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Original Research Article

Profiles of Lower Urinary Tract Injuries in a Tertiary Care Center

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Abstract

Background: Lower urinary tract comprises of bladder and urethra. Its injury results in long term morbidity. Men are more commonly injured thanfemale. Blunt trauma accounts for 90% of lower urinary tract injuries while penetrating injuries are extremely rare. Iatrogenic injury occurs due to catheterization, post-surgery etc, Lower urinary tract injuries should be diagnosed and treated efficiently to prevent longterm sequeale. As poorly managed patients will be having significant problems and recurring need for further interventions. To a young person, following urethral injury the potential complications of impotence, stricture and incontinence often create life-long morbidity and be a cause of social and psychological concern. In addition to the burden caused by the disease, treatment for lower urinary tract injuriesis associated with complications that further add to the burden of disease.

Aims and Objectives: (1) To identify age, sex, risk factors, nature of injury and clinical presentation of lowerurinary tract injuries among the patients presenting at KRH, Mysore. (2) To evaluate the different treatment modalities available for the management oflower urinary tract injuries.

Materials and methods: The study is conducted on 50 patients who are diagnosed to have lower urinary tract injury. Once admitted detailed history was taken about demographics(age, gender, and religion), history, physical examination, mechanism of injury, type of injury, associated injuries were noted. Following which patients are subjected for routine blood investigations, USG Abdomen and pelvis, X-ray pelvis, retrograde urethrogram and CECT Abdomen as per the need. They were diagnosed and management (conservative or surgical management) was done. Total duration of study and follow up was 1year and 6 months.

Results: After the patients were investigated diagnosis of Stricture urethra was made in 26(52%) of patients. Bladder tear was noted in 7(14%) of patients. Genital tear and Pelvic fracture urethral distraction defects (PFUDD) was seen in 6(12%) and 4(8%) patients respectively. Straddle injury was diagnosed in 3(6%) patients. Constricting ring related injury due to a rubber band around penis was diagnosed in 2(4%) of patients and penile fracture due to trauma and penis amputation also due to trauma was seen in 1(2%) patient each.

Conclusion: In our study non operative management was the predominant form of

management as in 34 (68%) of patients and operative management in form of tissue repair was done in 16 (32%) of patients. While managing lower urinary tract injuries care must be taken, with the goal of optimizing long term sexual, cosmetic and urodynamic outcomes.

Keywords: Bladder, Urethra, Penis, Trauma, Genito-Urinary Tract.

Background

The lower urinary tract comprises of bladder and urethra. Injuries of the lower urinary tract occur in patients with multiple injuries and trauma to the lower abdominal and pelvic region [1]. Lower urinary tract injury, although relatively uncommon, can lead to significant morbidity when diagnosed late or left untreated.

The prognosis for bladder rupture is excellent when treated. Significant intraperitoneal rupture or involvement of the bladder neck mandates surgical repair, whereas smaller extraperitoneal lacerations may be managed with catheterization alone [2].

With the push for management of trauma patients in larger centers, urologists in these hospitals are seeing increasing numbers of lower urinary tract injuries.

The urethral injury is much more common in males, because the female urethra is shorter and more mobile than that of a male and is almost completely protected by the pubic bone [3]. It can cause urinary outflow obstruction, extravasation and secondary sepsis in the acute setting, and can also result in significant morbidity, such as urethral stenosis, ED and urinary incontinence, which can be associated withlifelong disability.

Rupture of the bladder and of the urethra is serious injuries, which, if not recognized or treated adequately, can cause considerable morbidity, even death. The possibility of such injuries should be considered in patients who have lower abdominal trauma, especially in association with a fractured pelvis.

Retrograde urethrography should be done when urethral injury is likely [4]. A properly performed cystogram is reliable in diagnosing bladder rupture, which, with the possible exception of small extraperitoneal tears, should be treated by surgical exploration.

Intraperitoneal ruptures of the urinary bladder always require urgent surgical repair while extraperitoneal ruptures can mostly be managed conservatively with catheter drainage of the bladder. In male patients, any attempt of urethral catheterization which can otherwise make a urethral injury worse should be withheld until adequate urological examinations have led to the diagnosis or exclusion of urethral injury. The definitive surgical repair of a disruption of the male urethra should be undertaken with an interval of weeks to months [5].

