

## Original Research Article

# Clinical evaluation of cases of lower genitourinary tract trauma with special reference to primary realignment in cases of posterior urethral distraction defect

Vikash Kumar<sup>1</sup>, Krishna Kant Singh<sup>1\*</sup>, Dharendra Pratap<sup>2</sup>, H. S. Pahwa<sup>1</sup>, Mehboob Alam<sup>2</sup>

<sup>1</sup>Department of Surgery, KGMU, Lucknow, Uttar Pradesh, India

<sup>2</sup>Department of Surgery, K. K. Hospital, Lucknow, Uttar Pradesh, India

**Received:** 16 May 2020

**Accepted:** 10 June 2020

### \*Correspondence:

Dr. Krishna Kant Singh,

E-mail: [drkksinghkgmu@gmail.com](mailto:drkksinghkgmu@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** The exact management strategy for lower genitourinary tract trauma remains controversial. Primary realignment with/without suprapubic catheterization provides definitive procedure with low complications and avoids the need for further open surgeries.

**Methods:** This was a prospective longitudinal study done on 31 cases with different complaints related to lower tract genitourinary trauma. All patients underwent suprapubic catheterization and/or primary realignment. The outcome was measured in the terms of time for discharge, urinary incontinence, stricture formation, erectile dysfunction and impotence.

**Results:** Maximum proportion of patients with lower genitourinary injuries in the study was in 10-20 years age group (48.4%). Blunt trauma was accounted for 93.6% of lower genitourinary injuries. Road traffic accidents were the most common cause (90.32%) of lower genitourinary injuries. Urinary bladder injuries accounted for 41.9% of all lower genitourinary injuries. Blood at meatus is present in only about half of the significant urethral injuries. Primary realignment of urethral injury results in lesser duration of hospital stay ( $9.24 \pm 2.44$  days), shorter length of suprapubic catheterization ( $11.67 \pm 4.78$  days) and early spontaneous voiding ( $40.93 \pm 15.79$  days). The stricture rate following primary realignment is low (31.25%). Erectile dysfunction was noted only in two patients (16.6%).

**Conclusions:** Management of traumatic urethral disruption by primary realignment serves as ultimate therapy in majority of patients.

**Keywords:** Lower genitourinary tract trauma, Posterior urethral distraction, Primary realignment

## INTRODUCTION

Injuries to lower genitourinary tract is relatively uncommon in blunt trauma. It occurs in 5% to 25% of men who sustain pelvic fractures.<sup>1,2</sup> The management for urethral injuries still remains controversial.<sup>3</sup>

Two options remained essential for the management of traumatic posterior urethral injury i.e. suprapubic catheter (SPC) placement followed by urethral stricture repair or

primary urethral realignment (immediate or early i.e. 1-15 days following injury).<sup>1</sup>

Significant benefits are associated with early realignment i.e. the approach is associated with 50% decrease in stricture formation and strictures that are formed are easily manageable by simpler techniques like urethrotomy and dilation.<sup>4</sup> Some studies have shown that the early realignment group had a lower rate of stricture requiring urethroplasty. It was also noted that compared

to delayed repair, immediate surgical urethral realignment results in equivalent or better rates of impotence and incontinence without the need for multiple surgical procedures.<sup>5,6</sup>

There exists limited data on the success of endoscopic realignment, aids a lack of familiarity with realignment techniques at this time. The purpose (of this study was to investigate the outcomes of patients undergoing primary, realignment for the initial management of acute urethral injuries in Indian scenario.

**METHODS**

After getting approval from institutional ethics committee, a prospective longitudinal study done on patients attending surgery emergency or out-patient department of Dept. of General Surgery, KGMU, Lucknow; having lower genitourinary tract injuries from August 2014 to August 2017.

