



General Surgery

A COMPREHENSIVE STUDY ON GENITOURINARY TRAUMA IN RGGGH

Dr. S. Balakrishnan	Associate Professor Department Of General Surgery Madras Medical College & Rajiv Gandhi Government General Hospital Chennai
Dr. A. S. Moka Raj*	Post Graduate Department Of General Surgery Madras Medical College & Rajiv Gandhi Government General Hospital Chennai *Corresponding Author
Dr. Senthil. V	Post Graduate Department Of General Surgery Madras Medical College & Rajiv Gandhi Government General Hospital Chennai
Dr. Arunvadhani	Post Graduate Department Of General Surgery Madras Medical College & Rajiv Gandhi Government General Hospital Chennai

KEYWORDS :

INTRODUCTION

Trauma is defined as a physical injury or a wound to living tissue caused by an extrinsic agent. Trauma is the sixth leading cause of death worldwide, accounting for 10% of all mortalities. It accounts for approximately 5 million deaths each year worldwide and causes disability to millions more. Genitourinary trauma accounts for 10% of total trauma victims due to various modes of injury like road traffic accidents, blunt injury, penetrating injury, accidental fall and others. Genitourinary trauma is seen in both sexes and in all age groups, but is more common in males.

A trauma surgeon does the initial evaluation and resuscitation. For that it is important to know about the mechanism of injury, its extent and the methods used in the initial resuscitation process and their success rates.

AIMS AND OBJECTIVES

- To study the clinical and imaging parameters and decide upon the line of management in genitourinary trauma.
- To study the clinical outcome of patients managed conservatively.
- To study the profile of various other associated injuries.
- To study the role of multidisciplinary approach in genitourinary trauma.

MATERIALS AND METHODS

SAMPLE SIZE : 30 cases

STUDY DESIGN : Observational study (Prospective & Retrospective)

STUDY POPULATION : 30 cases

STUDY PERIOD : Oct 2016 to Sep 2017

STUDY CENTRE : Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai

SUBJECT SELECTION :

INCLUSION CRITERIA:

All trauma victims sustaining blunt and penetrating trauma to the genitourinary system with or without associated injuries.

EXCLUSION CRITERIA:

- Abdominal trauma to all visceral and solid organs without injury to the genitourinary organs.
- All children less than 13 years of age

ASSESSMENT OF PARAMETERS :

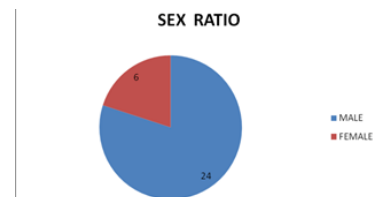
All patients who fit the inclusion criteria were observed and following data collected

- Routine blood investigations
 - Hemoglobin
 - Hematocrit
 - Renal function test

All these will be done serially

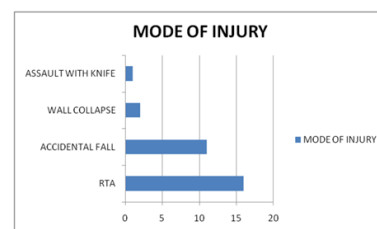
- FAST
- CECT Abdomen and Pelvis/KUB (i.v. contrast) for all cases, CT cystogram with delayed films and CT Pelvis in some cases.
- AAST grading system will be the standard methodology to assess severity of kidney injury.
- Patients managed conservatively will be followed up prospectively and till discharge and further.
- Specialist opinion like vascular, urology and surgical gastroenterology and orthopedics.

All collected data will be analysed and conclusions derived

DATA ANALYSIS AND RESULTS
OVERALL SEX RATIO

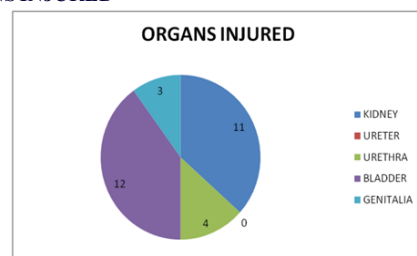
In our study, in a total population of 30 patients, 24 (80%) were males and 6 (20%) were females.

MODE OF INJURY



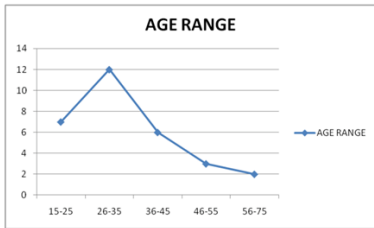
Out of 30 patients in our study, 16 were due to road traffic accidents (RTA) (53.3%), 11 due to accidental fall (36.6%), 2 due to wall collapse (6.66%) and one due to assault with knife (3.33)

ORGANS INJURED

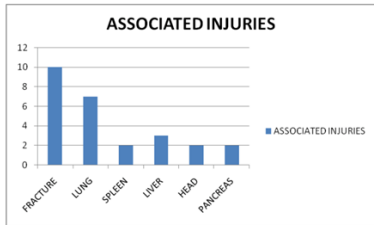


Bladder is the most common organ injured (40%) in about 12 patients and the next organ is kidney in about 11 patients (36.6). Urethra was injured in about 4 patients (13.3%) and genitalia in about 3 (10%). No cases of ureter injury in the study sample.

