



Changing Pattern of Genitourinary Injuries in the Niger Delta Region of Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author ONE designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author CCA managed the analyses of the study and the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Background: The prevention of injuries is a daunting task, and it is even more challenging in developing countries where resources need to be managed prudently. The aetiology of genitourinary injuries varies according to the geographical region. Injuries that were previously uncommon are now encountered in our practice. Changing social lives seem to have affected the pattern of the injuries that are presented by the patients in our practice.

Aims and Objectives: This study was aimed at documenting the new pattern of genitourinary injuries in patients who presented to our hospital from December 2007 to October 2017.

Materials and Methods: A retrospective study was conducted. Patients with genitourinary injuries who presented within the study period were identified. The information was retrieved from patients' case files, the unit's audit register, the main theatre operations' register and the accident and emergency theatre's register. The number of injuries, site of injury, cause of injury and management of injury were recorded. Data were entered using Microsoft Excel 2010 and analysed using SPSS version 17.0.

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Results: There were 186 injuries in 165 patients. One hundred and thirty-three patients (80.61%) were male, and 32 patients (19.39%) were female: the male-to-female ratio was 4.16:1. The modal age was 30–39 years, with an age range from 8 months–82 years. The mean age was 34±13.02 years. Urethral injuries were predominant. The bladder, kidney, scrotum and testis were also involved in the injuries.

The main causes were iatrogenic injuries (30.3%), road traffic accidents (17.0%), domestic accidents (22.4%) and domestic/civilian violence. Most patients had satisfactory outcomes following surgical intervention. Three patients died during the study period.

Conclusion: Genitourinary injuries predominantly affect young persons. The results of our study indicate that injuries associated with civilian violence, domestic accidents and iatrogenic injuries are on the rise in our region. Based on the results of our study, we recommend that attention be paid to social lifestyles, standards of care and existing government policies on safety in order to prevent these injuries.

Keywords: Urogenital tract; trauma; changing pattern; Nigeria.

1. INTRODUCTION

Genitourinary injuries can be divided into injuries that affect the upper and lower tracts and external genitalia. These organs are not commonly injured in isolation, and they are often presented in patients with multiple injuries. When they occur in isolation, they are rarely life threatening, but they can be the source of significant morbidity caused by their sequelae. The specific management of these injuries is tailored to the grades of the injuries, which has undergone several modifications [1]. Despite the advancement in radiological diagnostic tools, because the diagnoses of most of these injuries are clinical (except in the case of renal injuries where the computerised tomography scan is the gold standard), clinical experience is invaluable [2].

In Nigeria, the unique challenges of the availability and affordability of ancillary investigative modalities have necessitated a unique management protocol for patients with genitourinary injuries [2]. Previous studies have shown that road traffic accidents, straddle injuries, complications of obstetrics and gynaecology surgeries were the main causes of injuries in Nigeria [3]. Militancy, civilian violence, domestic violence, the introduction of endourology services as well as a ban on the commercial use of motor cycles seem to affect the injury patterns in our region. We present our experience over the past ten years and compare our findings to a previous study that was conducted 20 years earlier [4].

2. PATIENTS AND METHODS

All patients who presented to this hospital between December 2007 and October 2017 with

a diagnosis of a genitourinary injury were included in this retrospective study. Approval for the study was obtained from the hospital's Research Ethics Committee.

Patients who presented with trauma were initially evaluated in the emergency rooms, wards or theatres depending on the place and mode of presentation. Following their initial stabilisation, patients with genitourinary injuries were identified. The diagnoses of genitourinary injuries were made based on the patient's history, physical examination and appropriate radiological imaging as indicated. Suspected urethral injuries were treated by either a single attempt at Foley urethral catheterisation or suprapubic cystostomy and subsequent urethroplasty if stricture developed. Penile fractures were explored immediately, and lacerations of the tunica albuginea were repaired primarily. Urethral lacerations associated with penile fractures were also repaired immediately. Bladder injuries were repaired immediately, and urethral catheters were inserted for about 10 days. Ureteric injuries were treated by either de-ligation or ureteroneocystostomy (ureteric re-implantation) with double J stents. Renal injuries were managed conservatively but were examined if radiological investigations supported immediate exploration. Patients who had gunshot to the penis, scrotum or perineum had extensive wound debridement and/or secondary suturing. Pre-operative antibiotics, mainly quinolones and metronidazole were prescribed.