Complete information regarding demogrphics, mechanism of injury, primary management and outcomes was obtained. The degree of urethral injuries was graded based on American Association for the surgery of trauma (AAST).<sup>7</sup>

After completion of primary and secondary survey in the emergency department, immediate CT urography and retrograde urethrogram was done in case of bladder or urethral injuries. The initial urologic management for all patients in case of posterior urethral disruption was insertion of suprapubic drainage catheter. All patients were evaluated for genitourinary history, history of potency before and after trauma, and a record of voiding dysfunction before urethral disruption.

In patients with partial urethral injuries, per urethral catheterization over a guide wire was done. The position of guide wire is confirmed radiologically (under C-arm or by USG). After confirming the position of guide wire, a Foley’s catheter with open tip is passed gently over the guide wire. Position of catheter is again confirmed radiologically and the balloon of Foley’s catheter is inflated. The guide wire is removed then and the catheter is tugged.

In patients who needed laparotomy for their associated injuries and in patients who needed suprapubic catheterization to relieve the urinary retention and were stable, in such cases surgical realignment of urethral injury was done and accomplished via the interlocking sound technique or finger-sound technique and railroading to manipulate a catheter across the urethral gap, while doing suprapubic catheterization.

In patients who needed suprapubic catheterization to relieve the urinary retention and were not vitally stable to allow railroading and in patients who presented with suprapubic catheterization, but within 7-10 days of

injury, endoscopic realignment was attempted in these patients after 7-10 days of SPC. In this procedure, the patient was placed in lithotomy position if his/her associated injury permitted; otherwise procedure was done in supine position with both thighs abducted.

Once the primary realignment is accomplished, the suprapubic catheter is removed after 1-3 days. Catheter care is explained to the patient. A simple antibiotic is given to the patient (preferably a quinolone) along with analgesic and serratiopeptidase.

Patients were followed up during their hospital stay for development of secondary infection, removal of SPC and duration of stay in the hospital. After discharge, patients were followed up at 4-6 weeks, at 3 months and at 6 months.

The data was analysed using Microsoft Excel and presented in number and percentages.

**RESULTS**

During the study period, a total of 65 cases with genitourinary trauma were recorded. Out of them, 31 cases with different complaints related to lower genitourinary trauma were included in the present study. Demographic and clinical characteristics of the patients was given in Table 1.

**Table 1: Socio-demographic and clinical characteristics of study participants (n=31).**

Characteristics	Number	Percentage
<b>Age group (in years)</b>		
10-20	15	48.4
21-30	10	32.3
31-40	4	12.9
>40	2	6.5
<b>Type of injury</b>		
Blunt	29	93.5
Run over (crush injury)	1	3.2
Penetrating	1	3.2
<b>Cause of injury</b>		
RTA	28	90.32
Fall from height	2	6.5
Others (sharp object)	1	3.23

Maximum proportion of patients enrolled in the study were in 10-20 years age group (48.4%) followed by 21-30 (32.3%), 31-40 (12.9%) and >40 years (6.5%). The minimum age of patients was 14 years while maximum age was 60 years. Mean age was 24.8±9.90 years. All the patients who attended this hospital with lower genitourinary trauma during the study period were males. The type of injury was blunt in majority (93.5%), followed by run over (crush injury) and penetrating in 1 (3.2%) patient each. The cause of injury was found to be road traffic accident in majority (90.3%). Fall from height

was the reason of injury in 2 (6.5%) and in 1 (3.2%), the cause of injury was penetration by sharp object. Pain (93.5%), Urinary retention (61.3%), blood at meatus (41.9%), abdominal distension (35.5%), hematuria (22.6%) and others (16.1%) were the major clinical features at presentation (Table 2).

Lower abdomen/pelvis (45.2%) was the most common site of impact followed by abdomen only (16.1%), perineum and lower abdomen along with head injury (9.7%). One case each (3.2%) had inguinal region and lower abdomen along with perineum as the sites of impact.