For patients with urethral injuries, the management of other life-threatening injuries takes precedence. At places where appropriate facilities, instruments, and expertise for handling urethral injuries is not available, these injuries can best be managed using the Deferred Treatment Policy.

Because most patients with LUT injuries are young, inappropriate treatment and/or delay in management not only leads to low QOL but can also negatively influence social productivity. Early identification and appropriate management are therefore of utmost importance in preventing significant long-term morbidity and providing better QOL outcome.

Aims and Objectives

1. To identify age, sex, risk factors, nature of injury and clinical presentation of lower urinary tract injuries among the patients presenting at KRH, Mysore.
2. To evaluate the different treatment modalities available for the management of lower urinary tract injuries.

Materials and Methods

Method of collection of data

This prospective study was conducted on 50 patients who are diagnosed to have lower urinary tract injury and admitted in KR Hospital, Mysuru. This is hospital is a referral centre for neighbouring 5 districts. Once admitted detailed demographic characteristics (age, sex and religion) and history was taken. Physical examination, mechanism of injury, type and associated injuries were noted.

Following which patients are subjected for routine blood investigations, USG Abdomen and pelvis, X-ray pelvis, retrograde urethrogram and CECT Abdomen as per the need of the case. Later conservative or surgical management was done appropriately.

Inclusion Criteria

1. Patients admitted in K.R. Hospital, Mysuru, between January 2020 to May 2021 and diagnosed to have lower urinary tract injury due to any cause.
2. Patients willing to participate in the study.
3. Subjects of either sex
4. Subjects in the age group 15 - 75yrs

Exclusion Criteria

3. Patients less than 15 years of age.
4. Patients not willing to participate in the study.
5. Patients not willing for any investigations.
6. Sample & Sampling Technique
7. A sample size of 50 cases was selected using random sampling and compared in terms of age, sex, risk factors, nature of injury and clinical presentation and different modalities of treatment.

Results

Age distribution

Mean age of patients presenting with Lower Urinary tract injuries in this cohort is 45.6 ± 18.7 years. The Distribution of different age groups is as depicted below.

Gender distribution

There were 33(66%) males and 17(34%) female subjects in the cohort as depicted below.

Religion

The maximum number of patients in the study belongs to Hindu religion 41(82%). Muslims and Christians constitute 5(10%) and 4(8%) respectively.

Mode of injury

The most common mode of injury to lower urinary tract was due to catheterization as seen in 26(52%) of patients. 6(12%) were as a result of surgical intervention, 13(26%) were secondary to blunt trauma, 5(10%) of injuries were related to road traffic accidents and 2(4%)were as a result of fall from height.

Table 1: Representation of Various Modes of Injury

	RTA	BLUNT Trauma	Surgery	Catheterisation	Total
Number ofpatients	5	13	6	26	50
Percentage	10	26	12	52	100

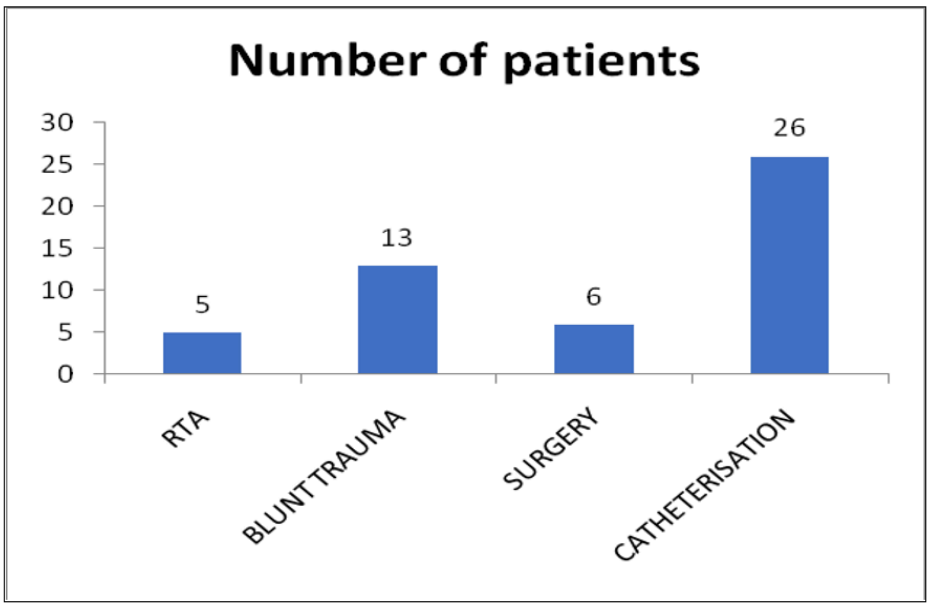

Figure 1: Representation of Various Modes of Injury

Presenting complaints

The patients included in the study had multiple complaints at presentation. Most common complaint was blood in urine in 42 (84%) patients and followed by painful urination which was seen in 15(30%) of patients. Pain abdomen and inability to pass urine was observed in 40(80%) and 37(74%) of patients respectively.

