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Injuries to the male external genitalia in the material of the Department of Urology of the Military Institute of Medicine – National Research Institute, using the AAST trauma scale

Urazy męskich narządów płciowych w materiale własnym Kliniki Urologii Wojskowego Instytutu Medycznego – Państwowego Instytutu Badawczego z wykorzystaniem skali urazów AAST

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Abstract

Introduction and objective: Injuries to male external genitalia account for 2% of all injuries. Most affected patients require surgical intervention. This study aimed to retrospectively analyse the diagnosis and treatment of male external genital injuries using the American Association for the Surgery of Trauma (AAST) scale to assess their severity. **Materials and methods:** A total of 998 men with abdominal and pelvic injuries were admitted to the Emergency Department of the Military Institute of Medicine – National Research Institute in Warsaw, Poland, between October 2017 and August 2022. Injuries to male external genital organs were identified in 26 patients (3%). The mean age of this group was 37 years (21 to 72 years). Direct trauma to external genital organs was diagnosed in 14 patients (54%). In 12 patients (46%), external genital trauma was an accompanying injury to multi-organ injuries resulting from traffic accidents or falls from heights. All patients underwent a detailed history taking and physical examination, as well as ultrasound and/or trauma scan, followed by AAST. **Results:** In the group of 26 patients with external genital trauma, 14 patients (54%) were classified for urgent surgical treatment, including 8 patients (31%) with penile fractures and 6 patients (23%) with scrotal and testicular injuries. In one case, penile fracture was accompanied by urethral damage. In another case, orchidectomy was necessary in the group of patients with scrotal injuries. Among the 12 patients (46%) with multi-organ injuries following traffic accidents or falls from heights, bed regimen and antibiotic therapy allowed full recovery. According to the AAST scale for penile, scrotal, and testicular injuries, grade I was observed in 14 patients, grade II in 6 patients, grade III in 5 patients, grade IV in 3 patients, and grade V in 1 patient. **Conclusions:** The AAST scale is an effective and practical tool for assessing injuries to the male external genitalia. Early diagnosis and surgical treatment of male genital injuries reduce the risk of complications, whereas delayed diagnosis and treatment may result in infection and reproductive dysfunction.

Keywords: penis, trauma, scrotum, procedure, AAST

Streszczenie

Wprowadzenie i cel: Około 2% urazów dotyczy męskich zewnętrznych narządów płciowych. Większość z nich kwalifikuje się do leczenia operacyjnego. Celem pracy była analiza retrospektywna diagnostyki i leczenia urazów męskich zewnętrznych narządów płciowych z wykorzystaniem skali American Association for the Surgery of Trauma (AAST) w ocenie ich ciężkości. **Materiał i metody:** Od października 2017 do sierpnia 2022 roku przyjęto na Szpitalny Oddział Ratunkowy Wojskowego Instytutu Medycznego – Państwowego Instytutu Badawczego w Warszawie 998 mężczyzn z urazami brzucha i miednicy

mniejszej. U 26 osób (3%) stwierdzono urazy męskich zewnętrznych narządów płciowych. Średnia wieku tej grupy wynosiła 37 lat – najmłodszy pacjent miał 21 lat, a najstarszy 72 lata. Bezpośredni uraz zewnętrznych narządów płciowych rozpoznano u 14 osób (54%). U 12 pacjentów (46%) uraz zewnętrznych narządów płciowych był urazem towarzyszącym urazom wielonarządowym powstałym na skutek wypadków komunikacyjnych lub upadku z wysokości. U wszystkich mężczyzn przeprowadzono szczegółowy wywiad, badanie fizykalne oraz ultrasonograficzne i/lub trauma scan, a następnie ocenę skali urazów według AAST. **Wyniki:** W grupie 26 pacjentów z urazami męskich zewnętrznych narządów płciowych 14 osób (54%) zakwalifikowano do pilnego leczenia operacyjnego – 8 osób (31%) ze złamaniem prącia oraz 6 (23%) z urazem moszny i jąder. W jednym przypadku złamania prącia doszło do uszkodzenia cewki moczowej. W kolejnym przypadku w grupie pacjentów po urazie moszny konieczna była orchidektomia. U 12 pacjentów (46%) z urazami wielonarządowymi po wypadkach komunikacyjnych oraz po upadku z wysokości zastosowano reżim łóżkowy oraz antybiotykoterapię, która przyniosła pełne wyleczenie. W skali AAST urazów prącia, moszny i jąder I stopień urazu stwierdzono u 14 pacjentów, II stopień – u 6, III – u 5, IV – u 3, a V – u 1 pacjenta. **Wnioski:** W ocenie urazów męskich zewnętrznych narządów płciowych skala AAST jest skuteczna i ma praktyczne zastosowanie. Wczesne rozpoznanie i leczenie operacyjne urazów pozwala zmniejszyć ryzyko powikłań. Opóźnienie w diagnostyce oraz podjęciu leczenia operacyjnego może skutkować rozwojem zakażenia oraz zaburzeniami funkcji rozrodczych.

