

## Original Research Article

# Contemporary management of genitourinary injuries in a tertiary trauma centre in Nigeria

Chimaobi G. Ofoha\*, Samaila I. Shu'aibu, Victor E. Onowa, Zingkur Z. Galam

Department of Surgery, Jos University Teaching Hospital, P. M. B. 2076, Jos, Nigeria

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**\*Correspondence:**

Dr. Chimaobi G. Ofoha,

E-mail: drchimao@yahoo.com

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### ABSTRACT

**Background:** The genitourinary system has been shown to be involved in 10% of patients presenting after trauma and is therefore a significant factor in trauma induced morbidity and mortality. It affects all age groups and both sexes. The aim of this study is to determine the aetiology, mechanism of injury and management of genitourinary injuries in a tertiary trauma centre.

**Methods:** This is a prospective study carried out at the Jos University Teaching Hospital between 2012 and 2017. All patients who presented at the A and E with genitourinary trauma were recruited into the study. Initial assessment involved taking an AMPLE history and resuscitation, using the Advanced Trauma Life Support (ATLS) protocol of the American College of Surgeons. Physical examination and investigation were carried out to localize and determine extent of injury. Investigations carried out were complete blood count, blood grouping, serum electrolyte, urea and creatinine and radiography where applicable. Surgical intervention was carried out where indicated.

**Results:** A total of 104 patients were involved in this study. The mean age was 32.14±15.5 years with a range of 3 to 75yrs. Median age was 28yrs. Eighty-nine (85.6%) were males while fifteen (14.4%) were females. The genitalia were the most affected in 34% (n=35) of the patients. Gunshot was the commonest mechanism of injury (37.5%, n=39). Operative and non-operative management were employed depending on mechanism and extent of injury.

**Conclusions:** Gunshot was the commonest cause of genitourinary trauma. These injuries require specialized attention for proper assessment and management.

**Keywords:** Bladder, Genitourinary injuries, Genitalia, Renal, Urethra

### INTRODUCTION

Trauma refers to injury caused by an external force from a variety of mechanisms, including traffic- or transportation-related injuries, falls, assault (e.g., blunt weapon, stabbing and gunshot), explosions, etc.<sup>1</sup> It accounts for approximately five million deaths each year worldwide and causes disability to millions more.<sup>2,3</sup> The genitourinary system has consistently been shown to be involved in 10% of patients presenting after trauma, and is therefore a significant factor in trauma induced

morbidity and mortality.<sup>4</sup> It affects all age groups and both sexes. Though there are several guidelines for the management of these injuries, however there's is no generally acceptable consensus. The importance of recognizing and appropriately managing urogenital injuries has been appreciated for centuries. Timely identification and management of these injuries is often organ saving, and at times lifesaving.<sup>5</sup> The aim of this study is to determine the aetiology, mechanism of injury and management of genitourinary injuries in a tertiary trauma centre.