AGE RANGE



ASSOCIATED INJURIES



FRACTURES

The most common associated injuries in genitourinary trauma are fractures especially pelvic fractures.

The most common pelvic fracture is inferior pubic ramus fracture . D12 burst fracture in one case and transverse process of L5 in another case has been observed.

LUNG

Lung injury was present in about 7 patients. Most common lung injury is Left Pneumothorax in about 3 patients Bilateral hemothorax - 1 case Lung contusion-1 case Rib fracture-1 case

LIVER

Liver injury was present in 3 cases. Grade 2,3 and 4 in each case

SPLEEN

Splenic injury was present in 2 cases.

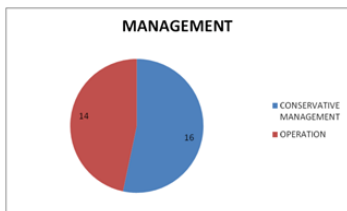
HEAD

Head injury was present in 2 cases. Both were thin SDH managed conservatively

PANCREAS

Distal pancreatic disruption was present in 2 cases.

MANAGEMENT



- Of the 30 patients with genitourinary trauma, 16 were managed conservatively (53.33%) and 14 were operated (46.66%)
- Of the 30 patients who had genitourinary trauma 28 survived (93.33%) and 2 patients expired (6.66%)

RENAL INJURY

SEX	COUNT	PERCENTAGE
MALE	8	72.7%
FEMALE	3	27.27%

Out of 30 patients, 11 had injury to kidney (36.6%). Among them 8 were males (72.71%) and 3 were females (27.27%).

MODE OF INJURY	COUNT	PERCENTAGE
RTA	8	72.72%
ACCIDENTAL FALL	2	18.18%
WALL COLLAPSE	1	9.09%
IATROGENIC	0	0
ASSAULT WITH KNIFE	0	0

Road Traffic Accident was the most common mode of injury in patients with renal injury i.e 8 patients (72.72%) followed by accidental fall in about 2 patients (18.18%) and wall collapse in 1 patient (9.09%).

MANAGEMENT	COUNT	PERCENTAGE
CONSERVATIVE MANAGEMENT	9	81.81%
OPERATION	2	18.18%

All the patients were received in our emergency trauma ward. Basic investigations along with FAST, CECT abdomen and pelvis and CT cystogram with delayed films done for all patients. Out of 11 patients with renal injury, 9 were managed conservatively (81.81%). Only 2 patients were taken for emergency surgery. Both the patients had distal pancreatic injury . 1 patient had grade -3 renal injury and another patient had grade-4 renal injury. Both were taken for emergency laparotomy and proceeded with left nephrectomy, distal pancreatectomy with splenectomy with the help of SGE and Urology team. Post operative period was uneventful. The most common associated injury with renal trauma is injury to lungs.

PROGNOSIS	COUNT	PERCENTAGE
ALIVE	9	81.81%
EXPIRED	2	18.18%

Out of 11 patients, 2 expired (18.18%). Both were hemodynamically unstable at the time of admission and was resuscitated with i.v fluids and blood products . both had multiple associated injuries and expired within 24hrs of admission.

BLADDER INJURY

SEX	COUNT	PERCENTAGE
MALE	9	75%
FEMALE	3	25%

In our study bladder is the most common organ to be injured in about 12 patients out of 30 (40%). Out of 12 patients, 9 were male (75%) and 3 were female (25%).

MODE OF INJURY	COUNT	PERCENTAGE
RTA	6	50%
ACCIDENTAL FALL	4	33.33%
WALL COLLAPSE	1	8.33%
ASSAULT WITH KNIFE	1	8.33%

Road Traffic Accident was the mode of injury in about 6 patients (50%) followed by Accidental Fall in 4 patients (33.33%), Wall collapse in 1 patient (8.333%) and Assault with knife in 1 patient (8.33%).

MANAGEMENT	COUNT	PERCENTAGE
CONSERVATIVE MANAGEMENT	3	25%
OPERATION	9	75%

Out of 12 patients, 9 had intraperitoneal bladder injury (75%). All 9 patients were subjected to basic investigations and CT cystourethrogram with delayed films. All 9 patients were taken for emergency laparotomy and primary bladder repair with supra pubic cystostomy.

