

ORIGINAL ARTICLES**THE PATTERN, MANAGEMENT AND OUTCOME OF GENITOURINARY TRAUMA IN GHANA****Mante S D¹, Yeboah E D², Klufio G O², Gepi Atee S², Mensah J E², Kyei M², Darko R³, Adusei B¹, Yegbe PK¹**¹Department of Urology, 37 Military Hospital, Accra, ²Department of Urology, Korle-Bu Teaching Hospital, Accra, ³Department of General Surgery, Korle-Bu Teaching Hospital, Accra**Abstract**

Objectives: This is to review the pattern of causes, management and outcome of genitourinary (GU) injuries managed at the Korle Bu and the 37 Military Teaching Hospitals from 1978 to 2010.

Patients and Methods: Prospectively cases of genitourinary trauma from 1978 to 2010 were studied at the Korle Bu and 37 Military Teaching Hospitals. Patient history and clinical examination was taken and classified into haemodynamically stable or unstable condition. Stable patients were admitted and investigated whilst unstable patients were stabilised and operated. Investigations were based on the injuries sustained and included a full blood count, plain and contrast radiological investigations and computerised tomography.

Results: A total of 523 cases (460 cases from Korle Bu teaching hospital from 1978 to 2001 and 63 cases from 37 Military Hospital from 2001 to 2010) were managed made up of 412 males (78.8%) and 111 females (21.2%) with a male to female ratio of 4 to 1.

The youngest was 4 years and the oldest was 64 years. Sites affected included 38 renal (7.3%), 63 ureteral (12.1%), 109 bladder (20.8%), 233 urethral (44.6%) and 54 external genital (10.3%). Causes included road traffic accidents (49.5%), industrial accidents (0.77%), falls (16.8%), high (1.15%) and low (2.7%) velocity injuries, bites (0.57%), iatrogenic (23.71%) and idiopathic (0.2%). Presentation included haematuria (80%), urinary retention (8%), anuria plus abdominal pain/peritonitis (10%) and 2% with peritonitis.

Management was 57 (10.8%) conservative and 466 (89.2%) operative. Outcome was 462 (88.3%) recovery, 47 (8.9%) with complications and 14 (2.64%) deaths.

Conclusion: Commonest causes of Genitourinary injuries in Ghana include Road traffic accidents 259(49.5%), Iatrogenic causes 124 (23.7%) and Falls 88 (16.8%). Early intervention in unstable patients prevents mortality.

Key words: Genitourinary trauma, Road traffic, Industrial, Iatrogenic, Blunt, Penetrating.

Introduction

Genitourinary injuries account for <5% of all trauma patients and 10% of patients who sustain penetrating injury. About 80% of all urological injuries involve the kidneys and 90% of these are blunt injuries. Conservative management is successful in treating the vast majority of genitourinary injuries.^{1,2}

Renal injuries are most commonly from motor vehicle accidents (MVAs). Renal injuries occur in 3% of patients hospitalized with trauma and in 10% of patients with abdominal trauma. Most renal injuries (80%) are minor and do not require surgical intervention.^{3,4}

Iatrogenic ureteral injuries are much more frequent than those due to external trauma. A high incidence of associated organ injuries with ureteral injuries exists (90% in gunshot wounds, 60% in stabbings).

Most bladder injuries occur in association with blunt trauma. Eighty-five per cent of these injuries occur with pelvic fractures, with the remaining 15% occurring with penetrating trauma and blunt mechanism not associated with a pelvic fracture (i.e. full bladder blowout).⁵

Injuries to the posterior urethra are mostly secondary to pelvic fractures, while injuries to the anterior urethra are caused by straddle injuries (e.g., bicycles, skateboards) or penetrating (often self-inflicted) injuries. Urethral injuries from trauma constitute only 10% of all GU injuries, with iatrogenic aetiology constituting a significant fraction of all urethral injuries.^{6,7}

Injuries to the external genitalia (i.e. the penis, scrotum, testis and vulva) are usually secondary to injuries caused by penetration, blunt trauma, continence - or sexual pleasure - enhancing devices, and mutilation (self-inflicted or otherwise).⁸ The objectives

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of this study is to review the pattern of causes, management and outcome of genitourinary(GU) injuries managed at the Korle-Bu and the 37 Military Teaching Hospitals from 1978 to 2010.