Słowa kluczowe: prącie, uraz, moszna, postępowanie, skala AAST

INTRODUCTION

Injuries to the male external genitalia are rare, accounting for 1–2% of all injuries[1,2]. They most often result in multiple, serious physical and psychological consequences. Diagnosis of injuries begins with a detailed medical history taking, followed by a physical examination and imaging using ultrasound (US) and, if necessary, trauma scan. Based on the collected history and imaging findings, the patient may be qualified for surgical treatment. The choice of an appropriate therapeutic approach is crucial for the management of each type of injury. The American Association for the Surgery of Trauma (AAST) scale allows for injury grading and deciding on further treatment[3].
In severe cases of penile, scrotal and testicular trauma prompt surgical revision is crucial. In most cases of injury to the male external genitalia, surgery allows for the restoration of normal function and anatomical structure, as well as prevention or control of post-traumatic shock. Due to their nature, these injuries are classified as blunt, most often arising from kicking, hitting or striking, and penetrating, resulting from self-harm or biting[4]. The group of blunt and penetrating injuries includes testicular, penile, scrotal and mixed (penile and scrotal) trauma[5].

AIM OF THE STUDY

The aim of the study was to retrospectively assess the diagnosis and treatment of injuries to the male external genitalia among the patients of the Department of Urology at the Military Institute of Medicine – National Research Institute (MIM-NRI) in Warsaw using the AAST grading system.

MATERIALS AND METHODS

A total of 998 men with abdominal and pelvic injuries were admitted to MIM-NRI Emergency Department between October 2017 to August 2022. Injuries to the male external genitalia were found in 26 patients (3%). The mean age in this group was 37 years (21 to 72 years). Direct trauma to the external genitalia was diagnosed in 14 patients (54%). In 12 patients (46%), external genital trauma coexisted with multi-organ injuries resulting from road accidents or falls from heights. Detailed history was taken, physical examination was conducted, and US and/or trauma scan were performed in all men with external genital injuries. The first group (14 patients with direct trauma), including 8 patients (31%) with penile fracture and 6 (23%) with scrotal and testicular injuries, were qualified for urgent surgical treatment at the Department of Urology of the MIM-NRI. The second group, which included 12 patients (46%) with external genital injuries, such as haematoma, contusion, bruising coexisting with multi-organ injuries, were qualified for conservative treatment (Fig. 1).
The AAST classification system was used in all patients with male external genital injuries. These were grades I and II in the group managed conservatively. Grade II, III, IV, and V injuries were qualified for surgical treatment (Tab. 1).

