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Short Communication

Conservative management of grade III penile injury using topical mupirocin: A case report

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ABSTRACT

Context: ns is infrequent, accounting for 0.2% to 8% of all reported cases of pediatric trauma. While the majority of literature emphasizes surgical intervention for severe (grade III) penile injuries, there is limited discussion on conservative management approaches. This study explores the efficacy of topical mupirocin in the conservative management of grade III penile injuries. Mupirocin, a topical antibiotic, inhibits bacterial protein synthesis and thereby reduces the risk of wound infection and promotes healing.

Aims: To evaluate the outcomes of using topical mupirocin in the conservative management of grade III penile injuries.

Methods: A case involving a 3-year-old male who sustained a penile injury following a fall was reviewed. Physical examination revealed erythema, swelling, and a hematoma of the glans penis. The patient was diagnosed with grade III penile injury, then underwent penile exploration and circumcision procedure, with subsequent conservative treatment involving topical mupirocin.

Results: The penile laceration, hematoma, and edema were minimal. The absence of additional injuries in the urogenital system allowed for a conservative treatment approach with mupirocin. The patient was discharged after three days, and a follow-up one week later showed substantial wound healing without complications.

Conclusion: This case suggests that, contrary to some recommendations for surgical management of grade III penile injuries, conservative treatment with topical mupirocin can be effective and warrant further consideration.

Keywords: conservative management; mupirocin; penile injury; penile trauma.

INTRODUCTION

Cases of external genital trauma are uncommon, particularly among children. With a prevalence ranging from 0.2 to 8% of all reported pediatric trauma cases, these represent a very minor fraction of trauma cases. (Fan et al., 2020). Common causes of genital trauma are sexual abuse, motor vehicle accidents, straddle injury, iatrogenic trauma (e.g., circumcision), animal bites, electrocution, zipper injuries, and strangulations (Fan et al., 2020; Saiad, 2018).

However, there are only a few literature that discuss the conservative management of accidental, nonsexual pediatric male genital injury, as most related literature is focused on genital trauma with sexual abuse in the female pediatric population and cases of genital trauma in the adult population due to gunshot, self-mutilation, and penile fracture (Casey et al., 2013; Zinman and Vanni, 2016).

Genital trauma cases can cause devastating consequences to the patient. Mild to severe injuries are possible and can present with anorectal injuries and urogenital injuries. These injuries are present in 10% of patients who present after trauma, making them a significant contributor to trauma-induced morbidity and mortality. As a result, victims may experience long-term physical and/or psychological sequelae (Fan et al., 2020; McGeady and Breyer, 2013).

The injury scoring scale by the American Association for the Surgery of Trauma (AAST) can be beneficial in classifying cases of penile trauma consisting of penis injury scale grade I to V (Table 1) (Moore et al., 2018). The degree of severity can be standardized by this classification, making it possible to establish a correlation between damage severity and the predicted outcome (Mohr et al., 2003).

European Association of Urology (EAU) has provided recommendations for treating any male genital trauma; they are by performing a thorough medical history record and physical examination. History includes the chronology and mechanism of trauma (Morey et al., 2014). Blunt trauma to the flaccid penis, in most circumstances, does not result in any tunica rupture. Surgery is not necessary when a subcutaneous hematoma is present but not any related cavernosal tunica albuginea rupture. In these cases, nonsteroidal analgesics and cold packs are recommended (Kitrey et al., 2022).

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However, due to the variety of causes, mechanisms, and severity of penile trauma, there is no universal treatment for the case. The treatment given is tailored to each case (Djordjevic et al., 2014). The principal treatment of the wound is to achieve hemostasis, a normally functioning penis, as well as the optimum cosmetic results. Some significant actions that can be taken into consideration in doing the treatment are the timing of repair, wound irrigation, minimizing contamination, and proper use of anesthesia. Any topical antibiotics can be applied for any lacerations to minimize the risk of infection (Forsch et al., 2017).