The patients were followed up at the outpatient clinic. Those with complicating urethral strictures were further treated by urethroplasty and/or the urethral dilation of direct vision urethrotomy (DVIU). The outcomes of the urethral repairs

were measured by uroflowmetry. Patients who had penile fracture were asked about their levels of satisfaction with penile erections and the presence or absence of chordee.

The data were extracted from emergency room records, patients' case files, theatre records and the divisions audit register. The data included the following: sociodemographic data, aetiology of injury, mode of presentation, duration of admission, organ(s) affected, treatment offered and outcome of treatments. The data were recorded in an Excel worksheet and then subjected to descriptive analysis using SPSS version 20 (IBM SPSS Inc. Chicago, IL). The results are presented in tables and figures. The approval for this study was obtained from the Research Ethics Committee of our hospital.

3. RESULTS

During the study period, 186 genitourinary injuries were recorded occurring in 165 patients. In 12 of these patients, more than one genitourinary organ was involved. One hundred and thirty-three patients (80.61%) were males and 32 patients (19.39%) were females. The age range was from 8 months–80 years. The mean age was 34.48 ± 13.02 years, and the modal age group was 30–39 years. The age and sex distribution are shown in Table 1.

Table 1. Sociodemographic characteristics

Age group	Frequency n=165	Percentage (%)
≤ 19 years	8	4.85
20-29 years	54	32.73
30-39 years	58	35.15
40-49 years	27	16.36
50-59 years	7	4.24
≥ 60 years	11	6.67
Mean age	34.48 ± 13.02 years	
Sex		
Male	133	80.61
Female	32	19.39

The organs and the types of injuries to them are shown in Fig. 1 and Table 2, respectively. The most frequently injured organ was the urethra: 69 cases (41.32%). Sixty-three cases (37.7%) occurred because of direct trauma to the urethra, and 6 cases (3.6%) followed catheter manipulation (insertion or removal). The urethral injuries were mainly ruptures or contusions. The phallus was involved in 35 cases (20.96%). The main injuries to the phallus were contusions,

fractures with or without associated urethral injuries, and amputations. Three patients had renal and testicular injuries. Injuries to the ureters occurred in 26 patients (15.57%), which were mainly lacerations and ligations associated with gynaecological procedures. Two injuries were ureteric avulsions following pyelolithotomy for stag-horn renal calculi.

Iatrogenic incidents were the most common causes of genitourinary injuries, accounting for 30.3.1% of these injuries. Hysterectomy in patients with distorted pelvic anatomies and obstetric emergencies were the most common surgical causes of the iatrogenic incidents. The recent introduction of endourological procedures and catheterisation-related injuries also contributed to the iatrogenic injuries. Road traffic accidents and fall-astride injuries accounted for 18.8% and 17.0% of the injuries, respectively. Most of these patients had pelvic fractures that were complicated by urethral injuries. Fig. 2 shows that sex-related domestic, accidents, gun shots and domestic violence accounted for 22.4%, 7.9% and 3% of these injuries, respectively. Sexual intercourse was the main cause of penile fracture. Massaging and rolling on the bed also contributed to penile fractures. A typical case of penile fracture is shown in Fig. 3. Gun-shot wounds resulted in multiple injuries, the most common of which were bowel and pelvic fractures. The kidney, bladder, penis, scrotum and testis were all involved in gun-shot injuries. Foreign body insertion (wires into the urethra) by robbers also occurred as shown in Fig. 4. Domestic violence between spouses accounted for two cases (1.5%), which involved a violent pull on the scrotum resulting in scrotal hematoma as shown in Fig. 5. Two patients presented with self-inflicted penile amputations.

Most patients who presented with blood at the tip of the urethra had an emergency suprapubic cystostomy especially when there was an accompanying urinary retention. We do not routinely do emergency retrograde urethrograms, and we tend to wait 3–6 weeks after the injury before performing this procedure. An endoscopic re-alignment was performed in four patients with urethral injury.

Fifty-eight of the patients had a urethroplasty, which is the definitive procedure for complicating stricture. Direct vision internal urethrotomy (DVIU) was the initial procedure in eight patients. Ten patients did not return after the initial urinary diversion. Twenty-five patients had presented

within a year with reduced stream of urine, and they had either a DVIU or urethral dilatation as the second procedure. Four patients with

extensive penoscrotal injuries and perineal urethrostomies had second stage urethroplasty. The treatments are shown in Table 3.