Table 2: Presenting Complaints in Subjects of Study

	Pain abdomen	Blood in urine	Unable to pass urine	Pain during urination
Number of patients	40	42	37	15
Percentage	80	84	74	30

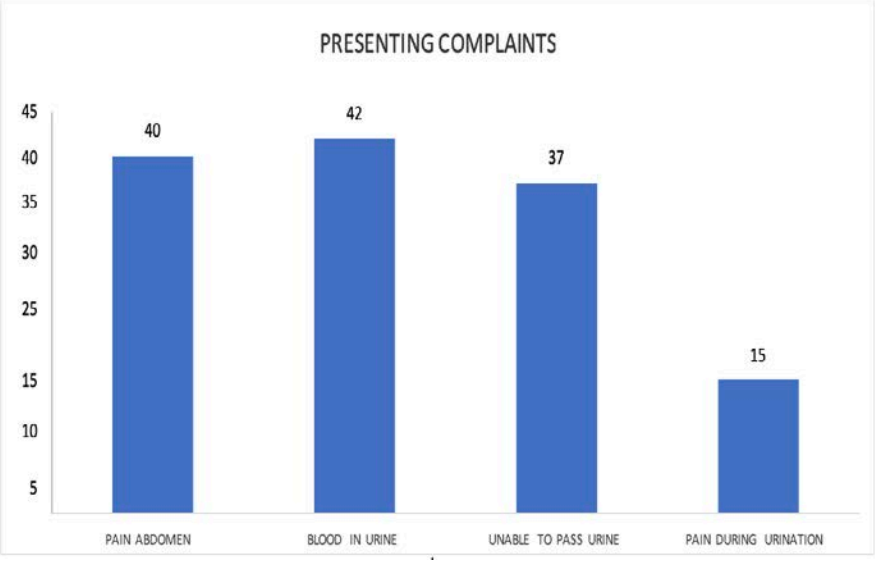

Figure 2: Presenting Complaints in Subjects of Study

Clinical features

Upon evaluation of these patients most patients had hematuria 42(84%). Abdominal pain was observed in 39(78%) of patients. External genitalia tenderness was present in 13(26%) of patients and abdominal distension in 26(52%) of patients.

Table 3: Clinical Features in Subjects of Study

	Hematuria	Abdomina pain	Abdominal distension	Genital pain
Number of patients	42	39	26	13
Percentage	84	78	52	26

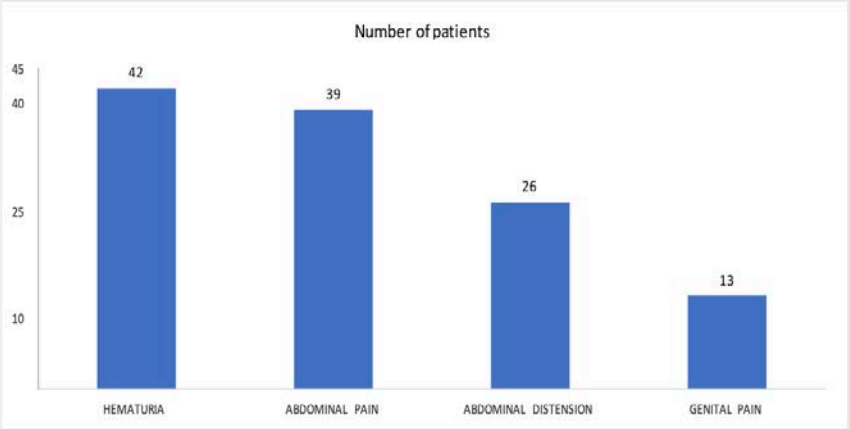

Figure 3: Clinical Features in Subjects of Study

Types of injuries

Urethral injury was the most common injury observed in 37(74%) patients andbladder injury was noticed in 7(14%) patients. External genital injury was seen in 10(20%) patients, 6(12%) patients had injury at multiple sites.

