.4%). The commonest repair technique used was a tubularised urethroplasty in 18 (31.6%) with a 72.2% success rate. **Conclusion:** Circumcision is a common surgical procedure carried out by different cadres of healthcare providers in our environment. Urethral injuries are the commonest seen complications in our practice. There is a need to improve the quality of training and monitoring of providers of this procedure.

Keywords: Male circumcision, circumcision injury, neonatal surgery, urethro-cutaneous fistula, Penile amputation, task-shifting.

INTRODUCTION

Male circumcision is one of the oldest and most widely performed surgical procedures.[1] It involves removing the foreskin, a practice linked to religious and ethnic customs as well as medical and public health benefits proven in clinical research. The World Health Organization (WHO) estimated in 2007 that approximately 30% of males worldwide are circumcised.[1] More recently, Waskett and Morris et al. estimated the global circumcision rates at 37.4% and 38.7%, respectively.[2,3] The male circumcision rate in Nigeria is between 85% and 98.9%.

Circumcision has been described as a simple procedure when performed by trained surgeons.[4] Medical experts perform circumcision in Western nations when there are medical indications. However, in many African countries where there is a shortage of surgical experts, there is a resulting intentional and unintentional task-shifting to address the surgical needs of the population,[5,6] putting patients at risk of preventable surgical complications. In Nigeria, nurses perform 56% of the procedures, while doctors and traditional (or unorthodox) practitioners perform 35% and 9%, respectively.[7] Not surprisingly, the reported incidence of circumcision-related complications is less than 0.5% in the United States and more than 20% in Nigeria.[7,8]

Given the near-universal prevalence of circumcision among Nigerian children, an evaluation of its practice, complications and the management of the complications, as well as the outcomes has become imperative. This retrospective study is therefore aimed to describe the pattern of presentation, challenges, and outcome of treatment for circumcision-related complications in children in Uyo, Nigeria.

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METHODS

This is a retrospective descriptive study conducted in the Paediatric Surgical unit of the University of Uyo Teaching Hospital, in South-south, Nigeria. The study examined the medical records of male children under 17 years old who were referred to the paediatric surgical clinic between January 2007 and December 2023 due to circumcision complications. The data collected included demographic information, age at circumcision, circumcision location, clinical findings, and treatment.

The data were entered into Microsoft Office Excel 365 and analysed as counts, frequencies and percentages. The results were displayed in tables and charts.

RESULTS

A total of 57 children presented with circumcision-related complications during this period. The ages of the children ranged from 13 days to 15 years, with a median age of 15 months (IQR 6 months–2.5 years). Forty-nine children (86.0%) were circumcised as neonates, while eight (14.0%) were circumcised outside the neonatal period (Table 1).

Table 1: Age at Circumcision and Types of Complications

	Age at circumcision				
Complication	**>1 Month**	**1 Month – 1 year**	**>1 year**	**Total**	**Percentage**
Urethral Injuries	28	1	1	30	52.6
Redundant Prepuce	7	-	-	7	12.3
Penile adhesions	6	-	-	6	10.5
Trapped Penis	2	3	-	5	8.8
Epidermal Inclusion cyst	2	1	-	3	5.3
Penile torsion	2	-	1	3	5.3
Glanular Injuries (Partial amputation/Gangrene)	2	-	-	2	3.5
Fourniers Gangrene		1	-	1	1.8
Total	49	6	2	57	100.0

The various types of complications seen in this study are listed in Table 1. Thirty patients (52.6%) had urethral injuries. These include urethro-cutaneous fistulas in 13 (22.8%), ventral penile avulsion in 11 (19.3%), meatal stenosis in 5 (8.8%), and urethral stricture in one infant (1.8%) [Figure 1]. Two patients (3.5%) came with Glanular injuries as their primary presenting complaint. One patient presented with gangrene of the glans penis five days after circumcision while another presented with partial amputation of the glans seven months after the procedure. A third patient who presented with a trapped penis was also noticed to have lost the tip of his glans on penile shaft release (Figure 2).