RESULTS

In the group of 26 patients with external genital injuries, 14 men (54%) were qualified for urgent surgical treatment, i.e. 8 men (31%) with penile fracture and 6 men (23%) with scrotal and testicular injuries. In one case of a penile fracture, the urethra was damaged, the continuity of which was restored intraoperatively. In another case in the group of patients with scrotal and testicular trauma, orchidectomy was necessary due to rupture of the tunica albuginea and damage to testicular parenchyma. In 12 patients (46%) with multiple organ injuries following road accidents or falls from a height, a bed rest regimen and antibiotic therapy were implemented, which allowed for complete recovery. According to the AAST scale for penile, scrotal, and testicular injuries, grade I was observed in 14 patients, grade II

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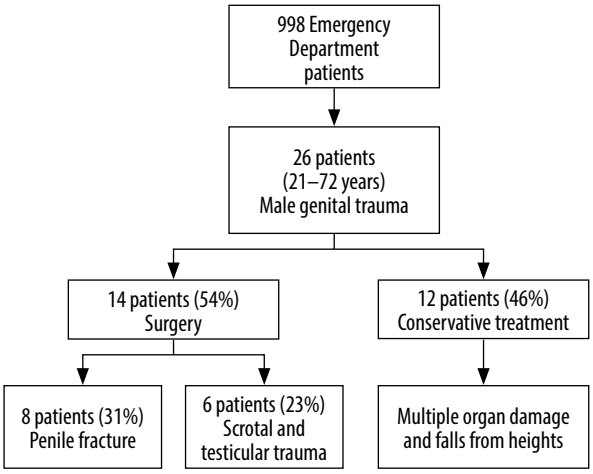

Fig. 1. Division of the research group by treatment method used, including the type of injury

injuries and allows for a quick choice of proper therapeutic approach[3]. The time of treatment onset has a decisive impact on the risk of infection and reproductive dysfunctions[6]. In the case of extensive subcutaneous scrotal haematomas or massive oedema, surgical procedure depends on the condition of the organ and the extent of the injuries. It most often requires a revision of the scrotum (Fig. 2)[7,8].

In our study population, 6 patients with scrotal trauma required urgent surgical intervention involving wound debridement and suturing, sparing the testicles. Eight men with penile fractures sustained during sexual intercourse were qualified for urgent surgical procedures. According to literature, sexual intercourse is the most common cause of this type of injury in Europe and the United States[9–11]. Fractures also occur as a result of, among others, masturbation or forceful bending of the penis in order to achieve immediate cessation of erection[12].

Penile trauma AAST		Scrotal trauma AAST		Testicular trauma AAST	
Grade	**Description**	**Grade**	**Description**	**Grade**	**Description**
I	Laceration/Contusion	I	Contusion	I	Contusion
II	Buck's fascia laceration	II	Laceration <25% of scrotal diameter	II	Subclinical laceration of the tunica albuginea
III	Cutaneous avulsion	III	Laceration >25% of scrotal diameter	III	Laceration of the tunica albuginea with <50% parenchymal loss
	Laceration through glans/meatus	IV	Avulsion <50%	IV	Major laceration of the tunica albuginea with >50% parenchymal loss
	Cavernosal or urethral defect <2 cm	V	Avulsion >50%	V	Total testicular destruction
IV	Partial penectomy				
	Cavernosal or urethral defect >2 cm				
V	Total penectomy				

Tab. 1. AAST grading system for penile, scrotal and testicular injuries

Penile AAST grade		
Grade	**Number of patients**	
I	3	30%
II	3	30%
III	3	30%
IV	1	10%
V	0	0%

Tab. 2. Penile trauma graded based on AAST

Scrotal AAST grade			Testicular AAST grade		
Grade	**Number of patients**		**Grade**	**Number of patients**	
I	8	75%	I	3	37.5%
II	0	0%	II	3	37.5%
III	1	8.3%	III	1	12.5%
IV	1	8.3%	IV	1	12.5%
V	1	8.3%	V	0	0%

Tab. 3. Scrotal and testicular trauma graded based on AAST

in 6 patients, grade III in 5 patients, grade IV in 3 patients, and grade V in 1 patient. Due to the occurrence of mixed injuries, i.e. of the penis, scrotum and testicles, simultaneous assessment using several AAST scales was needed in 6 patients (Tabs. 2, 3).

