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External genital injuries in children presenting due to falls

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Abstract

Objectives: The aim of this study was to evaluate pediatric patients who were hospitalized for isolated external genital injuries.

Patients and methods: A total of 22 patients (8 males, 14 females; mean age: 6.9±2.7 years; range, 3.1 to 14.2 years) who had isolated external genital injuries were retrospectively analyzed. Data including age, sex, mechanism of injury, injured sites, treatment process, length of hospital stay, and outcomes were evaluated. After presented to the emergency department, the patients were examined under general anesthesia when the source of bleeding could not be observed, in cases of inadequate compliance with the examinations, penetrating injuries, or when the source of bleeding could not be identified due to hematomas.

Results: The median length of hospital stay was 2.5 (range, 1 to 5) days. All patients were hemodynamically stable with normal urine output. Seventeen patients (77.2%) had penetrating injuries. In girls, genital bleeding was common. Injuries included perineal (n=7), vaginal (n=2), and labial (n=3) lacerations. Surgical interventions ranged from primary repair to vaginal reconstruction and hymenoplasty. In boys, scrotal lacerations (n=5), testicular edema or hematoma (n=3), and perineal lacerations (n=2) were noted. Primary repair was performed in most cases under anesthesia or sedation.

Conclusion: Most external genital injuries in childhood are superficial and can be managed conservatively or with minor interventions. Examination under anesthesia is essential, particularly in girls, to assess the injury extent and determine the need for surgery. This approach minimizes discomfort and provides effective, painless treatment.

Keywords: Accidents, external genital injuries, falls, female straddle injury, male.

Pediatric genital injuries account for 0.6% of all pediatric trauma cases.[1] The most prevalent causes of this type of injury are sports accidents and falls at home. Furthermore, genital injuries can occur, when women and children are exposed to sexual violence.[2] Spitzer et al.[3] reported that straddle injuries not extending inside the vagina were the most prevalent cause of unintentional female pediatric trauma, accounting for 81.9% of injuries. Pediatric female genital trauma includes injuries to the female external and internal genital organs. An examination under general anesthesia in the operating room is recommended for these patients with an aim to minimize trauma.[4]

Injury to the male external genitalia is rare and, therefore, there is little data as reported by previous studies on non-surgical treatment options and outcomes.[5] This is because of the fact that relative isolation and mobility of the genital organs provide protection against damage in men. The testes are protected by the surrounding tunica albuginea and the cremasteric reflex.[6] A previous study reported that penile and scrotum injuries was responsible for 4% of genitourinary traumas.[7]

In case of inappropriate management, genital injuries can have potentially significant long-term cosmetic, functional, and/or psychosocial sequelae.[8,9] In the present study, we aimed to evaluate the patients who were hospitalized for isolated external genital injuries.

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PATIENTS AND METHODS

This single-center, retrospective study was conducted at University of Health Sciences, Ümraniye Training and Research Hospital, Department of Pediatric Surgery between January 1st, 2020 and June 1st, 2024. Patients who were admitted to our clinic with injuries associated with falls were screened. The records of the patients who were hospitalized for isolated external genital trauma and followed and treated were reviewed. Of a total of 130 patients hospitalized due to falls, 22 (8 males, 14 females; mean age: 6.9±2.7 years; range, 3.1-14.2 years) who had isolated external genital injuries were included in the study. A written informed consent was obtained from the parents and/or legal guardians of the patients. The study protocol was approved by the Ümraniye Training and Research Hospital Scientific Research Ethics Committee (date: 17.10.2024, no: 372). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Data including age, sex, mechanism of injury, injured sites, treatment process, length of hospital stay, and outcomes were evaluated. After presented to the emergency department, the patients were examined under general anesthesia when the source of bleeding could not be observed, in cases of inadequate compliance with the examinations, penetrating injuries, or when the source of bleeding could not be identified due to hematomas.

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). Continuous data were expressed in mean ± standard deviation (SD) or median (min-max), while categorical data were expressed in number and frequency. The Mann-Whitney U test was used to analyze non-normally distributed variables. A p value of 0.05 was considered statistically significant.