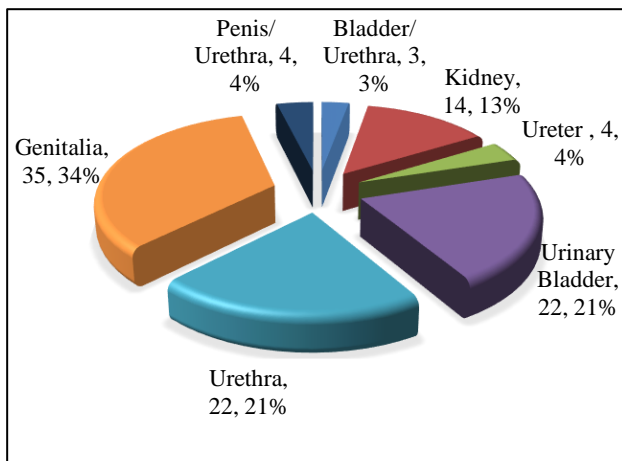
**METHODS**

This is a prospective study carried out at the Jos University Teaching Hospital between 2012 and 2017. All patients who presented at the A and E with genitourinary trauma were recruited into the study. Initial assessment involved taking an AMPLE (allergies, medication, past medical history, last meal and events surrounding the trauma) history and resuscitation, using the Advanced Trauma Life Support (ATLS) protocol of the American College of Surgeons. Physical examination and investigation were carried out to localize and determine extent of injury. Investigations carried out were complete blood count, blood grouping, serum electrolyte, urea and creatinine. Further evaluation included abdominal ultrasonography, urethrogram, cystogram and CT-urography where applicable. Unstable patients with renal injury had one shot on-table intravenous pyelogram prior to exploration. Surgical intervention was carried out where indicated.

**RESULTS**

A total of 104 patients were involved in this study. The mean age was 32.14±15.5 years with a range of 3 to 75yrs. The median age was 28yrs. Eighty-nine (85.6%) were males while fifteen (14.4%) were females.

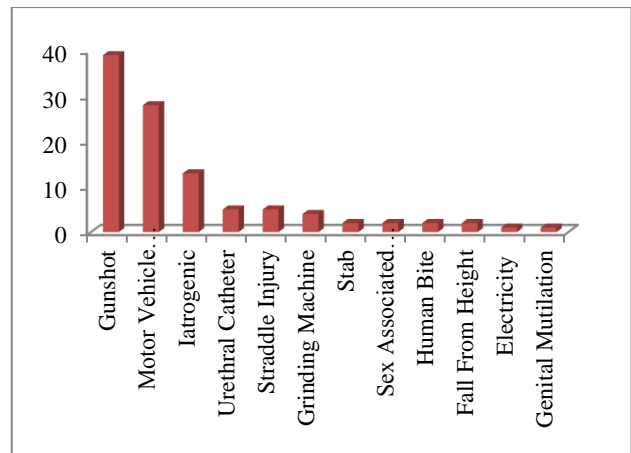
The genitalia were the most affected (34%, n=35) (Figure 1). The least affected was the ureter (4%, n=4). Four percent of the patients had combined penile/ urethral injuries.



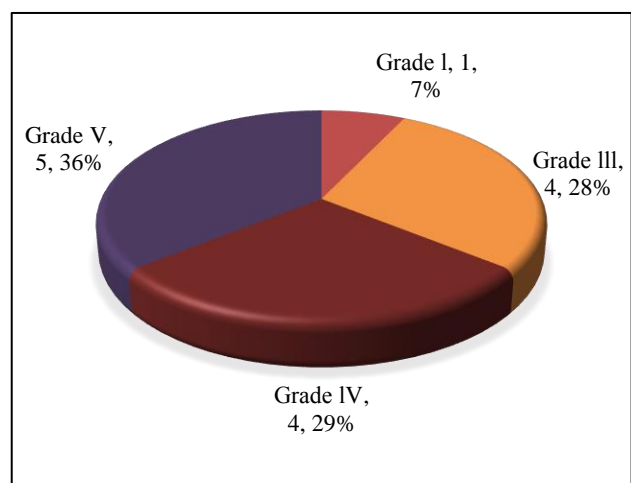
**Figure 1: Distribution of genitourinary trauma in Jos.**

Gunshot was the commonest mechanism of injury (37.5%, n=39) followed by motor vehicle collisions (26.9%, n=28). Self-inflicted genital injury was the least mechanism in 0.96% (n=1) as shown in Figure 2.