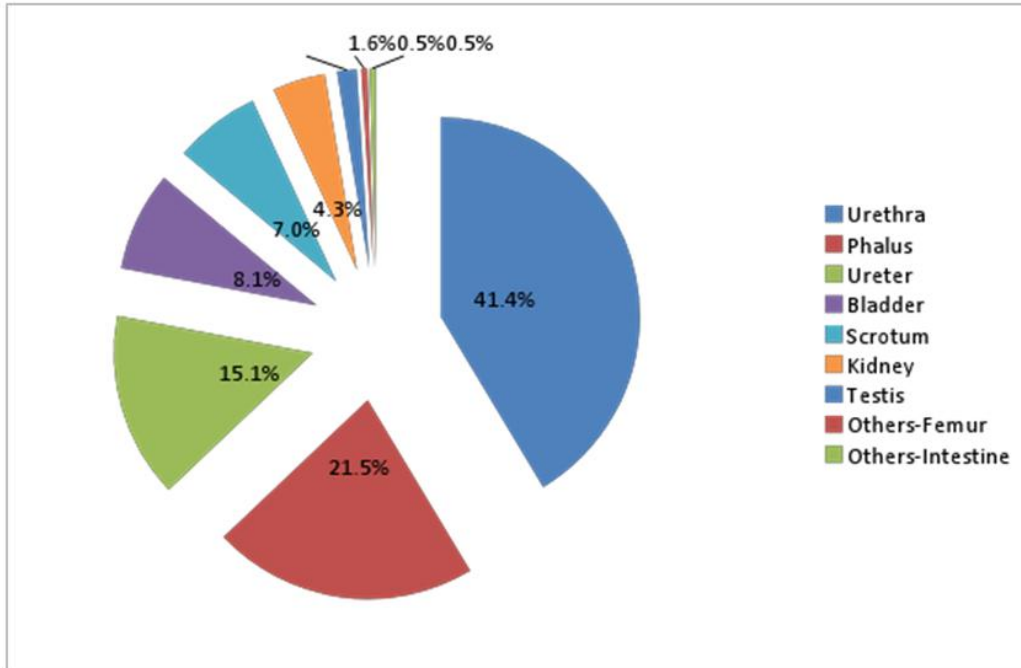


Fig. 1. Organs involved in genitourinary injuries

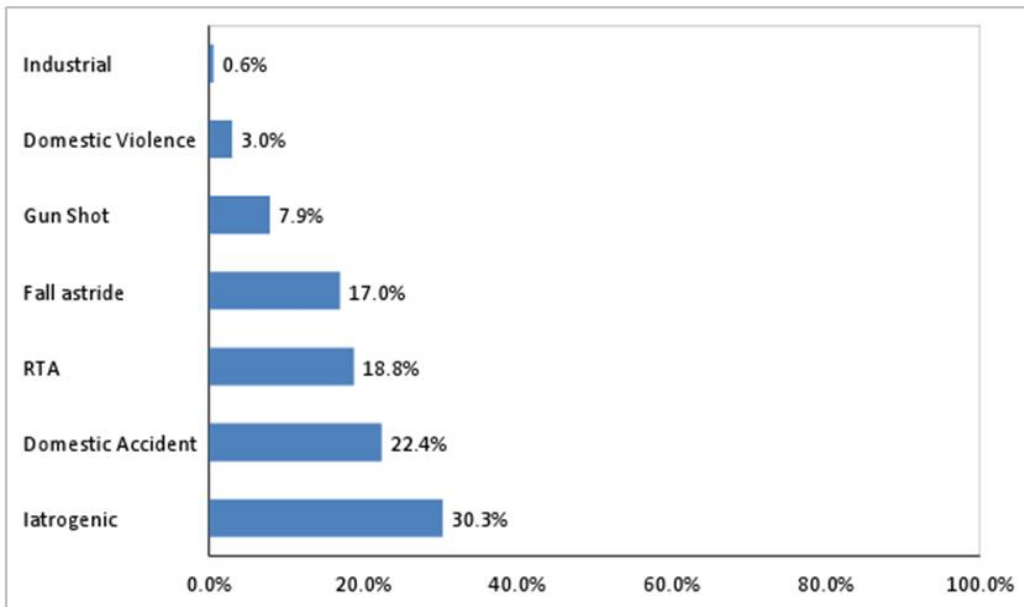


Fig. 2. Aetiology of genitourinary injuries

RTA = road Traffic Accidents

Table 2. Type of injury

Characteristics	Frequency (n=186)	Percentage (%)
Category I (Multiple)		
Urethral rupture	69	41.32
Penile fracture	35	20.96
Ureteric ligation / laceration	26	15.57
Bladder laceration	15	8.98
Scrotal haematoma /laceration	9	5.39
Renal laceration/shattering	5	1.80
Penile amputation	2	1.20
Testicular trauma	4	2.40
Penoscrotal laceration	1	0.60
Perineal laceration	1	0.60