Table 4: Types of Injury in Subjects of Study

	Poly trauma	Urethra	Urinary bladder	Genital injury
Number of patients	6	37	7	10
Percentage	12	74	14	20

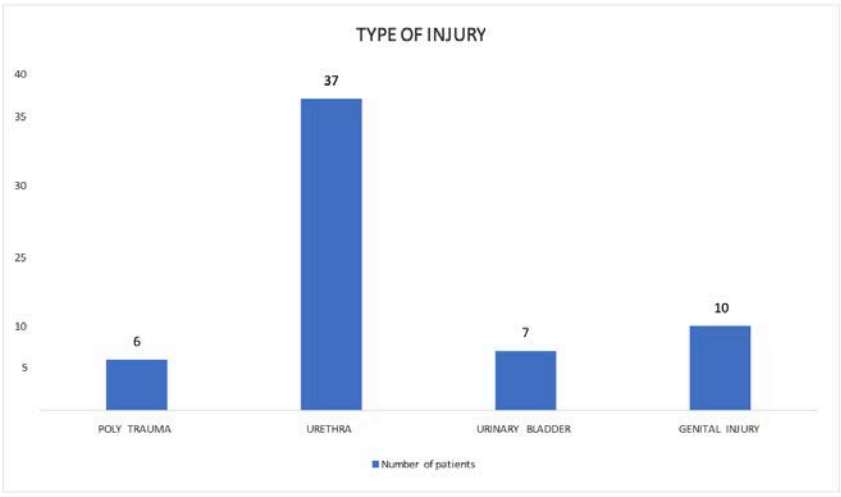

Figure 4: Types of Injury in Subjects of Study

Investigations

Ultrasound was the most common modality used to diagnose the Injury in 46(92%) of the patients. X ray was done in 9(18%) and RGU was done in 35(70%) patients each. CT scan was done in about 21(42%) of patients.

Table 5: Investigations Performed in Subjects of Study

	USG	X RAY	RGU	CT
Number of patients	46	9	35	21
Percentage	92	18	70	42

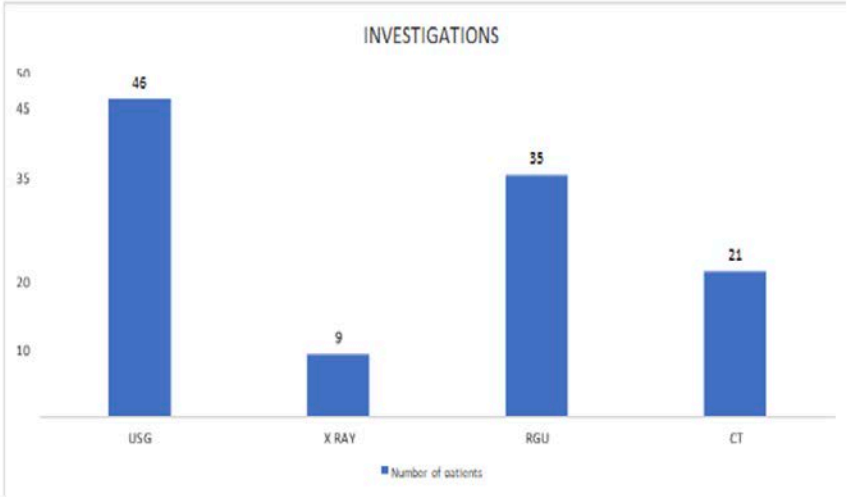

Figure 5: Investigations Performed in Subjects of Study

Diagnosis

After the patients were investigated diagnosis of Stricture urethra was made in 26(52%) of patients. Bladder tear was noted in 7(14%) of patients. Genital tear and Pelvic fracture urethral distraction defects (PFUDD) was seen in 6(12%) and 4(8%) patients respectively. Straddle injury was diagnosed in 3(6%) patients. Constricting ring related injury due to a rubber band around penis was diagnosed in 2(4%) of patients and penile fracture due to trauma and penis amputation also due to trauma was seen in1(2%) patient each.