**Table 2: Clinical observations of patients at the time of presentation (n=31).**

Symptoms	Number	Percentage
Abdomen pain	29	93.5
Loss of consciousness	7	22.6
Abdominal distension	11	35.5
Urinary retention	19	61.3
Blood at meatus	13	41.9
Hematuria	7	22.6
Other	5	16.1

### Management

During the hospital stay the patients were given injectable antibiotics (ceftriaxone 1 gm BD and gentamycin 80mg BD), along with oral analgesics and anti-inflammatory drugs. During the hospital stay days 8 (42.1%) patients had mild to moderate grade fever. A quinolone (ciprofloxacin/levofloxacin) was started empirically along with paracetamol in these patients and all of them responded well to it.

### Postoperative follow up at 4-6 weeks

The mean duration of hospital stay was 9.24±2.44 (range 6-14 days) days. Out of 31 patients, 19 patients showed up for postoperative follow up in 4-6 weeks, out of which only 15 patients underwent suprapubic catheterization. In these 15 patients the average period after which SPC was removed was 11.67±4.78 (range 8-21 days) days. During follow up at 4-6 weeks, 1 patient expired and 2 (12.50%) patient showed extravasation of dye in retrograde urethrography (RGU) and micturating cystourethrography (MCU). These patients were re-catheterized and voiding trial wasn't given to them. Mean time to spontaneous voiding was 40.93±15.79 (range 28-90 days) days. In 5 cases (5/16; 31.25%) stricture was found, and all of them were managed by direct vision internal urethrotomy (DVIU). Following DVIU, all the patients are voiding with good stream and are on clean intermittent catheterization with 14-F Nelaton's catheter. In rest of 16 patients, per urethral catheter was removed in this follow up. None of the patients had urinary incontinence (Table 3).

**Table 3: Postoperative follow-up at 4-6 weeks.**

At 4-6 weeks	Number	Percentage
Expiry (n=19)	1	5.26
Extravasation of Dye (n=19)	2	12.5
Fever (n=19)	8	41.2
Mean time for SPC removal	11.67±4.78	
Mean time for discharge	9.24±2.44	

### Follow up at 3 months

Among 13 patients showed up for follow up after 3 months since the time of primary realignment, 1 patient lost to follow up at this stage. Of remaining 12, erectile dysfunction was noted in two patients (2/12; 16.6%). None of the 12 patients have developed any stricture or urinary incontinence. All the patients were found to be voiding with good stream. All these patients are doing clean intermittent catheterization with 14-F Nelaton's catheter; once daily. (Table 4)

**Table 4: Postoperative follow-up at 3 months.**

At 3 months	N (%)
Lost to follow up	1/13 (5.55%)
New stricture / Urinary retention	None
Urinary incontinence	None
Erectile dysfunction	2/12 (16.6%)

### Follow up at 6 months

Follow up for six months could be completed in 6 patients only up to the end of study. All the patients in whom six months follow up could be carried out are having no urinary incontinence, and are voiding with good stream without formation of any new stricture. No erectile dysfunction or any other genitourinary complaint was reported. All these patients are doing clean intermittent catheterization with 14-F Nelaton's catheter; once daily.

## DISCUSSION

Traumatic posterior urethral disruption at a prostate-membranous junction is a serious injury and mostly associated with pelvic fractures approximately in 4-25% of time.<sup>1,2</sup> The mainstay of treatment for traumatic urethral injuries are urethral continuity and minimizing the incidence of complications such as impotence, stricture formation and urinary incontinence.<sup>8</sup> The initial step of management of injured urethra is bladder drainage. This will stop further infiltration of soft tissue by urine and allow for urinary output monitoring.<sup>9</sup> Once drainage of bladder is achieved, conclusive treatment will be started that include surgical or endoscopic primary realignment or SPC followed by delayed urethroplasty.<sup>8</sup>

