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Genitourinary Tract Injuries: Presentation And Management.

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Abstract:
Background*: Traumatic injury of different organs is the principal public health problem in every country regardless of the level of socioeconomic development. The genitourinary tract is involved in 10% of traumatic injuries, many of which are subtle and difficult to define and diagnose.*
Aim*: To study the different types of Genitourinary Tract Injuries, its presentation and management.*
Material and methods: This is a hospital based prospective, analytic, clinical study conducted in the Department of General Surgery, Assam Medical College & Hospital(AMCH), Dibrugarh, India from September 2017 to march 2019.The study was based on 45 cases of genitourinary tract injuries, which where clinically diagnosed and investigated by Ultrasonography, Computerized Tomography (CT), cystoscopy, retrograde urethrography(RGU) or intravenous pyelogram (IVP) wherever necessary for confirmation and proper staging and managed accordingly after resuscitation (if needed) .
Results*: njuries was caused by blunt trauma (91.11%) and penetrating trauma (8.89%). Patients presented with haematuria and pain abdomen in 91.11% and 88.88% respectively. Kidney was the most commonly injured organ (71.11%) followed by urinary bladder (13.33%). Majority of the patients (39 cases-86.67%) consisting of renal injury (31), bladder injury (4), urethral injury (3) and external genital injury (1) were managed conservatively. Rest 6 cases (13.33%) with renal injury (1), bladder injury (2) and external genital injury (3) underwent surgical management.*
Conclusion*: The study suggested that blunt trauma was most common cause of genitourinary injury. Proper history, clinical examination and judicious use of radiological investigations help in early diagnosis and staging of the disease for better outcome before embarking upon a definitive procedure. The most common presenting feature in all the cases was haematuria which was followed by pain abdomen. Ultrasonogarphy although with its limitations for diagnosis of renal parenchymal injury was the initial radiological investigation. CT (contrast enhanced) was done in all cases of abdominal injury for confirming the diagnosis. Majority of the cases were treated conservatively without surgical intervention.*
Keywords*: Renal injury, bladder injury, cystoscopy.*

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I. Introduction

Traumatic injury of different organs is the principal public health problem in every country regardless of the level of socioeconomic development. Every year, worldwide trauma causes death to around 5 million people and disability to millions more[1]. The genitourinary tract is involved in 10% of traumatic injuries, many of which are subtle and difficult to define and diagnose[2]. With the development in trauma care systems and centers and better technology of investigations, death rates have declined significantly over past 20 years.

The kidneys are the most common among the genitourinary organs to be injured by external trauma. Ureteric injuries are rare consisting of less than 1% of genitourinary tract injuries, majority of which are iatrogenic, which are managed surgically[3]. Injuries to the lower genitourinary tract alone are not life threatening, but their association with other potentially more significant injuries necessitates an organized approach to diagnosis and management. The urinary bladder is well protected by its deep location in the bony pelvis because of which majority of urinary bladder injuries due to external blunt trauma are associated with fracture of the pelvic bones. Traumatic injuries to the penis and scrotum are uncommon due to their mobility. Phallic injury is usually of concern only with an erect penis resulting in fracture of tunica albuginea which is typically associated with vigorous sexual intercourse or practice like *"taghaandan"*[4].

II. Material And Methods

This hospital based prospective, analytic, clinical study was conducted in the Department of General Surgery, Assam Medical College & Hospital (AMCH), Dibrugarh, India from September 2017 to march 2019.The study included 45 cases of genitourinary tract injuries, which where clinically diagnosed and

investigated by Ultrasonography, Computerized Tomography (CT), cystoscopy, retrograde urethrography (RGU) or intravenous pyelogram (IVP) wherever necessary for confirmation and proper staging and managed accordingly after resuscitation (if needed).

Study design: hospital based prospective observational study

Study location: This study done in Department of General Surgery, AMCH, Dibrugarh, Assam, India.

Study duration: September 2017 to march 2019.

Sample size: 45 patients.

Inclusion criteria: All patients with clinically confirmed Genitourinary Tract Injuries.

Patients with clinical suspicions of Genitourinary Tract Injuries, confirmed radiologically.

Exclusion criteria: Patients below 12 years of age. Patients not giving consent. Patients with catheter induced injury.

Procedure methodology: The study population was drawn from patients who presented to Department of surgery, AMCH with history of trauma. Data was collected by obtaining a detailed history, thorough clinical examination. After initial resuscitation of the patients, thorough assessments from head to toe for injuries were carried out in all the patients. Relevant diagnostic investigations were done where necessary. Initially with ultrasonography and once patient stabilized then with gold standard investigation CT abdomen.

Documentation of patients, which included, identification, demographic data including the age, sex, occupation and nature and time of accident leading to the injury, history, clinical findings, written informed consent, diagnostic test, operative procedures and findings , complications during the stay in the hospital and during subsequent follow-up period of 3 months, were recorded on the proforma specially prepared.