3 patients (25%) had extra peritoneal bladder injury. All 3 were managed conservatively and discharged. The most common associated trauma with bladder injury is pelvic fracture.

PROGNOSIS	COUNT	PERCENTAGE
ALIVE	12	100%
EXPIRED	0	0%

All patients were discharged with the mean hospital stay of 15 days.

URETHRAL INJURY

SEX	COUNT	PERCENTAGE
MALE	4	100%
FEMALE	0	0%

Out of 30 patients 4, had urethral injury (13.3%). All 4 patients were males (100%).

mode of injury	count	percentage
RTA	0	0%
ACCIDENTAL FALL	4	100%
WALL COLLAPSE	0	0%
IATROGENIC	0	0%
ASSULT WITH KNIFE	0	0%

All the injuries were due to Accidental Fall.

MANAGEMENT	COUNT	PERCENTAGE
CONSERVATIVE MANAGEMENT	4	100%
OPERATION	0	0%

All 4 presented with hematuria and subjected to CT Cystrourethrogram with delayed films and found to have membranous urethra rupture. All of them were managed conservatively by gentle catheterization.

Out of 4 patients with urethral injury 2 were associated with pelvic fracture.

PROGNOSIS	COUNT	PERCENTAGE
ALIVE	4	100%
EXPIRED	0	0%

All patients were discharged with the mean hospital stay of 14 days.

GENITALIA

SEX	COUNT	PERCENTAGE
MALE	3	100%
FEMALE	0	0%

Out of 30 patients, only 3 were had injury to Genitalia. All 3 were men.

MODE OF INJURY	COUNT	PERCENTAGE
RTA	2	66.66%
ACCIDENTAL FALL	1	33.33%
WALL COLLAPSE	0	0%
IATROGENIC	0	0%
ASSAULT WITH KNIFE	0	0%

Out of 3 patients, 2 had RTA (66.66%) and 1 had due to Accidental fall (33.33%)

MANAGEMENT	COUNT	PERCENTAGE
CONSERVATIVE MANAGEMENT	0	0%
OPERATION	3	100%

All 3 patients were operated. One of the patient had injury scrotum exposing the testis. He underwent left orchidectomy with implantation of right testis in right thigh pouch.

PROGNOSIS	COUNT	PERCENTAGE
ALIVE	3	100%
EXPIRED	0	0%

DISCUSSION

The current study includes, the observation made in 30 cases of Genitourinary trauma patients admitted in our hospital.

AGE DISTRIBUTION

AGE RANGE	AGE RANGE	PERCENTAGE
15-25	7	23.33%
26-35	12	40%

36-45	6	20%
46-55	3	10%
56-75	2	6.66%

In our study, 7 cases were in the age group of 15 – 25 years which accounts for 23.33% of cases, 12 cases were in the age group of 26 – 35 years which accounts for 40% of cases, 6 cases were in the age group of 36 – 45 years and accounts for 20% of cases, 3 cases were in the age group of 46-55 years which accounts for 10% of cases and , 2 cases were in the age group of 56-75 years which accounts for 6.66% of cases.

The male and female ratio was 24: 6 i.e., 80% of cases were male and 20% of cases were female. The increased incidence of male is probably due to the outdoor nature of their occupation and aggressive behavior in male. The age distribution shows that males of age between 26– 35 years exhibit maximal number of cases, which is most commonly due to Road traffic accidents and accounts for 53.3% of cases. Followed by Accidental fall which accounts for 36.66% of cases and Wall collapse this accounts for 6.66% of cases.

Regarding the organs injured in the genitourinary system bladder is most commonly injured organ, this accounts for 40% of cases followed by kidney, Urethra and Genitalia which accounts for 36.3%, 13.3%, 10% respectively.

In this study, all the cases were admitted in our hospital emergency ward within 24 hours of injury. At the time of admission only six cases were hemodynamically unstable, this accounts for 20% of cases. They were managed by resuscitation . These unstable patients were associated with other visceral organ injury and Fractures. The hemodynamically stable patients accounts for 80% of cases. Regarding renal injuries penetrating injury is more dangerous than blunt injury. Hematuria is most common presentation along with peritonitis and hemodynamic instability. Decision to operate is mainly based on clinical signs, X rays, ultrasound and CT scan. CT scan study is most commonly used for diagnosis and contrast CT is to observe the patients those managed conservatively. Our foremost aim in surgery for renal trauma is to preserve as much as renal tissue as possible. Nephrectomy rate in our study was 18.18%.

No case of ureteric injury was found in the study group. But most ureteric injuries are due to iatrogenic trauma most commonly during gynecological procedures. When compared to upper urinary tract injuries lower urinary tract injury is most common due to road traffic accidents which are most commonly associated with pelvic bone fractures. Cystogram is most valuable in diagnosing bladder injury followed by CT cystogram which demonstrates site, size and displacement of the bladder resulting from pelvic hematoma.