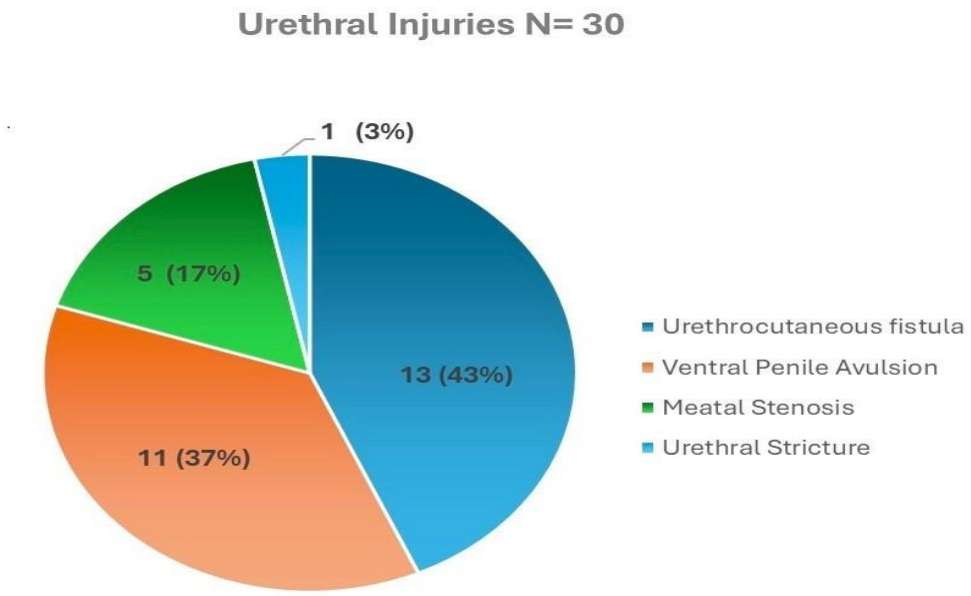

Figure 1 Types of Urethral Injuries

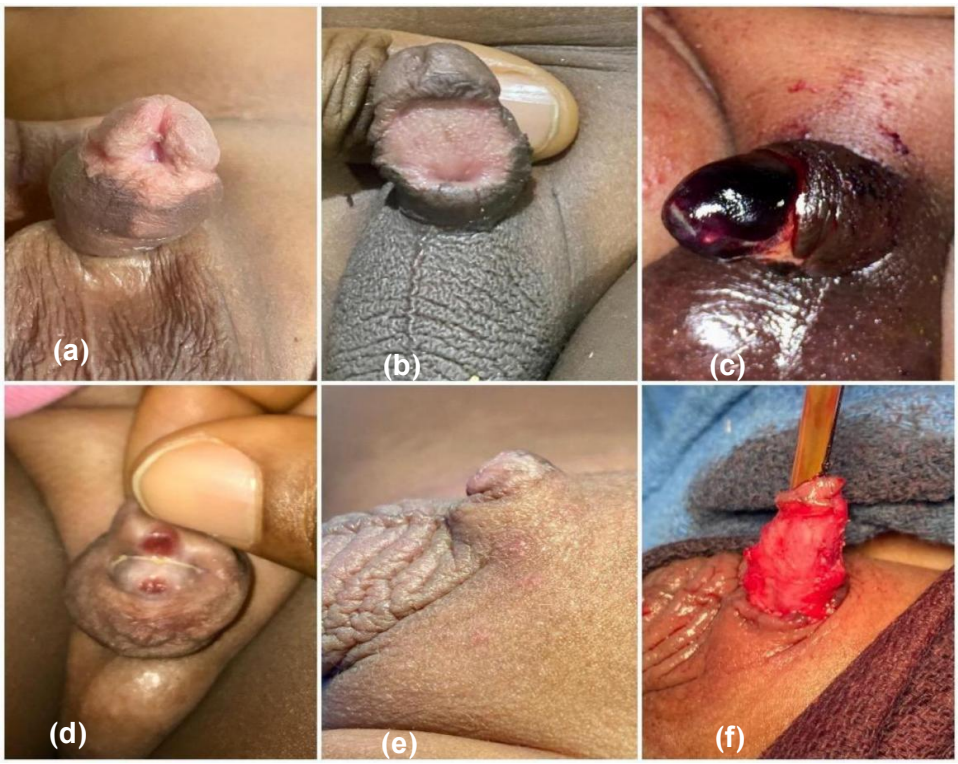

Figure 2 (a) 5mm urethro-cutaneous fistula (b)Ventral penile avulsion (c) Gangrene of the glans penis (d) Healed partial glanular amputation (e) Trapped Penis (f) Patient in (e) showing loss of the glanular tip seen at penile shaft release.

Nurses performed most of the circumcisions (35, 61.4%), while circumcisions performed by doctors accounted for 6 (10.5%) of these complications. Most of the complications occurred with circumcisions performed at home in 29 patients (50.9%). The cadre of practitioners and location of circumcision are summarized in Table 2

Table 2: Cadre of practitioner and location where circumcision was performed

S/no	Practitioner	Frequency	Percentage
1	Nurses	35	61.4
2	Untrained (TBAs, chemist, CHEW)	13	22.8
3	Doctors	6	10.5
4	Not known/not stated	3	5.2
5	Total	57	100.0
	Location of circumcision	**Frequency**	**Percentage**
1	Home	29	50.9
2	Maternity	14	24.6
3	Hospital	8	14.0
4	Primary Health Centre	6	10.5
	Total	57	100.0

TREATMENT

All patients had surgical corrections for their complications. The most common procedure was tabularized urethroplasty for all the patients with ventral penile avulsions (11 cases) and 7 patients with either large or multiple urethro-cutaneous fistulas, with successful repair achieved in 13 children (72.2%). The frequencies, different categories of surgical procedures, and success rates are displayed in Table 3. Successful outcomes were defined as achieving complete repair in a single stage, with satisfactory functional and cosmetic results.