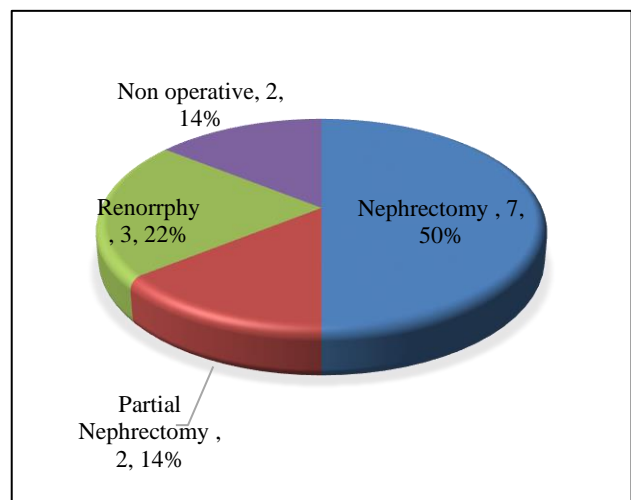
Fourteen patients had renal trauma, representing 13.5% of the patients. Grade V injury was the commonest, occurring in thirty six percent of the patients with renal injury (Figure 3).



**Figure 2: Mechanism of genitourinary injuries in Jos.**



**Figure 3: Grades of renal injury.**



**Figure 4: Management of renal injury.**

Fourteen percent of patients with renal injury had non-operative management while eighty six percent had operative management (Figure 4). Fifty percent had nephrectomy.

A total of twenty-five patients had bladder injury, sixty four percent (n =16) were intraperitoneal bladder rupture (Table 1).

**Table 1: Types of bladder injury.**

Type of injury	No. of patients	Percentage
Intraperitoneal Rupture	16	64%
Extraperitoneal Rupture	7	28%
Contusion	2	8%
Total	25	100%

**Table 2: Management of genitourinary injuries.**

Management of Genitourinary injuries	No. of Patients	Percentage
<b>kidney</b>		
Nephrectomy	7	50.0%
Partial Nephrectomy	2	14.3%
Renorrhaphy	3	21.4%
Non operative	2	14.3%
Subtotal	14	100%
<b>Ureter</b>		
Ureteroneocystostomy + Stenting	4	100%
Subtotal	4	100%
<b>Urinary Bladder</b>		
Exploration and Repair	23	92.0%
Non Operative	2	8.0%
Subtotal	25	100%
<b>Urethra</b>		
Suprapubic Cystostomy with subsequent Urethroplasty 23		92.0%
Railroading	2	8.0%
Subtotal	25	100%
<b>Genitalia</b>		
Penile Stump Refashioning	8	20.5%
Penile Exploration and corporal repair	8	20.5%
Penile debridment	5	12.8%
Scrotal Exploration and Orchidectomy	5	12.8%
Scrotal Exploration and Orchidoplasty	1	2.6%
Scrotal Exploration and haematoma evacuation	3	7.7%
Scrotal debridment and repair	8	20.5%
Vulval Debridment	1	2.6%
Subtotal	39	100%

Ninety seven percent of patients with genital injuries were males, with three percent of genital injuries occurring in females. Fifty four percent of the injuries involved the penis while the vulvovagina was involved in three percent.

All genital, urethral and ureteric injuries were managed operatively. Non operative management was required in 3.8% of the entire patients. The type of management offered for the various injuries in different structures is shown in Table 2.

## DISCUSSION

Trauma is a disease of the young and genitourinary trauma follows similar pattern. In this study, the mean age was 32.1±15.5yrs reflecting the general trend. This is similar to the findings by other authors. Sarvestani et al, in the assessment of genitourinary trauma in southeastern Iran had a mean age of 23±12 years while Barman et al, noted an average age of 27.45±14.2 years with highest incidence in the age group of 21 to 30 years.<sup>6,7</sup>

There is a preponderance of males in trauma.<sup>8</sup> This is also reflected in injuries of the genitourinary system. In this study 85.6% were males. In a study in Port Harcourt, Nigeria by Eke et al, 85% of the individuals with genitourinary trauma were males.<sup>9</sup> Other studies had similar patterns.<sup>10,11</sup> This can be explained by high level of violence, aggressive sports, motor vehicle collisions and other risk promoting behaviors among men.