The management depends upon the stage of the disease for each organs of genitourinary tract and associated injuries. The management of associated non-genitourinary tract injuries if any was managed as per standard protocol for the concerned organ.

Statistical analysis: All data has been compiled and analyzed using SPSS version 25.

III. Result

The highest number of cases was found in the age group of 21—30 years, followed by the age group of 31—40 years. The mean age incidence for genitourinary tract injuries in the present study is 31.6 years. The present study reveals a male preponderance with 77.78% against female patients 22.22%.kidney was found to be most commonly injured organ, 71.11% of total cases (table-1). Kidney injuries were seen in 3 cases of penetrating trauma.

Genitourinary organ involved	N	%
Kidney	32	71.11
Ureter	0	0.00
Urinary Bladder	6	13.33
Urethra	3	6.67
External Genitalia	4	8.89
TOTAL	45	100.00

TABLE–1: Relative frequency of different genitourinary organs injuries in the present series.

Associated non genitourinary injuries were noticed in 34 cases out of the total 45 cases in the present study. Associated non genitourinary injuries to abdominal viscera like the bowel, liver, spleen, and pelvis was observed in 24 cases. Other associated non genitourinary injuries observed in the present study were craniocerebral injuries and chest injuries consisting of 10 cases,

In the present series, 41 cases of blunt trauma (91.11%) and 4 cases of penetrating trauma (8.89%) of genitourinary organs were observed due different modes of injury (table-2).

Types of Injury	N	%	Kidney	Bladder	Urethra	External Genital
Blunt	41	91.11	29	5	3	4
Penetrating	4	8.89	3	1	-	-
TOTAL	45	100.00	32	6	3	4

TABLE–2: Types of trauma in relation to the number of patients in the present series.

RTA was the commonest mode of injury consisting of 23 cases followed by fall from height and sports related injuries consisting of 7 cases each.

PRESENTATION	N	%	Kidney	Bladder	Urethra	External Genital
Haematuria	41	91.11%	32	6	3	-
Pain abdomen	40	88.88%	32	6	-	2
Suprapubic pain	6	13.33%	-	6	-	-
Dysuria	5	11.11%	-	-	3	2
Acute Retention of Urine	5	11.11	-	5	-	-

TABLE-3: Clinical presentation of genitourinary organs injuries in the study series.

Haematuria was the commonest presenting symptom and was complained by 41 cases (91.11%) in the present study. Pain abdomen is the second common presenting feature manifested by 40 cases (88.88%) in the present series.

The patients were subjected to resuscitative measures based on severity of the injuries. Intravenous fluid and blood transfusion was administered according to the demand of the situation. Other measures like nasogastric aspiration, analgesics, and antibiotics were started as and when required. Definitive management of the genitourinary injuries started after initial resuscitation based on stage of the injury and associated injuries.

Majority of the patients 39 cases (86.67%) consisting of 31 renal injury, 4 bladder injury, 3 urethral injury and a single case of external genital injury were managed conservatively. Rest 6 cases (13.33%), which include single renal injury, 2 bladder injuries and 3 external genital injuries, underwent surgical management.

During follow up of the patients for genitourinary organs injuries, complications were observed in 4 cases (8.89%) out of 45 patients in the present series constituting 1 case of Delayed bleeding and 1 case of Urinoma in two of the grade II renal laceration case, 1 case of Clot retention in bladder injury and a single case of Painful erection with curved penis in penile fracture case.

IV. Discussion

The study has shown that genitourinary tract injuries are diseases of the young with a mean age of 31.6 years. It affects predominantly male. Anselmo da Costa I et al (2015) for renal injuries found mean age of 30.8 years which is comparable with the present study [5]. In the present series, 91.11% cases and 8.89% cases presented with blunt trauma and penetrating trauma respectively. Baverstock K et al showed in 2001 showed that blunt trauma and penetrating trauma was found in 93.4% and 6.6% [6]. 51.11% of injuries were caused by RTA which was comparable to data given by Voelzke BB and Leddy L et al (2014) showing vehicle collision in 63% [7]. In the present study, the most common organ injured was kidney (71.11%) and least common was urethra (6.67%) which is similar to study conducted by Paparel P et al (2006) in which kidney was injured in 65% and urethra in 2%[8]. Haematuria (91.11%) was the most common presenting feature which was comparable with the study of Brandes SB et al (1999), Carroll PR et al (1990), Mendez R (1977) for haematuria in renal trauma, concluding that haematuria is a very common sign of injury to genitourinary tract [9, 10, 11].