Table 3 Surgical Treatments and Success Rates

Procedure	Indication	Number performed	Success rate
Tubularized Urethroplasty	Ventral Penile avulsion and Large Urethro-cutaneous Fistula	18	13 (72.2%)
Fistula excision and Repair	Urethro-cutaneous Fistula <5mm	6	4 (66.7%)
Meatotomy	Meatal stenosis	5	4 (80%)
Penile Release ± Skin Flap	Trapped Penis	5	3 (60%)
Dartos flap rotation	Penile torsion	3	3 (100%)
End-to-end urethroplasty +Glansplasty	Partial glanular amputation	1	1 (100%)
Meatoplasty	Glanular gangrene with meatal stenosis	1	1 (100%)
Debridement and wound dressing	Fournier's Gangrene	1	1 (100%)
Adhesiolysis	Penile adhesions	6	6 (100%)
Cyst Excision	Epidermal inclusion cyst	3	3 (100%)
Urethral dilatation	Urethral Stricture	1	1 (100%)

DISCUSSION

Male circumcision is the most common surgical procedure carried out in both medical and non-medical settings.[9] Despite having originated over 15,000 years ago for religious, ceremonial, and cultural purposes, it was only adopted for medical purposes in the 19th century.[10] Nevertheless, its benefits remain a topic of controversy, with supporters highlighting improved hygiene, reduced risks of urinary tract infections, lower rates of HIV transmission, and decreased incidences of cervical and penile cancer. In contrast, critics point out the high complication rates and reduced penile sensation as reasons against the widespread practice of circumcision.[10] Complications of male circumcision have been found to be associated with several factors such as age at circumcision, training and expertise of the provider, and the conditions or environment under which the procedure is undertaken.[11]