Patients and Methods

This was a prospective study of consecutive cases of genitourinary trauma from January 1978 to December 2010. All patients admitted at the surgical trauma emergency and accident centre were fully clerked and classified into stable or unstable in terms of haemodynamic status. Stable patients were admitted to the wards and investigated based on the injuries sustained which included a full blood count, plain and contrast radiological investigations and computerised tomography. Those very unstable were stabilised and sent to the theatre for urgent surgery.

Results

A total of 523 trauma cases were managed throughout the period. This was made up of 412 males (78.8%) and 111 females (21.2%) with a male to female ratio of 4 to 1. The youngest was 4 years of age and the oldest was 64years of age. 259 (49.5%) of the cases occurred from road traffic accidents, followed by 124 (23.7%) iatrogenic causes and 88(16.8%) caused by falls (Table 1). 233 (44.6%) of the injuries were urethral, 109 (20.8%) bladder, 63 (12.1 %) ureteral, 54 (10.3%) external genital and 38 (7.3%) renal (Table 2).

Table 1: Mechanism of Injury

Mechanism of Injury	Number	%
Road traffic accidents	259	49.5
Falls	88	16.8
Industrial accident	4	0.77
Bites (Human and dog)	3	0.57
Self-Inflicted	15	2.9
High Velocity Injuries	6	1.15
Low Velocity Injuries	14	2.7
Sports	9	1.7
Iatrogenic	124	23.71
Idiopathic	1	0.2
TOTAL	523	100

Table 2: Site of Injury

Site of Injury	Number	%
Renal	38	7.3
Ureteral	63	12.1
Bladder	109	20.8
Urethral	233	44.6
External Genital	54	10.3
Vaginal Fistula	26	4.9
TOTAL	523	100

Haematuria (80%) was the hallmark of symptoms in most cases of genitourinary trauma usually associated with urinary retention (8%), anuria with peritonitis (10%), and peritonitis only (2%).

Mild to moderate renal injuries 14/38 (2.7%) were managed conservatively usually monitoring serial urine collections for clearance or increase of haematuria. 7 (1.3%) of the moderate to severe renal injuries were managed by laparotomy and repair of the kidneys. 17 (3.3%) of severe renal injuries (Figure 1) were managed by partial or total nephrectomy. 24 (4.6%) of the ureteric injuries were bilateral ligations of ureters with anuria and were managed by dialysis and ureteroneocystostomy +/- bilateral ureteric stents. 24 (4.6%) of the ureteric injuries were managed by ureteroneocystostomy whilst 39 (7.5%) Uretero vaginal fistulae were managed by ureteroneocystostomy with Boari flap and or psoas hitch. 39 (7.5%) were uretero-vaginal fistulae.



Figure 1: Nephrectomy Specimen from Gun Shot

Causes of ureteric injuries were mainly from unilateral or bilateral ligation after hysterectomy (Table 3). There were 109 (20.8%) bladder trauma cases and these included 36 (6.8%) cases of contusion which were managed conservatively. 26 (4.97%) were cases of intraperitoneal rupture which were managed by laparotomy and bladder repair whilst 47 (8.98%) which were cases of extraperitoneal rupture were managed by extraperitoneal bladder exploration and bladder repair.