Table 3. Treatment offered

Characteristics (Multiple)	Frequency (n=186)	Percentage (%)
Urethroplasty	58	31.18
Repair of penile fracture	32	17.20
Suturing	27	14.52
Re-implantation	22	11.83
Catherisation	12	6.45
DVIU	8	4.30
Debridement	7	3.76
Conservative management of renal injuries	4	2.15
Urethroplasty + Repair of penile fracture	3	1.61
Exploration of abdomen	3	1.61
Refashioning of penile stump	2	1.08
Removal of foreign body	1	0.54
Urethroplasty	1	0.54
Anastomosis of ureter	1	0.54
Ureterosigmoidostomy	1	0.54
Nephrectomy	1	0.54
DJ Stenting	1	0.54
De-ligation of ureter	1	0.54
Dilatation of urethra	1	0.54

DVIU = Direct Vision Internal Urethrotomy; DJ = Double j

Renal injuries occurred in 5 (2.44%) patients. Three injuries followed blunt trauma caused by road traffic accidents; the other two had gun-shot injuries. Two patients had an exploratory laparotomy for associated small bowel injuries, and the other two were managed conservatively. One patient had a nephrectomy. The renal injury patients who presented with blood in the urine but had normal haematocrit and blood pressure readings were conservatively managed. They did not develop complications, and they were discharged after seven days of observation.

The outcome of the treatment was satisfactory in over 80% of cases as shown in Table 4. Three of the patients died immediately post-therapy. One died from sepsis, one died from multiple injuries, and one died from renal failure. The most common complication was urethral stricture. Five patients had re-stricture after initial treatment. Erectile dysfunction was observed in two patients; two testes were lost while the outcome in 13 patients was not recorded. One patient who was treated for penile fracture reported the presence of chordee. A healed penile fracture is shown in Fig. 6.

Table 4. Outcome of treatment

Characteristics	Frequency (N = 165)	Percentage (%)
Satisfactory	140	84.85
Not Stated	12	7.27
Re-stricture	5	3.03
Orchidectomy	2	1.21
Erectile dysfunction	2	1.21
Chordee	1	0.61
Deceased	3	1.82



Fig. 3. Penile fracture



Fig. 4. Wire inserted into the urethra by armed robbers

Scrotal haematoma by an angry wife



Fig. 5. Scrotal haematoma following 'wife abuse'



Fig. 6. Penile fracture after repair

4. DISCUSSION

Injuries continue to be important causes of morbidity and mortality in developed and developing countries. The decline in the rates of almost all injuries has become so prominent that it could warrant the general statement that the world is becoming a safer place [5]. However,

this statement is not true for many developing countries, such as Nigeria. Reports in Tanzania have confirmed increasing incidents of injuries [6]. In our hospital, trauma is a leading cause of morbidity and mortality, which are common in other developing countries [7,8,9]. Moreover, the results of the present study indicate that there has been an increase in the number of patients

with genitourinary injuries in our centre compared to the results of a previous study that was conducted 20 years ago [4].

The reasons for the increase in the number of injuries found in this study may be changing lifestyles, improper attention to existing safety regulations, poorly maintained roads and vehicles, militancy and urban civilian violence, and the learning curve associated with new endoscopic equipment. The rapidly growing population and the lack of a corresponding increase in infrastructural development may also have led to urban congestion and civil unrest.

The results of this study showed that genitourinary injuries affected all age groups and both sexes: the peak age was 30–39 years and the mean age was 34.48 ± 13.02 years. This result aligns with the findings of a study done in Lagos by Afolayan et al. [3]. In the present study, the male-to-female ratio was 4.15:1, which is similar to that in [3], which reported a ratio of 6:1. The predominance of injuries in males may be explained by the tendency of more men than women to be involved in high-risk activities. In addition, the phallus is more exposed than the vulva is.

In 2000, Eke reported urogenital injuries from the same institution. He also found that the urethra was the most commonly affected genitourinary organ and that road traffic accidents were the most common aetiologic factor. In his study, iatrogenic injuries accounted for only 12% of the causes [4]. However, the results of the present study showed that iatrogenic injuries were more common. The previous study revealed that iatrogenic injuries were mainly catheter-related. However, in the present study, they were mainly endoscopy related or involved obstetrical and gynaecological complications.