Table 6: Spectrum of Diagnosis in Subjects of Study

	Patients	Percentage
Bladder Tear	7	14
Constricting ring	2	4
Penile Fracture	1	2
Penis Amputation	1	2
Genital tear	6	12
PFUDD	4	8
Straddle Injury	3	6
Stricture Urethra	26	52

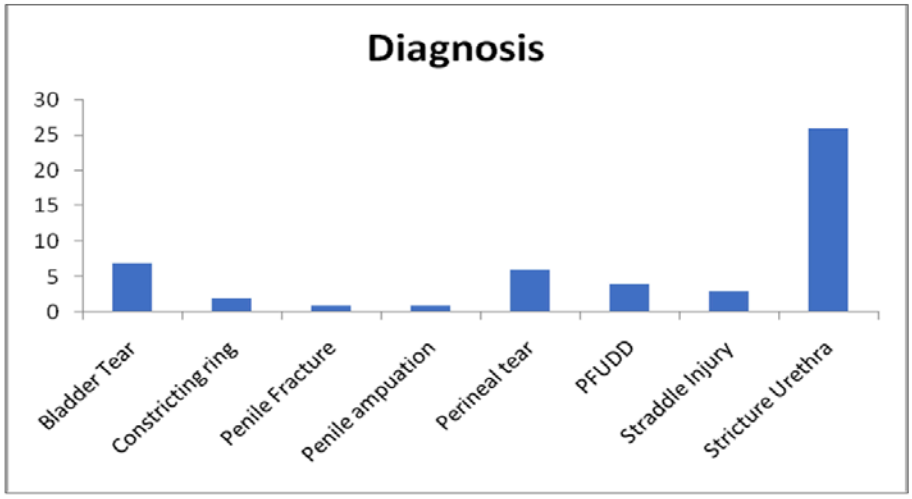

Figure 6: Spectrum of Diagnosis in Subjects of Study

Most of the Stricture urethra cases were as a result of faulty catheterisation and Bladdertear was noted in 6 iatrogenic cases and 1 blunt trauma abdomen case due to road traffic accident.

Management strategy

With respect to initial management strategy, conservative management alone was preferred in 6(12%) patients and conservative management with SPC was preferredin 34(68%) of patients. Primary tissue repair was done in 8(16%) and 7(14%) of patients required bladder repair. Definitive line of management in the form of urethroplasty was performed in 10(20%) patients whereas 30(60%) patients required visualized internal urethrotomy (VIU) after certain interval in the form of Deferred management.

Table 7: Management Strategy in Subjects of Study

	Conservative	SPC	VIU	Primary tissue repair	Urethr plasty	Bladder repair
Number of patients	6	34	30	8	10	7
Percentage	12	68	60	16	20	14

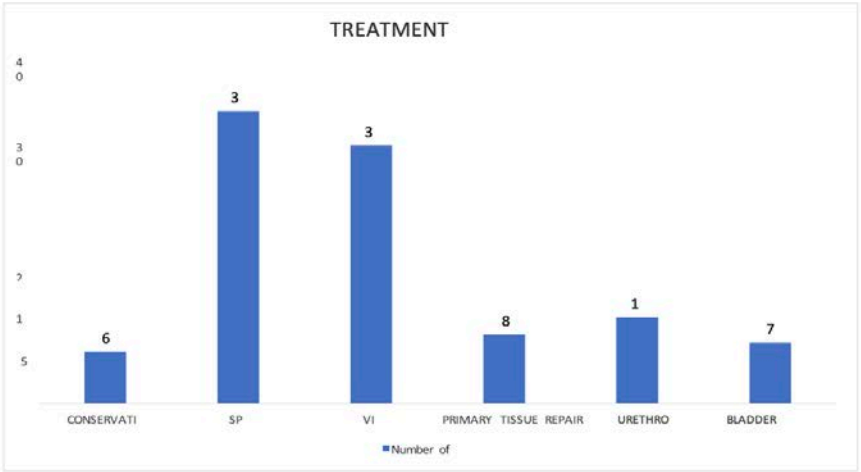

Figure 7: Management Strategy in Subjects of Study

Discussion

Our study was conducted in a tertiary care hospital in Mysore which focused on Lower urinary tract injuries with the aim to study the epidemiology of such injuries.

The mean age of patients in our study was 45.6 ± 18.7 years and maximum number of patients was less than 60 years of age. This was similar to study by javanmard *et al* [6] who reported mean age in their study as 27.3 ± 6.1 years and also lee *et al* [8] who reported mean age of 39.0 years in their study.