Table 3: Aetiology of Iatrogenic Injuries in Females

Procedure	Number	%
Hysterectomy	64	12.2
Caesarian Section	2	0.38
Forceps Delivery	5	0.96
Hair fastener in bladder / FNAC of Wilms Tumour	3	0.6
Wertheims hysterectomy	15	2.9
Total	89	17.01

Of the 233 (44.6%) cases of urethral injuries, 7 (1.3%) were cases of contusion and 131 (25%) were incomplete ruptures which were managed by suprapubic cystostomy and suprapubic catheterization. 32 (6.2%) of the 131 (25%) incomplete ruptures recovered without any residual stricture whilst 99 (18.9%) cases developed urethral strictures. 38 (7.3%) cases were managed by urethroplasty (anastomotic, substitutional or staged) and 61 (11.7%) were managed by direct vision internal urethrotomy. 95 (18.2%) of the urethral injuries were complete ruptures which were managed initially by open suprapubic cystostomy and reviewed in 4-6 weeks by a combination of retrograde urethrogram and voiding cystourethrograms and eventually managed by urethroplasty (anastomotic, substitutional or staged) (Table 4). In all 133 (25.4%) were managed by Urethroplasty. Short complete urethral strictures (1-2cm) were managed by anastomotic urethroplasty, long complete urethral strictures (3-4cm) were managed by substitutional urethroplasty and long multiple urethral strictures (>5cm) were managed by staged urethroplasty (Table 5).

Table 4: Aetiology of Iatrogenic Injuries in Males

Procedure	Number	%
Bouginage	6	1.15
Retraction of Prepuce	5	0.96
Prostatectomy	3	0.6
Catheterisation (Catheter Introducer)	4	0.76
Herniorrhaphy	6	1.15
Circumcision	9	1.7
Ritual Practice	1	0.19
Swensons Procedure (For Hirschsprungs Dx)	1	0.19
TOTAL	35	6.7

Table 5: Types of Iatrogenic Injuries in Males

Injury	Number	%
Ruptured Urethra	9	1.7
Prostatic middle lobe rupture	1	0.19
Urethro cutaneousFistula	9	1.7
Vesicocutaneous fistula	3	0.6
Paraphimosis	5	0.96
Bilateral Vas Ligation	4	0.76
Prostatourethrorectal fistula	2	0.38
Urethral Stricture	2	0.38
TOTAL	35	6.7

External genital injuries were 54(10.3%). 20 (3.8%) penile, 25 (4.8%) scrotal (Figure 2) and 9 (1.7%) testicular injuries. 25 (4.8%) mainly abrasions were managed by wound dressing, 5 (0.95%) with non-viable testis were managed by orchidectomy and 24

(4.6%) mainly lacerations were managed by debridement and suturing.



Figure 2: External Genital injury from sports injury

Complications included Hypertension 4 (0.8%), Urinoma 2 (0.4%) and Hydronephrosis 4 (0.8%) for renal trauma as a result of repair of low grade kidney injuries and Urethrocutaneous fistulae 11 (2%) and Restricturing 26 (5%) for urethral trauma after all types of urethroplasty. 10 (1.9%) mortality rate was from renal trauma, urethral trauma 2 (0.38%) and bladder trauma 2 (0.38%) usually with associated injuries such as rib injuries with respiratory difficulty 5 (0.96%), diaphragmatic ruptures 2 (0.38%), head and neurological injuries and other associated visceral injuries (Table 6).

Table 6: Associated Injuries

Sites of injury	Number	%
Chest Injuries	5	0.96
Pelvic Fractures	63	12
Femur Fractures	5	0.96
Bowel trauma	4	0.76
Diaphragmatic tears	2	0.38

Discussion

Renal trauma occurs commonly in young males with the mean age between 20-30 years.⁹ The vast majority of renal injuries in young men and children result from blunt trauma although there are some geographical variations.^{10,11,12} Motor vehicle crashes and falls account for most kidney trauma in the developed world¹³. However penetrating mechanisms occur in 4.6-87% and are much more likely to cause severe renal injuries requiring operative intervention and nephrectomy.^{11,13,14}