Mupirocin, in the form of a topical ointment, is one of the most effective antibiotics utilized against pathogens in wounds. This antibiotic contributes tremendously to preventing and treating superficial dermatological infections due to any surgery, trauma, and abrasion (Üstündağ Okur et al., 2019). In the urogenital cases, research by Lee and Cohen (2017) and Bari and Cohen (2017) found that mupirocin was effective in treating zoon balanitis, an idiopathic inflammation of the glans penis, and prepuce with bacterial involvement.

CASE HISTORY

A 3-year-old boy came to the emergency department with his parents with the complaint of penile pain, which occurred one hour after the patient fell forward in a prone position. According to the parents, there was a lesion on the tip of the penis; the tip of the penis gradually became swollen and red and complained of severe penile pain. The other complaint is the pain during urination, but no change in urine color occurred. Any complaints of fever, nausea, and vomiting, abdominal pain were denied. There was no trauma history to the other body parts and no history of other genitourinary diseases.

Then, a physical examination was carried out, and it was found that the patient appeared to be moderately ill, conscious, with a regular pulse of 95×/minute with adequate pressure, a respiratory rate of 22×/minute, a temperature of 36.6°C, a body weight of 14.4 kg, and height at 98 cm. The results of physical examination of the head, thorax, abdomen, and extremities were within normal limits. The physical examination of the penis showed redness, swollen penis glans with hematoma of 0.7 × 0.5cm on the right lateral side, and pain on a scale of 6 using the visual analog score (VAS) (Fig. 1). There were no abnormalities on the shaft of the penis and testicles, no injury, tenderness, and signs of inflammation. There was no change in the position of the testis.

Table 1. Penis injury scale.

Grade*	Description of injury
I	Cutaneous laceration/contusion
II	Buck's fascia (cavernosum) laceration without tissue loss
III	Cutaneous avulsion or laceration through glans/meatus or cavernosal/urethral defect <2 cm
IV	Partial penectomy or cavernosal or urethral defect > 2 cm
V	Total penectomy

*Advance one grade for multiple injuries up to grade III

Figure 1. Initial assessment of penis.

Next, chest radiology, urinalysis, and blood laboratory tests were performed. Macroscopic urine examination was normal, urine color was yellow and clear, and no gross hematuria was found. Microscopic urine examination was normal, and no erythrocytes were found. No abnormalities were displayed on all other workups.

Based on anamnesis, physical examination, and workups that have been carried out, and referring to the penis injury scale by AAST, the final diagnosis of the patient was grade III penile injury. The patient was given initial management of pain medication, then hospitalized, and spontaneous urination was observed. On the same day, the patient was able to urinate spontaneously. Furthermore, the patient is planned for a penile exploration procedure and circumcision. Then, the procedure showed a visible laceration on the right lateral side, and no other injuries were found. No active bleeding or pus (Fig. 2).

Post-operation, the patient was admitted to the ward and observed for vital signs and post-operative wounds. Treatments were micro NaCl infusion, paracetamol IV injection, cefotaxime IV injection, tranexamic acid IV injection, and mupirocin topical ointment.

Figure 2. After penile exploration and circumcision.

Figure 3. A week follow-up after surgery.

From Day 1 to Day 3, post-operative care, complaints of penile pain gradually decreased, no bleeding complaint, and spontaneous urination was normal. The patient was discharged after three days of post-operative care in good condition.

A week after surgery, the follow-up was carried out in the urology clinic. The patient had no complaints of pain or urination. Physical examination showed that the circumcision wound had healed, the penis glans had no swelling or redness, and the hematoma and laceration had decreased (Fig. 3).

