



Case report

Penile strangulation by a metallic nut in an 8-year-old male: A rare case report of urological emergency

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ABSTRACT

Introduction and importance: Penile strangulation due to metallic objects in pediatric age groups is a rare urological emergency that warrant emergency management. Removal of metallic ring from strangulated penis poses a great challenge to urologist as it may require industrial gadgets. Multidisciplinary management involving psychiatrist is required. To the best of our knowledge, this is the first reported novel case of penile strangulation by a metallic nut in children in Tanzania. Furthermore, this case report shows that Industrial Manual Scissor metal (IMSMC) cutter offers a safe way of removing metallic nut from strangulated penis with few complications. **Case presentation:** We report a case report of penile strangulation in an 8 year-old boy by a metallic nut which stayed for 11 h prior to arriving at a tertiary hospital in Northern Tanzania. The reason for insertion of nut by a child was not clear.

Clinical discussion: On arrival to the hospital the child was clinically stable but in pain. Local examination revealed a metallic nut at proximal penis with grossly edematous penis. A diagnosis of penile strangulation by metallic nut was reached and the child was planned for emergency surgery to remove the metallic nut. The metallic nut was successful removed by IMSMC. This technique has been used in adult with success with few complications and therefore opted in our setting. The child was also diagnosed with oppositional defiant disorder.

Conclusion: Industrial Manual Scissor Metal cutter is a safe way of managing penile strangulation by a metallic nut in children.

1. Introduction and importance

Penile metallic ring strangulation is one of the challenging urological emergencies that can have devastating consequences if not intervened in an emergency manner. Despite being rare, mostly occurs in adult and adolescent due to erotic or autoerotic or enhancement of sexual performance or sometimes from devices applied to collect urine in patients with enuresis or urine incontinence [1–3]. There are more than 16 case report of pediatrics penile strangulation with metallic nut in one case [4]. Moreover, most patients also have associated psychiatric illness [1,2].

Penile strangulation may result from objects such as metal rings, bands, pipes, bottles, threads of metal or plastic or latex of all shapes and sizes [5–8]. In children usually is due to typical objects such as rubber bands, threads or hair [1,9–11]. Non-metallic objects usually are easy to

remove while metallic objects are difficult to remove and usually result in penile damage [5].

Early removal of these objects from strangulated penis is of paramount importance as it will prevent progression of compartment syndrome. However, most of the time surgical approach for metallic objects require industrial devices that may not be readily available in urology theatres, nonetheless the skills and expertise to use them [5].

Here, we report our approach to a case of penile strangulation by a metallic nut in an 8 years old child which was successful removed by IMSMC. The authors recommend IMSMC is safe and effective technique of removing metallic nut from a strangulated penis. The work has been reported in line with the SCARE 2020 criteria [12].

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2. Case report

An 8 years old boy presented to our department with a history of penile swelling associated with difficult voiding for 11 h following insertion of metallic nut. The child was taken at primary healthcare facility where by the child was thegerun referred to a tertiary hospital in Northern Tanzania. He reported the ring to be inserted by his peer mate at school but refused to explain the intention of his colleague. The mother reported the child to be mischievous and violent with history of biting his friend's lower lip which caused an ulcer and also hit another boy with a stone breaking his teeth. He is the third born of four siblings living in one house with his mother and farther. No history of psychiatric illness in the family.

Upon arrival at urology department in hospital, he was calm, clinically stable with normal vital signs. On external genitalia examination, dirt, rusted metallic nut of size 14 was encircling proximal uncircumcised penis. There was gross swelling of penis and prepuce distal to the encircling nut (Fig. 1). The edematous penis was tender on touch with no change of skin color. The stream of urine was observed to be poor, however the bladder was not palpable.

Engineering department consulted urgently whereby the mechanical engineer brought the bolt cutter (Figs. 3, 4 & 5). The patient was then planned for emergency nut removal under general anesthesia. Emergency investigations were taken (Full blood picture, random blood sugar and grouping and cross-match). Consent was thought from the parents and patient was taken to theatre, draped aseptically and given general anesthesia. The procedure was performed by the urologist and residents in urology department. A small plastic ruler and gauze was inserted between the penis and the nut to protect the skin as the nut was cut at 6 and 12 o'clock (Figs. 2, 5 & 6). The nut was placed between the cutting edges and then the handles compressed together multiple times until the nut was completely cut at 6 and 12 o'clock (dorsal and ventral sides of penis). The patient sustained minor laceration on the skin during the procedure (Fig. 7). The wound was then cleaned with normal saline and dressed with povidone iodine in erect position of the penis. Urethral catheterization was tried but failed because of gross edema of penis. Perioperative antibiotic for 72 h, oral analgesics and tetanus toxoid were administered.

Psychiatrists reviewed him and came up with diagnosed of moderate oppositional defiant disorder that was treated by risperidone. However, the mother refused to allow the child to take medication. He had uneventful recovery with the edema that was decreasing significantly. He was allowed home 12 h after the procedure and advised to come for review. At day five post discharge, he was reviewed in the clinic and the



Fig. 1. Swollen penis (A) with a encrning 14 Fr size nut (B).