TABLE 1
The demographic data and hospital stay durations of the patients (n=22)

			Age (year)	Hospital stay duration (day)
	n	%	Mean±SD	Mean±SD
Sex				
Male	8	6.3	8.25±3.53	2.12±1.5
Female	14	63.6	6.05±1.93	2.85±1.40

SD: Standard deviation.

RESULTS

Of a total of 22 patients had isolated external genital injuries. The median length of hospital stay was 2.5 (range, 1 to 5) days. The demographic data and length of hospital stay are presented in Table 1. Age and length of hospital stay were statistically significantly similar between male and female patients (p>0.05). All patients were hemodynamically stable. Other system examinations were normal. Patients had no urination problems. Seventeen (77.2%) patients had penetrating injuries.

Nineteen patients presented due to falls from one floor onto a hard object on another floor, two patients due to falls from a scooter, and one patient due to fall from a swing. All female patients presented with the complaint of bleeding in the genital area after a fall. Four patients had abrasions and two had diffuse genital hematoma. All male

Figure 1. Interlabial laceration.

patients had pain in the external genital area, five had edema with bleeding, and three had extensive ecchymosis.

All female patients were examined under general anesthesia/sedation. There were lacerations on labium minus in seven patients, vagina in two patients, and labium majus in three patients (Figures 1 and 2). One patient with labium minus injury had perineal laceration extending to the anal sphincter. One the patients with vaginal injury also had laceration of the hymen. Primary repair was performed in nine patients, perineoplasty in one patient, vaginal reconstruction and hymenoplasty in one patient, vaginal reconstruction in one patient, while two patients did not need surgical repair for extensive ecchymosis upon examination and local care was recommended (Figure 3). Patients had no history/examination findings or suspicion of sexual abuse. No cosmetic and functional problems were seen during follow-up. The patient with anal sphincter injury had no continence problem.

Five male patients had edema with scrotal incision, one had glans injury, and two had concomitant perineal laceration. Testicular damage was excluded upon scrotal Doppler ultrasound. Five patients who needed repair were examined under general anesthesia. The rectum was intact in patients with perineal injury. Primary repair was performed under general anesthesia in five patients. Three patients did not require surgical treatment for extensive ecchymosis and were followed with local care (Figure 4). Testicular examinations were normal at three months of the follow-up period. Cosmetic results were acceptable.

Figure 2. Labium minus laceration extending to perineum in a female patient.

Figure 3. Hematoma in labium majus.

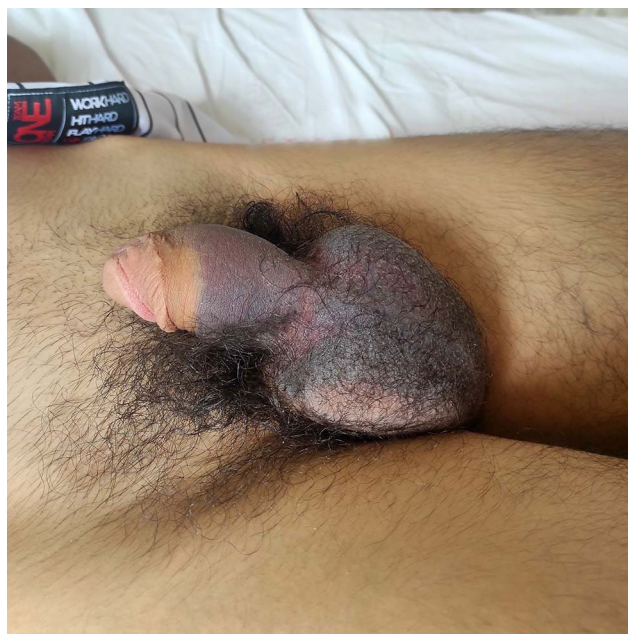

Figure 4. Hematoma in external genitalia in a male patient.