The accepted or preferred age of circumcision varies around the African continent as diverse cultural and religious beliefs have considerably shaped circumcision practices. In Eastern and Southern Africa, circumcision is carried out on older boys or teenagers, as a form of initiation or rite of passage, symbolising the transition from childhood to adulthood.[12,13] While in some sub-Saharan countries, religious belief systems like Judaism, Christianity and Islam have largely shaped circumcision practices. In southern Nigeria, where Christianity is predominant, neonatal circumcision is widely practised following the teachings of the Old Testament of the Bible.[14] The timing of circumcision among patients in our study was mostly in the neonatal period (86.0%). This is in keeping with findings from other studies from our region.7,15,16 Eight (14.0%) of our patients had circumcision outside the neonatal period, mostly delayed for health reasons.

Reports on the impact of age on circumcision vary in the literature. Several studies suggested that complications tend to occur less frequently in neonates and infants than in older boys.[8,11,17] Those that do occur are minor and treatable. The authors found that older boys, on the other hand, experience a higher frequency of complications, up to 14%, even in ideal settings. This is attributed to the simpler nature of the procedure in neonates, the better healing capability, and the lower likelihood of suturing during neonatal circumcision. However, when examining injury-specific complication rates, studies have shown that the risk of urethral complications is inversely related to age at circumcision, with most complications occurring in males circumcised during the neonatal period and infancy[18]. This is attributed to the neonates' smaller, more difficult-to-manipulate genitalia. Ghods et al reported a significantly higher incidence of meatal stenosis with the plastibel device in younger age groups, where 15% of neonates developed Meatal stenosis as compared to 1.4% of non-neonates.[19] Lucas et al found that younger patients were more likely to develop Urethro-cutaneous fistulas following voluntary medical male circumcision (VMMC), as their less matured genitalia are more fragile.[20] In addition, the relatively closer proximity of the urethra to the skin in young males predisposes it to injuries during circumcision. This is especially true when aggressive clamping or suturing on the ventral surface of the glans or penile shaft occurs while securing haemostasis.[20,21]

A total of 30 children (52.6%) had urethral injuries in our report. Of this number, 24 had either post-circumcision urethra-cutaneous fistulas or ventral penile avulsion. This rate is less than the figure reported by Ikuerowo *et al*.,[22] who had 31 cases of urethro-cutaneous fistula in Lagos, Nigeria, over a 3-year period, but similar to the findings by Takure et al.[23] in Ibadan and Ugwu *et al*.[24] in Nnewi, who managed 25 and 22 cases in 9 and 10 years, respectively. Ekenze and Ezomike also reported managing 25 urethral injuries over 6 years in Enugu, Nigeria, of which 11 were urethro-cutaneous fistulas and 14 were meatal stenosis.[25] These studies reported that circumcisions were done in the neonatal period in 84–100% of their cases. This further highlights the need for increased awareness and training on proper circumcision techniques for newborns to prevent urethral injuries.

Studies from high-income countries show that circumcisions are done by specialist surgeons with complication rates as low as 0.2-0.4%.[8] On the contrary, in Nigeria and other African countries, the reverse is the case. Nurses carried out the highest number of circumcisions in this study. Thus, invariably accounting for the highest number of complications. However, we could not determine the cadre or training of the nurses in our study. Other persons referred to as untrained or unskilled in this study, were traditional birth attendants and chemists, which accounted for 22.8 percent of complications. Complications from doctors accounted for 10.5 percent. These findings are similar to those from other studies carried out in Nigeria and Ghana.[7,15,16] This could be attributed to the paucity of specialists

in Nigeria especially in rural areas and in some urban settings.