SPC followed by delayed open urethroplasty was the method of choice for restoring urethral continuity as

described by Johansson in 1953.<sup>10</sup> Early open realignment was first described by Ormond and Cothran in 1934. But the technique lost its popularity because surgical intervention soon after injury converts closed haematoma to open wound that can potentially lead to infection with increased risk of urethral necrosis and increased risk of incontinence, stricture formation and postoperative impotence.<sup>11,12</sup>

Early closed realignment (railroading) was the first line treatment for urethral disruption and this technique did not change the incidence of impotence. No stricture formation was noted with this technique and if stricture formed also, it would be short and easily managed by internal urethrotomy or dilation without need of open surgery.<sup>13</sup> The present study was done with the objective to study the outcomes of primary realignment in cases of PUDD in terms of time to void spontaneously, incontinence rate, impotence rate & any need of further intervention.

In the present study, maximum proportion of patients enrolled in the study was in 10-20 years age group (48.4%). The minimum age of patients was 14 years while maximum age was 60 years. Mean age was 24.8±9.90 years. All the patients who attended this hospital with lower genitourinary trauma during this period were males. This might be because of small study population. The type of injury was blunt in majority (93.5%). This was in accordance with the findings of Johnsen et al.<sup>14</sup>

Among the patients who sustained lower genitourinary injuries, majority (67.8%) had the impact of injury in lower abdomen and perineum. Urinary bladder injuries accounted for 41.9% of all lower genitourinary injuries. Out of these, 22.6% of patients had only bladder injury whereas remaining 19.3% of patients had associated urethral or external genitalia injuries. In 30% of patients with urinary bladder injuries; associated urethral injuries were seen. In a study done by Dobrowolski et al, reported that concomitant bladder and urethral injuries occur in 10-29% of patients.<sup>15</sup>

Urethral injuries accounted for 70.96% of all lower genitourinary injuries. In 95.45% patients of urethral injury the cause was blunt trauma whereas 1 (4.54%) had penetrating injury. The cause for blunt trauma was a road traffic accident in majority. Blood at meatus was found at presentation in about 59% of patients with urethral injuries. Elliott et al reported that blood at meatus is present in about half of significant urethral injuries. The remaining patients were diagnosed because of the inability to pass a Foley catheter.<sup>16</sup>

In this study average length of suprapubic catheterization was 11.67±4.78 days (range 8-21 days). Hadjizacharia et al reported the average length of suprapubic catheterization to be 19±16 days in early endoscopic

realignment group of their study whereas it was 219±77 days in case of delayed repair group.<sup>17</sup>

Mean time to spontaneous voiding was 40.93±15.79 days (range 28-90 days). Hadjizacharia et al, reported time to spontaneous voiding to be 35±23 days in early endoscopic realignment group of their study whereas it was 229±79 days in case of delayed repair group.<sup>17</sup>

In this study, 5 patients (31.25%) developed strictures following primary realignment; whereas in delayed repair group, rate of stricture formation is 96%. These patients were managed by DVIU. None of them required formal open urethroplasty. All the patients who undergo delayed repair required formal open urethroplasty. Similar observation was done by Kotkin et al.<sup>6</sup>

All the patients who underwent primary realignment in this study are performing clean intermittent catheterization with 14-F Nelaton's catheter. Erectile dysfunction was noted in two patients (2/12; 16.6%). Some degree of impotence is noted in 30-60% of cases of pelvic fracture and urethral distraction injury in the studies done by Elliott et al, Corriere et al and Routt et al.<sup>16,18,19</sup> This complication might be due to injury itself and might not be related to the procedure authors have performed in these patients.