In 2010, Salako et al. also noted predominance in Western Nigeria of urethra injuries (58.9%) and of road traffic accidents as the aetiologic factor [10]. It is important to note that because Salako et al. did not consider iatrogenic injuries traumatic injuries, they were excluded in their study. They also did not consider penile fractures traumatic injuries.

The World Health Organisation has classified traumatic injuries into intentional injuries (interpersonal violence-related, war-related, and self-inflicted) and unintentional injuries (motor vehicle accidents and domestic accidents) [4].

In 2008, a ban was imposed on the use of commercial motorcycles for public transport within the city metropolis [11]. In the same year, endourology practice was introduced in the urology division. Could this coincidence account for the changing pattern in urologic injuries?

The most common cause of genitourinary injuries found in this study was iatrogenic, and the urethra was the most commonly injured organ. Iatrogenic injuries following endourologic procedures are more commonly associated with the ureter [12]. However, our initial experience was that most complications were limited to the lower urinary tract. Failed direct vision internal urethrotomy and bladder perforation were some of the complications observed [13]. This observation is similar to that reported in Ibadan where maiden endourological procedures were restricted to the lower urinary tract, and complications were limited to the same anatomic region [14].

Ureteric injury is a potential complication of any abdominal or pelvic operation; its incidence is 0.5 to 1%. Gynaecological surgery has traditionally accounted for more than 50% of all injuries [15]. Another common cause of iatrogenic injuries found in this study was the complications caused by obstetrical and gynaecological procedures. Most of the injuries occurred following hysterectomies and caesarean hysterectomies. This observation was reported elsewhere [16, 17]. Bladder injuries were underreported in the present study because only cases where the urologist was involved in their management were included [18].

Laparoscopy may also contribute to ureteric injuries [19]. However, in our centre, this procedure has only just begun to be performed.

Domestic accidents were responsible for most of the cases of penile fracture. The events leading to penile fractures were sexual intercourse, forceful bending of the phallus and rolling on the bed, which were reported in previous studies [20,21,22].

Urban civilian violence, cultism and armed robberies were reported as the reasons for injuries in this region [23]. Of these injuries, most were caused by gun shots and insertions of foreign bodies into the urethra.

Domestic violence has become increasingly recognised as a public health problem. It is a

globally underreported phenomenon. Common sites of abuse include the breasts, the gravid uterus and the genitals [24]. In one of the patients during a verbal altercation, a spouse pulled on her husband's scrotal sac, which caused a hematoma. This trend warrants psychological research based on Freudian concepts of penis envy [25].

Penile fractures have been considered uncommon [10] but are they? Eke reported 1,331 cases described in 183 publications between January 1935 and July 2001 [20]. In 2014, Ekeke reported 21 cases in a single institution within an eight-year period [21]. In this study, penile fractures accounted for 35 cases, which indicate an increase in this type of injury.

Because of the absence of a national database of injuries, hospital-based data are important means of collection. Although a limitation of retrospective studies is that data are restricted to previous records, in many situations, they are the only means available.

Although circumcision-related injuries were initially common, they were absent in the data used in our study. We believe that these injuries still occur, but they are managed mainly by the very active paediatric surgery unit of our hospital.

The deaths of three patients could have been prevented if they had presented early. One died from overwhelming sepsis. Another died from an acute kidney injury after a bilateral ureteric ligation. The other died from multiple injuries that affected the kidney, intestines and thigh following a gun-shot. In two patients, testes were lost because of the severity of the injuries (avulsion and crushing). One patient who had a penile fracture repaired developed chordee but was not interested in further corrections. The chordee and erectile dysfunction observed in this study are known complications of penile fractures [26]. Re-stricture reported by our patients has been documented in another study [27]. The two patients who amputated their penises were referred to the psychiatrist for further treatment after their proximal penile shafts were reconstructed. Satisfactory outcomes were recorded in the majority of our patients.

5. CONCLUSION

The results of our study showed that young men are the most commonly involved in genitourinary injuries in our region. In addition, the results

showed that injuries associated with civilian violence, domestic accidents and iatrogenic injuries are increasing in our region. The pattern of presentation of genitourinary injuries seems to reflect the social changes occurring within this geographical region. The learning curve associated with the acceptance of current medical techniques, civilian violence, and sexual permissiveness may account for this trend. The training and education of citizens and medical personnel could be implemented to curtail this trend.

CONSENT

It is not applicable.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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