CHAPTER 8

OVERVIEW: PENETRATING AND BLUNT INJURIES OF THE EXTERNAL GENITALIA

GU Tract Structure	Ch 2 Kidney	Ch 3 Ureter	Ch 4,5 Bladder	Ch 6,7,8,11 Urethra	Ch 8,9 Scrotum Testis	Ch 8,9 Spermatic Cord	Ch 8,10 Penis
No. Patients With Injury to Structure	132	36	72	83	199	14	128
% of Total GU Injuries	19.1	5.2	10.4	12.0	32.8	2.0	18.5

GU: genitourinary

Published reports[1–5] from the Vietnam War reveal that injuries to the external genitalia were most common: 40% to 66.7% of all genitourinary tract injuries. In Japan, 452 (65.2%) of the 692 urological injuries managed by the authors (JNW and JWW) involved the external genitalia (see Table 2-1). The organ distribution of these 452 external genitalia wounds and injuries in 303 patients is tabulated in Table 8-1.

For statistical clarity and simplification, urethral traumatic injuries are included in the statistics as injuries and wounds of the external genitalia, recognizing that not all urethral trauma injuries involve the external genitalia. Furthermore, because of their unique problems in management, blunt posterior urethral injuries are discussed in Chapter 6, Blunt Pelvic Trauma With Posterior Urethral Disruption; penetrating posterior urethral wounds in Chapter 7, Wounds of the Posterior Urethra and Prostate; and anterior urethral trauma in Chapter 11, Anterior Urethral Penetrating and Blunt Injuries.

TABLE 8-1
INJURIES OF THE EXTERNAL GENITALIA

Organ Injured	No. Patients*	Injuries No.	Injuries %
Scrotum–Testis	199	227	50.2
Penis	128	128	28.3
Urethra			
Anterior	48	48	10.6
Posterior	35	35	7.8
Spermatic Cord	14	14	3.1
Totals:		**452**	**100.0**

*303 patients total; some had injuries to more than 1 organ

Of the 452 external genitalia wounds and injuries in the 303 patients evacuated to Japan, wounds of the scrotum and testes were the most common, 50.2% of all 452 external genitalia wounds (see Table 8-1), and 32.8% of all urological injuries (see

Table 2-1). In Table 8-2, the incidence of wounds of the external genitalia, as a percentage of all genitourinary tract injuries, are compared from the 2 world wars and Vietnam.[1,6,7] The incidence and distribution of these wounds have not changed significantly since World War II. The low frequency of external genital wounds in World War I was due to the relatively immobile, stagnant nature of this conflict, with trench warfare being predominant and most casualties from artillery fire. The high frequency of wounds of the external genitalia in World War II and the Vietnam War reflect the increase in the mobile combat activity of the soldier and the increased use of mines, grenades, booby traps, and other high-velocity explosive surface missile devices, which detonated immediately beneath or beside the soldier.[6–11] Penetrating missiles were the predominant cause of injury in Vietnam.[1–5] In our experience in Japan, primarily at the US Army Hospital at Camp Zama, the 452 external genital wounds in the 303 patients were caused primarily by high-velocity penetrating missiles: either multiple fragments, gunshots, or both (Table 8-3).

TABLE 8-2
HISTORICAL TRENDS IN TRAUMA OF THE EXTERNAL GENITALIA*

Organ	World War I[1] %	World WarII[2] %	Vietnam %
Scrotal Testis	—	34.9	32.8
Penis	—	18.7	18.5
Urethra	—	14.5	11.9
Totals:	**29.4**	**68.1**	**63.2**

*As a percentage of all urological injuries
Data sources: Busch FM, Chenault OW Jr, Zinner NR, Clarke BG. Urological aspects of Vietnam War injuries. *J Urol.* 1967;97:764. (1) Young HH. Wounds of the urogenital tract in modern warfare. *J Urol.* 1942;47:59–108. (2) Kimbrough JC. War wounds of the urogenital tract. *J Urol.* 1946;55:179–189.