DISCUSSION

Regardless of the cause of external genital injuries, urgent conservative and surgical treatment is necessary. The AAST classification system is a valuable tool in assessing

Less common cases include subcutaneous administration of clostridiopeptidase, as well as mechanical injuries arising from attacks, e.g. animal attacks[13]. The presence of blood in the urethral meatus or urinary retention may be a sign of concomitant urethral damage[14] (Fig. 3). The European Association of Urology recommends cystoscopy, US and urethrography[15] as some of the most reliable tools for diagnosing male genital injuries[16]. The AAST grading system used to classify and assess male genital injuries significantly contributes to the treatment process. Patients graded as AAST I and II do not require surgical treatment with

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Fig. 2 A, B. Scrotal injury from dog bite

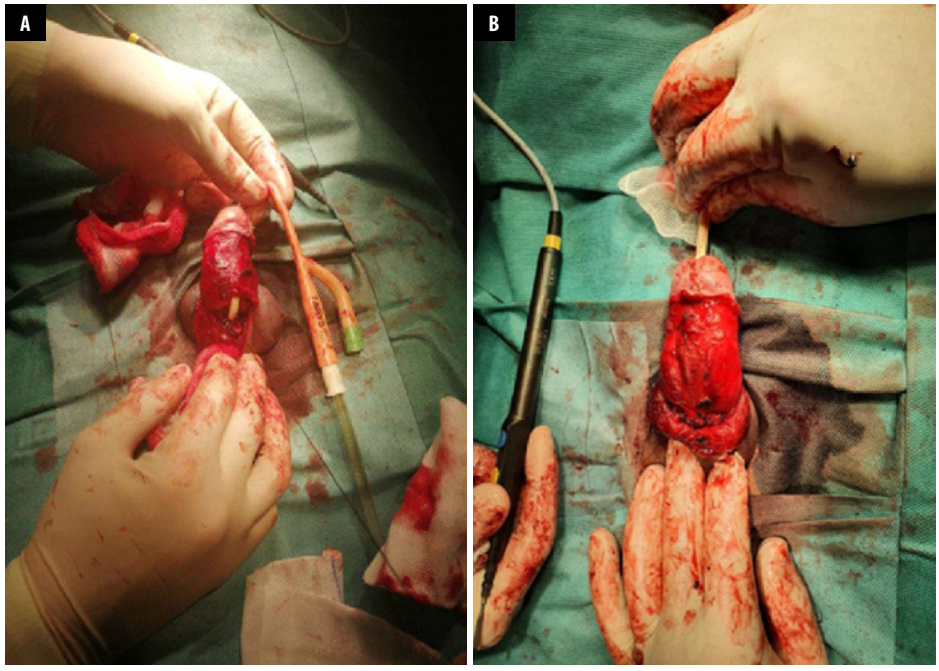

Fig. 3 A, B. Penile damage with urethral rupture

a high degree of reliability, which allows for rapid and effective identification of cases whose further treatment requires extended analysis. Surgical approaches are needed in higher grades (III, IV and V) (Fig. 4).

CONCLUSIONS

AAST is an effective and practical tool for assessing injuries to the male external genitalia. Early diagnosis and surgical treatment of such injuries reduces the risk of complications, such as necrosis or erectile dysfunctions. Surgery allows for maintaining normal function and anatomical structure[6,17], as well as preventing or controlling post-traumatic shock. Delayed decision to initiate surgical treatment may result in infection and reproductive dysfunction[7]. Education of medical personnel and increasing their awareness of the benefits of AAST and the possibility of early diagnosis and implementation of appropriate management may improve treatment outcomes[18].

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Fig. 4 A, B. Multiple organ injury with partial penile and scrotal degloving

Conflict of interest

The authors do not report any financial or personal connections with other persons or organizations which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

Author contribution

Original concept of study: MJB, TZ. Collection, recording and/or compilation of data: MJB, AG, ŁM, AM, BG. Analysis and interpretation of data: MJB, KC, MG, ŁM, AM, TS. Writing of manuscript: MJB, KC. Critical review of manuscript: MG, AG, ŁM, AM, BG, PW, TS, TZ. Final approval of manuscript: MJB, PW, TZ.

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