Closure of the bladder wall with plain catgut or polyglycolic acid suture material will avoid the risk of phosphate encrustation. In urethral injuries diagnostic catheterization is strongly condemned except single gentle catheterization. Retrograde urethrogram is the safest and simplest procedure to provide a diagnosis of urethral injury. With the development of end viewing endoscope, the approach to investigating rupture of urethra has been completely changed.

Turner and Wardwick recommend complete excision of para urethral fibrosis in initial reconstruction procedures. Opinion differs on the relative merits of repeated urethral dilatation or urethroplasty in the management of urethral strictures. Genital injuries are rare due to its mobility and are most commonly due to RTA followed by Accidental fall in our study.

CONCLUSION

- The most common cause of genitourinary tract injury is due to road traffic accident.
- Similar to many large series males are more often affected by road traffic accident than females due to their outdoor nature of work.
- Middle aged patients are the victims when compared to either extremes of age.
- Most common injury to the genitourinary system is lower urinary tract injury. Among these, bladder injury is most common and it is commonly associated with pelvic bone fracture.

- e. Hemodynamically unstable patients are most commonly associated with other intra abdominal visceral organ or pelvic fractures. Early resuscitation and laparotomy along with methodical exploratory technique is essential for penetrating injuries and blunt injuries.
- f. Renal injuries can be managed conservatively unless associated with other injuries.
- g. Investigations such as X rays and blood tests are only complementary to clinical examination.

REFERENCES

1. Skandalakis^{*} Surgical Anatomy, The Embryologic and Anatomic basis of Modern Surgery.
2. Grays Anatomy for students by Richard L. Drake, Waynevogel, Adam W.M. Mitchell.
3. Campbell's Urology by Walsh, Retik, Vaughan, Wein-Eighth edition.
4. Trauma by Mattox, Feliciano and Moore-Fourth edition.
5. Hinman F Jr : Atlas of urosurgical anatomy, Philadelphia, WB Saunder, 1993.
6. American college of surgeons committee on trauma: Advanced trauma life support for doctors. Chicago, American college of surgeons, 1997.
7. Baker SP, O'Neill B, Ginsburg MJ, et al : Injury Fact Book, 2nd ed. New York, Oxford University Press, 1992.
8. Atala A, Miller FB, Richardson JD, et al: Preliminary vascular control for renal trauma, Surg Gynecol Obstet 1991; 172: 386-390.
9. Bretan PN Jr, Mc Aninch JW, Federle MP, Jeffreg RB Jr: Computerized tomographic staging of renal trauma: 85 consecutive cases. J. Urol 1986; 136: 561-565.
10. Carroll PR, Mc Aninch JW : operative indications in penetrating renal trauma. J Trauma 1985; 25: 587-592.
11. Cass AS : Renovascular injuries from External Trauma. Urol Clin North Am 1989; 16: 213-220.
12. Haas CA, Ditchman KH, Nasrallah PF, Spirmak JP: Traumatic renal artery occlusion : A 15-year review. J Trauma 1998; 45: 557-561.
13. Husmann DA, Morris JS : Attempted nonoperative management of blunt renal lacerations extending through the corticomedullary junction : The short term and long term sequelae. J Urol 1990; 143: 682-685.
14. Knudson MM, Mc Aninch JW, Gomez R, et al : Hematuria as a predictor of abdominal injury after blunt trauma. Am J Surg 1992; 164: 482-486.
15. Armenakas NA : Current methods of diagnosis and management of Ureteral injuries . World J Urol 1999; 17: 78-83.
16. Assimos DG, Patterson LC, Taylor CL : Changing incidence and etiology of iatrogenic Ureteral injuries, J Urol 1994; 152: 2240-2246.
17. Boome TB, Gilling PJ, Husmann DA : Ureteropelvic junction disruption following blunt abdominal trauma. J Urol 1993; 150: 33-36.
18. Morey AF, Iverson AJ, Swan A, et al : bladder rupture after blunt trauma: Guidelines for diagnostic imaging. J Trauma 2001; 51: 683-686.
19. Morey AF, Metro MJ, Carney KJ, et al : Consensus on genitourinary trauma. BJU Int 2004; 94: 507-515.
20. Andrich DE, Mundy AR : The nature of Ureteral injury in cases of pelvic fracture urethral trauma, J Urol 2001; 165: 1492-1465.
21. Lin WW, Kin ED, Quesada ET, et al : Unilateral testicular injury from external trauma : Evaluation of semen quality and endocrine parameters. J Urol 1997; 159: 841, 1997.
22. Gousse AE, Coburn M : Penile injuries : a ten year review. Presented at 1994 Annual meeting of the American Urological Association, San Francisco, CA.