TABLE 8-3
CAUSES OF INJURIES TO THE EXTERNAL GENITALIA

Agent of Injury	No. Patients	
Penetrating Missiles	275	
Fragments		207
Gunshot		64
Mixed		4
Blunt Penetrating	4	
Blunt Nonpenetrating	22	
Miscellaneous	2	
Total Patients:	**303**	

Hardaway,[12] in a wound analysis of 17,726 American soldiers hospitalized in Vietnam from March 1966 to July 1967, identified 594 patients (3.35% of the total patients admitted) with wounds of the external genitalia. Of these patients with wounds of the external genitalia, 35% were returned to duty in the Republic of Vietnam and 65% were evacuated to hospitals outside of Vietnam. Their average hospital stay was 8.58 days; and 2.48% of these patients died while hospitalized in Vietnam. Antibiotics were used liberally in this group with wounds to the external genitalia, and those with antibiotic coverage had an infection rate of 4.55%. Patients with wounds of external genitalia required large quantities of blood: of the 594 patients with genital wounds, 27.6% received blood transfusions with an average of 10.45 units of blood transfused per patient. These figures reflect the vascular nature of the area of injury and the frequency of injuries to other multiorgan systems, not the genital injury per se.

Associated organ system wounds were common in the patients with external genitalia wounds that we managed in Japan. Many patients had 1 or more other wounds of the external genital organs (see Table 8-1). Data in 285 of the 303 patients were used to assess associated injuries to other organ systems (Table 8-4). Associated injuries occurred in 270 (95%) of 285 patients with retrievable data. Soft-tissue and bony wounds of the extremities—single or multiple, or to both upper and lower extremities or to all 4 extremities—were most common, occurring in 70% of patients. Sixty-three of 270 (23%) patients had associated intraabdominal wounds, and 12 of 270 (4%) had intrathoracic wounds. The true incidence of other soft-tissue injuries and wounds to the bony pelvis was difficult to retrieve from the case records.

TABLE 8-4
NONGENITOURINARY SYSTEM INJURIES ASSOCIATED WITH EXTERNAL GENITALIA INJURIES

Category	Patients No.	Patients %
Retrievable Data	285	
Associated Injuries	270	95
Extremity: Soft Tissue and Bone	189	70
Single Extremity Wounds	53	
Multiple Extremity Wounds	136	
Upper and Lower Extremities	29	
All 4 Extremities	14	
Abdominal	63	23
Intrathoracic	12	4
Soft Tissue and Bony Pelvis	?	?

The predominant general philosophy of treatment of wounds to the external genitalia employed by urologists in Vietnam was careful, thorough, yet often conservative, initial debridement of vital tissue and organ injury, with open wound dressing, and redebridement prior to delayed primary closure. This was because of the ischemic and necrotizing effects of high-velocity missile wounds. Conservative management also dictates the need to preserve the external genitalia for their vital importance as a component of the male's body image and psychological sense of being intact.

Early in the Vietnam War, "heroic attempts" at initial reconstruction and skin coverage of extensive soft-tissue penile and urethral wounds often resulted in secondary infection, tissue necrosis and slough, and organ deformity. Scrotal wounds, because the scrotum is highly vascular and elastic, were usually managed by aggressive debridement, primary closure, and drainage. Both limited and bilateral testicular wounds were treated conservatively: debridement (partial orchiectomy) and absorbable suture closure of the tunica albuginia. Orchiectomy was reserved for destroyed testicles and to facilitate hemostasis in unstable patients with extensive wounds.

Limited low-velocity penile soft-tissue wounds, with or without localized urethral injury, were usually managed with debridement and primary repair. Extensive high-velocity wounds to the deep penile soft-tissue and urethra, on the other hand, were generally treated with

- suture or pressure control of bleeding,
- conservative initial debridement,
- open wound dressing,
- urethral marsupialization or proximal urethrostomy, and with
- redebridement,
- delayed skin coverage, and
- urethroplasty.

Suprapubic cystostomy urinary diversion was indicated and generally used in all the wounded casualties with deep penile urethral wounds.

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