Haematuria (microscopic/macrosopic) is the hallmark for injury to the genitourinary system¹⁵. However the amount of haematuria does not necessarily correspond to injury severity.¹⁶ When blunt or penetrating injuries cause massive haemorrhage and require immediate laparotomy, CT may not be possible so intraoperative one shot IVU, in conjunction with find-

ings at laparotomy can be used to exclude life threatening renal injury and confirm the existence of a contralateral functioning kidney.¹⁷ Selection of patients for surgery is indicated in those patients with clinical signs of shock, expanding haematoma, decreasing haemoglobin level during observation and radiological signs of extravasation, non-function, delayed excretion or hydroureteronephrosis from blood clots.¹⁸ The incidence of iatrogenic ureteric injury is 0.5%-30% depending on the experience of the Surgeon and the technical difficulty of the procedure. In our report ureteric injuries constituted 4.6% with majority due to iatrogenic causes. Iatrogenic Ureteric Injuries in this study occurred mainly as a result of hysterectomies done. These could have been prevented if Obstetrician Gynaecologists are well oriented in the anatomy and exposure of the ureter during surgery. Urinary tract injuries from blunt or penetrating trauma constitute only 10% of all genitourinary injuries, with iatrogenic etiology constituting a significant fraction.^{19, 20} Urethrography is the investigation of choice if a urethral injury is suspected.²¹ Immediate repairs give a high incidence of impotence from damage to the cavernosal nerves and vessels. Delayed urethral repairs using a one stage perineal anastomotic urethroplasty give excellent results. A delayed repair gives a restenosis rate of 12% at 10yrs²² and the risk of complications such as impotence or incontinence occurring as a consequence of the surgery in experienced hands is low.²³ In our report urethral injuries (44.6%) were the most common. Bladder injuries occur in 1.6% of blunt abdominal trauma cases.²⁴ Eighty percent of bladder injuries are associated with pelvic fracture and 5.7% of patients with pelvic fracture sustain a bladder injury. Combined urethral and bladder rupture is present in 15% of cases.²⁵ The percentage of penetrating bladder injuries in different series varies according to the patient population included in each study and is 0-45%. Such injury is reported to be present in 3.6% abdominal gunshot wounds,²⁶ 13% in penetrating injuries to the rectum²⁷ and 20% of penetrating injuries to the buttock. Gross haematuria is the cardinal sign associated with intraperitoneal and extraperitoneal bladder ruptures. When present no other laboratory testing is needed except in the setting of delayed or missed diagnosis. Operative exploration plus mini laparotomy and repair is the standard approach to managing penetrating injury to the bladder.²⁷ Up to 85% of testicular injuries are a result of blunt trauma.²⁸ Hematoceles, in which blood accumulates in the space between the tunica albuginea and the tunica vaginalis and hydroceles can be the result of trauma. Traumatically induced testicular torsion is another well recognized entity. When testicular rupture is suspected prompt surgical intervention is advised in an effort to avoid untoward outcomes such as testicular loss, infection, chronic pain, infertility etc. McCormick *et al.* reported the value of early exploration and repair to reduce complications and hospitalisation,²⁹ and Gross

reported that the probability of testicular salvage after blunt trauma decreased from 80% to 32% if the exploration is delayed by more than 3 days.

Outcome was 462 (88.3%) recovery, 47 (8.9%) with complications and 14 (2.64%) deaths. Lessons learnt in this study include early haemodynamic assessment and rapid intervention in unstable patients in order to prevent morbidity and mortality.

Conclusion

Commonest causes of Genitourinary injuries in Ghana include Road traffic accidents 259 (49.5%), Iatrogenic causes 124 (23.7%) and Falls 88 (16.8%). Lessons learnt in this study include early haemodynamic assessment and rapid intervention in unstable patients in order to prevent morbidity and mortality. In this study complications were 47 (8.9%) and mortality was 14 (2.64%). Causes of morbidity and mortality include delayed intervention in unstable patients, haemorrhage, anaemia and infection. Preventive measures include enforcing road traffic laws and training of staff in hospitals.

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