## CONCLUSION

The findings of the study conclude that management of traumatic posterior urethral disruption injuries with primary realignment serves as definitive therapy in majority of the patients and prevents the need of open urethroplasty. It is observed that all patients who undergo primary realignment are at low risk of stricture formation, erectile dysfunction and impotence.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Koraitim MM, Marzouk ME, Atta MA, Orabi SS. Risk factors and mechanism of urethral injury in pelvic fractures. *Br J Urol.* 1996;77(6):876-80.
2. Guillé F, Cippola B, El Khader K, Lobel B. Early endoscopic realignment for complete traumatic rupture of the posterior urethra-21 patients. *Acta Urol Belg.* 1998;66:55-8.
3. Chapple C, Barbagli G, Jordan G, Mundy AR, Rodrigues-Netto N, Pansadoro V, et al. Consensus statement on urethral trauma. *BJU Int.* 2004;93(9):1195-202.
4. Mouraviev VB, Coburn M, Santucci RA. The treatment of posterior urethral disruption associated with pelvic fractures: Comparative experience of

- early realignment versus delayed urethroplasty. *J Urol.* 2005;173(3):873-6.
5. Asci R, Sarikaya S, Buyukalpelli R, Saylik A, Yilmaz AF, Yildiz S. Voiding and sexual dysfunctions after pelvic fracture urethral injuries treated with either initial cystostomy and delayed urethroplasty or immediate primary urethral realignment. *Scand J Urol Nephrol.* 1999;33(4):228-33.
  6. Kotkin L, Koch MO. Impotence and incontinence after immediate realignment of posterior urethral trauma: result of injury or management? *J Urol.* 1996;155(5):1600-3.
  7. Leddy L, Voelzke B, Wessells H. Primary realignment of pelvic fracture urethral injuries. *Urol Clin North Am.* 2013;40(3):393.
  8. Koraitim MM. Pelvic fracture urethral injuries: The unresolved controversy. *J Urol.* 1999;161(5):1433-41.
  9. Kamal B. Primary urethral realignment in traumatic urethral rupture. *Bahrain Med Bull.* 2000;22:64-7.
  10. Johanson B. Reconstruction of the male urethra stricture: Application of the buried intact epithelium technique. *Acta Chir Scand Suppl.* 1953;176:1-4.
  11. Lieberman SF, Barry JM. Retreat from transpubic urethroplasty for obliterated membranous urethral strictures. *J Urol.* 1982;128:379-81.
  12. Morehouse DD, Mackinnon KJ. Management of prostatomembranous urethral disruption: 13-year experience. *J Urol.* 1980;123:173-4.
  13. Herschorn S, Thijssen A, Radomski SB. The value of immediate or early catheterization of the traumatized posterior urethra. *J Urol.* 1992;148(5):1428-31.
  14. Johnsen NV, Dmochowski RR, Mock S, Reynolds WS, Milam DF, Kaufman MR. Primary Endoscopic Realignment of Urethral Disruption Injuries-A Double-Edged Sword? *J Urol.* 2015;194(4):1022-6.
  15. Dobrowolski ZF, Weglarz W, Jakubik P, Lipczynski W, Dobrowolska B. Treatment of posterior and anterior urethral trauma. *BJU Int.* 2002;89:752-4.
  16. Elliott DS, Barrett DM. Long-term follow up and evaluation of primary realignment of posterior urethral disruptions. *J Urol.* 1997;157:814-6.
  17. Hadjizacharia P, Inaba K, Teixeira PG, Kokorowski P, Demetriades D, Best C. Evaluation of immediate endoscopic realignment as a treatment modality for traumatic urethral injuries. *J Trauma.* 2008;64(6):1443-50.
  18. Corriere JN, Rudy DC, Benson GS. Voiding and erectile function after delayed one-stage repair of posterior urethral disruptions in 50 men with a fractured pelvis. *J Trauma.* 1994;37(4):587-90.
  19. Routt MC, Simonian PT, Defalco AJ, Miller J, Clarke T. Internal fixation in pelvic fractures and primary repairs of associated genitourinary disruptions: a team approach. *J Trauma.* 1996;40(5):784-90.

**Cite this article as:** Kumar V, Singh KK, Pratap D, Pahwa HS, Alam M. Clinical evaluation of cases of lower genitourinary tract trauma with special reference to primary realignment in cases of posterior urethral distraction defect. *Int J Res Med Sci* 2020;8:2866-70.