There was a male preponderance in our study i.e 33(66%) males and 17(34%) females. In other studies, like Javanmard *et al* [6] a similar trend was seen i.e 75% males and 25%females. Salimi *et al* [9,10] also reported a male to female prevalence of 80% vs 20% respectiely.

Most commonly seen mode of injury to Genito-Urinary organs was catheterization in our study 26 (52%), blunt trauma 26%, RTA 10%, and Iatrogenic during surgery 12% were other causes. This is in contrast to other studies which show that most common mode was Road Traffic Accidents which was seen in 41% in a study by Dobrowolski *et al* [9] and 65% in Salimi *et al* (10). In a study focused on genital trauma by lee *et al* [8] blunt trauma was most common mode of injury at 52%. In our study firearm related injuries were not observed. One study from Nigeria by Ofoha *et al* [7] showed that out of 104 patients included in the study only 5(6%) of patients had injuries because of catheterization. This was in stark contrast to our study where catheterization related injuries formed the most common mode of injury.

In our subject's most common presenting feature was hematuria in 42 (84%) of patients which was similar to a study of 267 patients by javamard *et al* [6] which reported hematuria in 63% patients. Pain abdomen was seen in 78% in our subject's vs 26% of subjects in above mentioned study. Obstruction to urine was seen commonly in our patients in 74% but was low in the study by javanmard *et al* [6] 56 % of patients. This difference may be explained by more upper urinary tract injuries in their study which were out of the scope ofour study.

Our study was solely focused on Lower urinary tract and genital injuries. The organs affected and their comparision to various studies in as depicted in table below.

Table 8: Studies Reflecting Differences in Organ Injury

Studies	Lower urinary Tract Injury	Bladder Injury	Urethral Injury	Genital
Salimi *et al* (n=175)	39(22.3%)	24(13.7%)	15(8.6%)	4(2.3%)
Javanmard *et al* (n=267)	49(18.3%)	34(12.7%)	15(5.6)	68(26%)
Lee *et al* (n=156)	-	-	-	156(100%)
Bariol *et al* (n=362)	123(34%)	65(18%)	58(16%)	72(20%)
Our Study (n=50)	44(88%)	7(14%)	37(74%)	10(20%)*

*Few patients in our study had injury to multiple organs as a result of polytrauma

Table 9: Studies Showing Management Strategies

Studies	Non-Operative	Operative
Salimi *et al* n=175	120 (68.5%)	55 (31.5%)
Javanmard *et al* n= 257	207 (80.5)	52 (19.5)
Ofoha *et al* (n=104)	0 (0%)	104 (100%)
Our Study (n=50)	34 (68%)	16 (32%)

In the present study Ultrasound (Abdominal+Pelvis) was used for diagnosis in 46 (92%)of patients and RGU was next most common modality in 35 (70%) of patients and CT was used in 42% of cases. In a study by Dobrowolski *et al* [9] in 512 patients in 2002 the only study during review which looked at diagnostic modalities reported USG as most common modality used in 455 (89%) of patients and RGU in 388 (76%) and CT in 15 (3%) of patients. The contrast in number of Injuries diagnosed by CT scan reflects the difference in chronology of the studies 1995-1999 for dowbrowolski *et al* [9] and 2018-2020 in our study. When comparing management stratergies, the comparision to various studies is as depicted in table below.

In our study non operative management was the predominant form of management as in 34 (68%) of patients and operative management in form of tissue repair was done in 16 (32%) of patients. The other Studies also reflect a similar line of management except a study from Nigeria by Ofoha *et al* [7] in which all patients were managed operatively which may reflect the more severe nature of injuries in their study.

Conclusion

1. As the incidence of trauma is increasing the incidence of pelvic fracture with urinary tract injury is also increasing. Every case is to be judged individually to select the bestoptions of available modalities.
2. The management of any suspected lower urinary tract injury must be done at the earliest to prevent long term sequelae.
3. While managing lower urinary tract injuries care must be taken, with the goal of optimizing long term sexual, cosmetic and urodynamic outcomes.
4. The urethra should be adequately anaesthetised while attempting catheterisation, in order to relax the sphincter.
5. Urethral realignment may be deferred in haemodynamically unstable patients by up totwo weeks and attention given to more alarming life-threatening conditions. In the interim, patient can be managed with suprapubic catheter to bypass the injured urethra.

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