RESULTS AND DISCUSSION

Cases of penile trauma are relatively rare and rarely described in the literature. Blunt trauma to the flaccid penis, in most circumstances, does not result in any tunica albuginea rupture. However, a hematoma can be found and does not require any surgical intervention. Nonsteroidal analgesics and cold packs are indicated in these circumstances (Kitrey et al., 2022). Cold therapy is widely used due to its physiological effects, such as vasoconstriction, slowing of tissue metabolism, increase in blood viscosity, and local anesthesia. By causing vasoconstriction in the arterioles, the application of cold reduces blood flow and capillary permeability, which in turn reduces bleeding. Additionally, it slows down blood flow while enhancing viscosity and coagulation. Increased blood coagulation, decreased capillary permeability, and decreased metabolic needs aid in the ability to control hemorrhage and reduce the development of ecchymosis and hematomas (Kurt and Kaşıkçı, 2019).

Previous studies revealed that non-operative treatment is an approach for penile injuries involving the corpora cavernosa, although in most cases, corporotomy or debridement can be performed. Meanwhile, conservative management is given to patients who have a lower grade on the penile injury scale and are not accompanied by any other urogenital injuries, such as urethral and testicular injuries (Mohr et al., 2003).

A study by Mohr found that in evaluating patients who are candidates for non-operative therapy, the AAST score combined with a comprehensive physical examination is recommended based on the urologist's clinical judgment (Mohr et al., 2003). Grade I penile injuries can be managed non-operatively with local wound care. Non-operative management is also performed in some cases of grade II injuries without any significant corpora damage using simple laceration management. Meanwhile, operative intervention should be given for grade III lesions to the glans and meatus, whereas a cutaneous avulsion of the penile shaft may sometimes be treated with local wound care only (Mohr et al., 2003).

In this case, report of grade III penile injury, the considerations to give conservative management in this patient were the conditions of laceration, hematoma, and edema in the glans penis, which were very small in size. Thus, the treatments that could be given were wound care and the administration of antibiotic ointment. Another consideration was the absence of other injuries in the other urogenital system, such as urethral injuries, corpora cavernosa/spongiosa injuries, and testicular injuries, and the patient's micturition function was normal.

Furthermore, whenever feasible and safe, non-operative management should be the first choice for pediatric patients. However, when non-operative management fails, and a patient is unstable, surgical intervention is still the best option. All other aspects of trauma management, including physiology, anatomy,

and related injuries, should be considered (Coccolini et al., 2019).

Any form of wound, cut, or injury to the skin or mucosal membrane causes a loss of the protective barrier against environmental contaminants. The major issue is the potential for infection brought on by the entry of microorganisms, particularly bacteria, since the skin's outer layer will be exposed. Therefore, it is advised to treat the wound with a topical antimicrobial agent to decrease the probability of opportunistic microorganisms colonizing the wound and to lessen any risk of systemic infections (Sritharadol et al., 2017). In a systematic review, it was stated that patients with uncomplicated wounds who were given topical antibiotics had a lower risk of post-operative infection than those with a placebo or with antiseptics (Tong et al., 2018).

Mupirocin, one of the most widely used topical antibiotics, is highly effective against aerobic Gram-positive cocci as well as some Gram-negative cocci, including methicillin-resistant *S. aureus* (MRSA). Mupirocin, a fermentation byproduct of the bacterium *Pseudomonas fluorescens*, inhibits protein synthesis by blocking the incorporation of isoleucine into proteins by binding to isoleucyl transfer-RNA synthetase. As a result, it has antibacterial properties. Mupirocin is available as a 2% cream or ointment with a hydrophilic base. The indication is the prophylaxis use in ulcers, surgical wounds, burns, and the treatment of skin infections (Sritharadol et al., 2017).

CONCLUSION

To date, there is no single treatment that works for all cases of penile injury because there are so many different causes, mechanisms, and degrees of severity. The treatment given is tailored to each case to achieve normal genitourinary function and cosmesis. Even though some studies stated that grade 3 penile injury cases require surgical management, it is still possible for patients to have conservative management with the administration of topical mupirocin.

CONFLICT OF INTEREST

The authors declare no conflicts of interest with the data contained in the document.

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