Out of total 45 patients, 39 were treated conservatively (86.67%). Majority of renal injury cases (96.87%), 31 out of 32 cases were managed conservatively. In the study group there were 29 cases (90.62%) of Grade I, 2 cases (6.25%) of Grade II and a single case (3.12%) of Grade III were found among 32 cases of renal injuries. Except for the Grade III renal laceration with concomitant splenic injury and hemodynamic instability, all other renal cases were managed conservatively. The above results of renal injury are comparable with the studies conducted by, *Dayal M et al (2013*) who concluded that most common grade of renal injuries, grade 1 constituting 75%–85% , in most cases are generally managed conservatively [12] and. *Min A Lee et al (2017)* who showed that majority of blunt renal injuries are low grade and 80-85% of these injuries can be managed conservatively [13].

Of the 6 urinary bladder injury 4 extra-peritoneal bladder injury(66.67% of total bladder injury) patients were managed conservatively with urinary diversion and rest of the 2 cases (intraperitoneal injury) were managed by early surgical intervention (repair of bladder with 2 layers absorbable suture). The findings and management of bladder injury is comparable with *Lumen N et al (2019*) showing intraperitoneal bladder injuries need exploration with surgical repair and urinary diversion until bladder heals. Uncomplicated extra-peritoneal bladder injuries can be managed by urinary diversion only, until spontaneous bladder healing is achieved.

Placement of a suprapubic catheter under echographic or direct vision is always a good solution in the initial management of urethral injury [14]. Intraperitoneal injuries require open repair with two-layer closure using absorbable sutures because of their nonlithogenic property [15]. All penetrating or intraperitoneal injuries resulting from external trauma should be managed by immediate operative repair [16].

All the three urethral injuries and a single case of external genital injury (metallic ring stuck at base of penis) were managed conservatively. *Lumen N et al in a study published in (2019)* found placement of a suprapubic catheter under echographic or direct vision is always a good solution in the initial management of urethral injury [14].

Among the external genital injuries 3 of them (consisting of 1 penile fracture and 2 scrotal injury cases) were repaired at the earliest to have better prognosis which are supported by *El-Taher et al (2004)*[17] *Muentener et al (2004*) [18] who showed Immediate surgical reconstruction results in faster recovery, decreased morbidity, lower complication rates, and lower incidence of long-term penile curvature. *Asgari et al (1996)* said those undergoing repair of penile fracture within 8 hours of injury had significantly better long-term results[19]. *Lumen N et al (2019*) showed early exploration and repair of a testicular rupture are required to salvage the testicle [14]. In the present study only 4 patients (8.88%) had complications like painful erection, clot retention, urinoma and delayed bleeding which were managed accordingly. *Anselmo da Costa I , et al 2015*) showed that extravasation of urine is the most common complication of renal trauma [20].

V. Conclusion

The study has shown that genitourinary tract injuries are diseases of the young age group of age 21—30 years. It affects mainly male. The study suggested that road traffic accident followed by fall from height and sports related incidents had a strong association with the injury.

The presenting symptomatology is variable, but in all patients with suspected genitourinary tract injuries, proper history taking, thorough clinical examinations and judicious use of radiological investigations help in early diagnosis and staging of the disease for better outcome before embarking upon a definitive procedure. The most common presenting feature in all the cases was haematuria which was followed by pain abdomen. The haematuria was mainly associated with pain due to trauma.

Ultrasonogarphy although with its limitations for diagnosis of renal parenchymal injury was the radiological investigation done in all the cases and they helped in the diagnosis and rule out other associated injuries. CT (contrast enhanced) was done in all cases of renal injuries (gold standard for renal injuries) and bladder injury after resuscitation (whenever needed) was done. Cystoscopy examination was done in cases of bladder and urethral injuries.

Of the genitourinary tract injuries, kidney was the commonest organ involved following either blunt or penetrating trauma. Associated injuries to other non genitourinary organs were not rare.

In the present study with the facilities in our set up all cases of renal injuries except one (grade III renal injury with splenic injury and haemodynamically unstable penetrating injury patient) underwent renorrhaphy through abdominal approach.

Extraperitoneal bladder injuries urethral injuries received conservative management by urinary diversion. Single case of ring stuck at base of penis was also managed conservatively.

Intraperitoneal bladder injuries and external genital injuries on the other hand received urgent surgical management after primary resuscitation (if needed).

So from the study it can be concluded that further study of diagnosing, staging technique, longer period of study are required to change the fate of these patients with multiple injuries and comorbid conditions. As such isolated urological injuries are uncommon and all such patients survived. The majority of patients with urological trauma has multiple non genitourinary injuries and requires a multi-disciplinary approach.

Also there should be proper setup and facilities to practice the various advanced technique like angioembolisation for renal injuries. Indeed management of genitourinary tract injuries requires good support, comprehensive management, better judgment and patience on the part of the surgeons while it requires good compliance and self belief and regular follow up on the part of the patients.

Present day the treatment approach for any trauma is organ preservation while keeping in mind the patient safety. The kidney as such has a remarkable ability to heal. The aim of the trauma surgeon in a renal trauma situation is therefore to maintain hemodynamic stability, maintain unobstructed urinary flow, and prevent persistent urinary extravasation.

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