Motor vehicle collision remains the leading cause of genitourinary trauma. This is supported by Malay et al, who showed that 90% of genitourinary injuries resulted from road traffic accident.<sup>12</sup> Other authors made similar findings.<sup>5,6,10,13,14</sup> However, this study showed that gunshot was the main mechanism of injury. 37.5% (n=39) of genitourinary injuries resulted from gunshots followed by motor vehicle collisions 26.9% (n=28). This is a common finding in communities rife with civil conflicts and gun violence.<sup>15,16</sup>

The kidney is the most injured genitourinary organ. Paparel et al, in his series showed that following road traffic collision, 43% of the patients had renal injuries followed by testicular trauma (24%).<sup>10</sup> Hurtuk et al, in his analysis of the American College of Surgeons' National Trauma Data Bank had similar findings while Wessells et al, in a population based study identified renal injuries as the commonest.<sup>17,18</sup> The genitalia (34%) were the commonest organ injured in this study followed by the urethra (21%). Other authors have noted findings different from the norm. Eke et al, found the urethra to the most frequently injured structure (49%) followed by the bladder (24%).<sup>9</sup>

Universally, non-operative management is the current trend for kidney injuries.<sup>19,20</sup> All grades of renal injury can be managed conservatively as long as the patient remains haemodynamically stable. However, most high grade renal injuries will require operative intervention, either as a result of haemodynamic instability or other associated injuries. 86% of the patients in this study with renal injury had operative intervention with 50% having nephrectomy. This discrepancy from the global trend can

be explained by the fact that most of the patients in this study had high grade renal injuries (grade V 36%, grade IV 29%) resulting mostly from high velocity gunshots. In a combat hospital in Iraq, 65.5% of the patients with renal injuries had nephrectomy.<sup>21</sup>



**Figure 5: Remnant of a shattered kidney.**



**Figure 6: Gunshot injury of the male genital.**

The ureter was the least injured structure in this study (4%) and is in keeping with the findings by other authors.<sup>5,10,22</sup> All the injuries were transections of the lower third of the ureter, which necessitated ureteroneocystostomy. The blood supply to the lower ureter is usually compromised by injury; hence these injuries are best tackled by ureteroneocystostomy.<sup>23,24</sup>

Twenty four percent of the injuries involved urinary bladder injury. Sixty four percent of them were intra peritoneal rupture.

Bladder rupture can be managed non-operatively, which emphasizes continuous bladder drainage or operatively with direct repair of the injury.<sup>25</sup> Operative repair is encouraged for intra peritoneal rupture to reduce the risk of complications.<sup>26</sup>



**Figure 7: Post reconstruction of gunshot injury.**

In our series all patients with urinary bladder injury had exploration and repair. This encourages rapid healing, decreases the potential for complications, reduce hospital stay and duration of catheterization. Urethral Injuries were managed either by suprapubic cystostomy and subsequent urethroplasty or by railroading which is a form of primary realignment.

Urinary diversion in the form of suprapubic cystostomy as an initial treatment does not interfere with the urethral anatomy and allows micturating cystourethrography during follow-up.<sup>27</sup> The subsequent urethroplasty is technically easier and is associated with less adverse effects compared to primary repair. The benefits of railroading include alignment of the urethra hence reducing the technical difficulty and complications if urethroplasty is required. There is also reduction of urethral distraction defect.

The genitalia were the commonest structure injured in this study. Trauma to the genitalia has been on the increase due to domestic and gun violence.<sup>28,29</sup> Ninety seven percent of the patients with genital injuries were males. This can be explained by the anatomical differences, increased exposure to violence, performance of aggressive sports and motor vehicle accidents.

Prompt surgical intervention with conservative debridement and primary repair of injured organ is recommended for patients with injuries to the genitalia. However selected patients with blunt and superficial injuries can be managed expectantly.<sup>30</sup>

## CONCLUSION

The genitalia were the commonest structure injured, while gunshot was the main mechanism of injury. These injuries require specialized attention for proper assessment and management. Expedite management is invaluable in organ preservation and can be lifesaving.



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