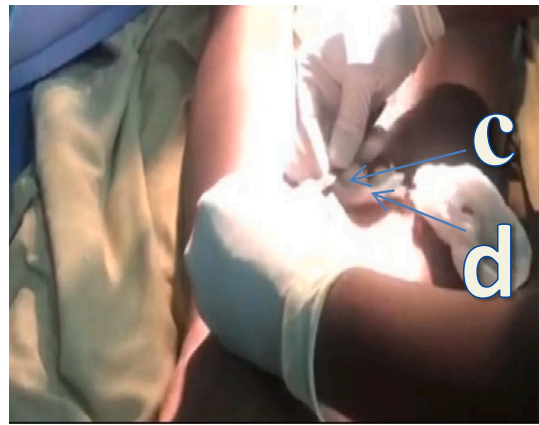


Fig. 2. A small plastic metal ruler inserted between the ring and penis (c), gauze (d).



Fig. 3. Well positioned plastic ruler between the ring and penis before cutting with IMSMC.



Fig. 4. Photo showing process of cutting the nut by using IMSMC.

edema had resolved and reported to have normal voiding and morning erection (Fig. 8).

3. Discussion

Penile strangulation is a urological emergency which warrant emergency treatment in order to preserve the normal function of the penis such as erectile function and voiding. In adolescents and adult men, the most common reason for penile strangulation are for autorereric stimulation or increasing sexual performance [2,11]. Penile



Fig. 5. Industrial Manual Scissor Metal cutter(IMSMC) which was used to remove the nut.



Fig. 6. Fragments of nut after removal from penis.

strangulation has also been reported in pediatric population with hair tourniquets, rubber bands and threads as common constricting objects [8,14–16]. Penile strangulation has also been associated with psychiatric disorders [4]. In our case, the child was diagnosed with moderate oppositional defiant disorder and her mother reported the child to have argumentative and defiant behavior, vindictiveness, angry and irritable mood for more than six months [15]. To help parents to learn more-effective parenting techniques (parent child interaction therapy-PCIT) to decrease child's disruptive behaviors were done [17–20]. Psychiatric evaluation for all patients is contentious [18], as some will be mentally stable. However, we consider that an initial evaluation in these cases is essential to pick out and treat those with an underlying mental disorder. Moreover, because this population is often ephemeral, inpatient psychiatric consultation may keep the patient from being lost to follow-up.

The pathophysiology is due to decreased lymphatic and blood flow due to constriction leading to a cycle of tissue injury with ischemia and necrosis [16]. This will ultimately result in compartment syndrome with tissue ischemia. If delayed to be intervened, it may result in



Fig. 7. Laceration with minimal bleeding after ring removal.



Fig. 8. Oedema resolved 5th day postoperative and laceration healed.

complications such as erectile dysfunction, skin necrosis, urethrocutaneous fistula, urethral injury, gangrene of the penis and in worse scenario amputation and/or sepsis [6–11,13–15]. In our case report, the complication was only lymphedema and laceration of the skin during removal of the nut.

The management of the penile strangulation depends on the type of constricting object, time from onset of strangulation, severity of injury, available instrument and experience of the surgeon [5,15]. Metallic objects are challenging to remove as they require industrial metallic cutting devices which may not be available in the hospital [5–7]. Furthermore, due to rarity of occurrence most surgeons have no experience in removing metallic penile objects. Instruments such as pliers, angle grinder, chisel, dental drill saw and industrial bolt cutter have been employed in cutting metallic objects to relieve strangulation [10–11,13–14]. In our case, industrial bolt cutter was used to cut the nut and complications were only small laceration with minimal bleeding.

The prognosis depends on the degree of penile incarceration. Bhat

et al., in 1991 described a classification of penile incarceration composed of 5 grades as follows [3,9,11]:

Grade I Distal penis edema. No evidence of skin ulceration or urethral injury.

Grade II Distal penile edema with decreased sensation. Injury to skin, constriction of corpus spongiosum. No urethral injury.

Grade III Injury to skin and urethra, without urethral fistula. Loss of distal penile sensation.

Grade IV Complete division of corpus spongiosum leading to urethral fistula and constriction of corpus cavernosum with loss of distal penile sensation.

Grade V Gangrene, necrosis, or complete amputation of penis.

Based on classification above, our patient had grade 2 penile incarcerations. The grade of injury depends on the severity of constriction of penis, time from onset of strangulation and also type of management. A surgeon should use the methods with minimal trauma to remove the objects. In our case, the patient reported 11 h after onset of strangulation which could also explain the good prognosis in our patient. Most cases of penile strangulation which present more than 72 h are associated with severe complications such as gangrene, sepsis, renal failure or penile amputation [7,11].

4. Conclusion

Urologist should be prepared to manage challenging and emergency cases of penile strangulation. Industrial Manual Scissor Metal Cutter is a simple, cheap and effective method for emergency removal of metallic objects such as nut or rings from strangulated penis with minimal complications. Psychiatry involvement can be of helpful to prevent reoccurrence of the dangerous behavior. Penile strangulation managed within 24 h is associated with good prognosis.

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Ethical approval

There was exemption of ethical clearance from our institution for this work.

Statement of informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Research registration number

Not applicable.

Guarantor

Orgeness Jasper Mbwambo is the guarantor of this work.

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CRedit authorship contribution statement

OJM and BNN conceptualized and prepared the first manuscript.

OJM, EK, JM, BNN, FB, JSM and AKM reviewed the patients' medical records, planned and provided treatment. All authors read and approved the final manuscript.

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Declaration of competing interest

All authors have declared that no competing interests exist.

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