DISCUSSION

Pediatric genital injuries account for 0.2 to 0.8% of all childhood traumas.[10,11] The patients in the current study series were predominantly female, and the age group was similar to previous studies. In both sexes, penetrating injuries due to foreign objects during falls occurred more frequently than blunt trauma after falls. The external genital traumas are often associated with unintentional injuries and are most common between four and nine years of age in pediatric population.[12] A previous study reported that the most frequently injured organs were the female external genitalia, the penis, and the testicles, and that the most common injuries were crushing (35.5%) and laceration (32.9%).[1]

Non-obstetric external genital injuries of females occur due to several causes.[13] The most common injuries are straddle injuries. In addition, accidental penetration (including foreign bodies), sexual abuse, tearing, or tissue injuries due to sudden abduction of the lower extremities or pelvic fractures can occur. Straddle lesions may involve the mons, clitoris, urethra and/or anterior parts of both labium minus and labium majus and account for 75% of all genital injuries in younger females.[14] A penetrating or blunt injuries may occur as a result of external genital organ injuries.[2] These injuries in females usually heal quickly and without sequelae and associated with relatively low morbidity.[15] Superficial abrasions can be treated conservatively by cleaning and topical antibiotic application. The significant tears of the labia majora and injuries involving nearby structures such as the introitus, urethra, and anorectal region usually require surgical treatment.[4] Also, a full-thickness transection along the posterior hymen is reliable evidence of trauma and cannot heal without surgical repair.[15]

In the present study, laceration was most prevalently seen in the labium minus in females, which required surgical repair. Furthermore, the distinction between falls and abuse is an extremely critical issue, while evaluating a child presenting with a complaint of injury or bleeding in the genital area.[16] In our study, detailed inquiries were performed in patients with vagina and hymen injuries. Upon examination under anesthesia, the injury was considered as associated with penetrating injury excluding abuse and repair was performed. It is well-established that, in genital injuries in girls, certain areas including the hymen and vagina depend on the protection mechanism of the fat pads in the vulva.[2]

In males, external genital injuries occur due to falls, kicks, sports activities, and cycling. Additionally, scrotal injuries from animal bites have been reported in the literature in school-aged boys. Penile injuries are frequently seen in preschool-aged boys after falling from a toilet seat. The scrotum is less likely to be injured because it is relatively small. Zipper injuries are another concern for both preschool and school-aged groups. Although external genital injuries are common in males for various reasons, genital injuries requiring medical and surgical intervention are extremely rare. Non-sexual injuries to pediatric male genitalia can range from minor lacerations to severe trauma resulting in genital mutilation and castration.[17]

If these injuries are superficial, they can be treated non-surgically with local wound care. Wounds with severe local tissue damage or contamination should be cleaned with debridement and left open for drainage.[6] Previous studies have recommended surgical exploration for all penetrating trauma to the male genitalia.[17,18] In the present study, no testicular exploration was required in any case, as scrotal Doppler ultrasound results did not show any testicular problems in all patients. Additionally, it is known that the testicles are protected against injury by the mobility and elasticity of the scrotal tissues.[19] In the present study, male patients with penetrating external genital injuries were examined under general anesthesia during radiological imaging. Isolated and limited injuries involving only the scrotal skin and subcutaneous tissue were repaired primarily. No testicular sequelae were observed during the follow-up period of the patients.

Nonetheless, this study has several limitations. First, the sample size is relatively small, which restricts the generalizability of the results. Second, being a retrospective study, there is a possibility of incomplete clinical records and recall bias. Furthermore, the inability to assess long-term outcomes makes it challenging to evaluate the treatment results from a broader perspective.

Future research can overcome these limitations by employing larger sample sizes and prospective study designs.

In conclusion, emergency physicians and pediatric surgeons frequently encounter penetrating injuries in children due to falls. To prevent these types of injuries that can have extremely disastrous consequences, efforts should be made to reduce the risk of injury by shaping the children's play environment to prevent injuries in certain age groups without matured physical abilities. Upon presentation, examination under general anesthesia aimed to determine the severity of the injury, to perform a painless examination, and ultimately to provide treatment is considered a comfortable management method for the patient.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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