Though the Nigerian health system is considered to be better off relative to some other African countries, it has less than 50% of the required personnel to serve rural populations.[6] To salvage the situation or take advantage of the gap, untrained and unskilled persons often carry out surgical procedures and provide alternative health care within their communities. Task-shifting, as defined by the WHO, involves assigning tasks that require advanced skills to healthcare workers with lower qualifications, utilising existing human resources.[5,6,26] Registered nurses, midwives, semi-skilled community health extension workers (CHEWs), unskilled voluntary village healthcare workers (VVHWs) and doctors who visit periodically, offer primary healthcare in Nigeria. Unskilled traditional birth attendants (TBA) also help women during childbirth in villages. In addition to delivering babies, some of these healthcare providers often perform procedures for which they are not certified.[27] Surgical specialists seldom visit these communities, and many people seek healthcare based on proximity and affordability.[28,29] This unintentionally shifts the responsibility for circumcision to other providers, resulting in increased complications and poorer outcomes for patients.

In this series, 50.9% of patients had their circumcisions done at home, while 36.1% of patients had their circumcisions done in lower health facilities like maternities and primary health care facilities. Complications related to hospital-based circumcisions accounted for only 14.0%. Osifo and Oraifo, and Atikeler et al. also demonstrated the correlation between increased complications and circumcisions performed outside hospital settings.[21,30] Unlicensed and unskilled practitioners did not have access to a standard operating theatre, sterilised and appropriately sized surgical instruments, or anaesthesia. Performing circumcisions without anaesthesia, analgesia, or assistance can make the procedure riskier, increasing the chances of preventable adverse events. This underscores the need for a sterile surgical environment, adequate resources, training and monitoring of practitioners for safe circumcisions.

Procedures that we carried out for the treatment of minor complications such as excision of penile adhesions, removal of epidermoid cysts, and meatotomy were mainly straightforward and had good outcomes. The choice of technique for more severe complications like urethro-cutaneous fistulas or ventral penile adhesions depended on the size of the defect and the availability of soft tissue on the penis. Small fistulas less than 5 mm in size underwent fistula excision and simple repair, while large fistulas or ventral penile avulsions were treated with multilayered tubularised urethroplasty. One patient presented 7 months after circumcision with a healed near-total glans amputation (Figure 2). On examination, the glans was attached to the penile shaft by a band of dorsal tissue. The distal and proximal openings of the urethra were seen at the site of partial severance. Both openings were calibrated with a 6 Fr Silicone Foley Catheter. We did an end-to-end urethroplasty and glansplasty, with good functional and aesthetic outcomes.

A trapped penis is another rare complication of circumcision.[31,32] It results from the excision of excess preputial skin while not enough inner preputial epithelium is excised, thus bringing the new preputial orifice distal to the glans, forcing the penile shaft into the suprapubic fat at the level of the mons pubis. Treatment for these patients involved excising the phimotic ring, releasing the penile shaft, performing corporopexy, and providing skin coverage. Two of our patients had failure after local skin flaps were raised to cover the released shaft, requiring repeat surgery at a later date, thus giving a success rate of 60%. Another challenge encountered was managing the patient who developed gangrene of the glans penis. At presentation, there was an inevitable loss of the glans. To treat, we closed the corpora cavernosa and performed a meatoplasty to enable the patient to urinate. The most common complication of this procedure is stenosis or stricture of the urethral meatus, which may necessitate dilatation or revision.[33]

CONCLUSION

Neonatal and infant circumcision, a common practice in Nigeria, is sometimes associated with tragic complications. The high proportion of severe injuries recorded in this study mirrors the results from other studies across the country and underscores the poor knowledge and skill of the majority of the practitioners performing the procedure. We recommend a clear and comprehensive national policy on childhood circumcision. This policy should outline standardised training, certification, licensing, and monitoring procedures for practitioners. Additionally, this policy could offer incentives to parents to choose certified facilities, such as

providing free or subsidised circumcisions. This report, however, describes the experience in a tertiary referral hospital, and a larger community-based study is also recommended to determine the true prevalence of circumcision-related complications in this region.

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