



## Surgical Repair of Posterior Urethral Distraction Defects and its Outcome : Initial Experience in a Tertiary Level Hospital

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### Abstract :

**Purpose:** Management of posterior urethral distraction defects are challenging for urologists and need very careful and meticulous dissection for getting a good outcome. Dhaka medical college hospital is a tertiary referral hospital where we receive a lot of cases from different districts. The study was done to observe the outcome of anastomotic urethroplasty for posterior urethral distraction defects.

**Methods :** This was a prospective experimental study. This study was done in a single unit of DMCH urology department by a single surgeon . Those who were suffering from posterior urethral distraction defects with suprapubic catheter in situ were included and underwent anastomotic urethroplasty from the period of January, 2018 to October, 2019. After proper evaluation and counseling all patients underwent perineal anastomotic urethroplasty under spinal anesthesia with 6-8 interrupted suture, using 4/0 vicryl. A 14 Fr Foley catheter was placed in urethral lumen and 16 Fr catheter in SPC site. A latex strip drain was placed for perineal wound. Drain was removed after 48 hours of operation . Patients were usually discharged in between 5<sup>th</sup> to 7<sup>th</sup> POD with definite follow up protocol and medications with supra pubic catheters (SPC) and per urethral catheters in situ. On 21 POD urethral catheter was removed. SPC was removed after 7 days if patient can void normally. 1<sup>st</sup> and 2<sup>nd</sup> follow up were done at the completion of 3<sup>rd</sup> and 6<sup>th</sup> month respectively. The prevalence of post-operative sexual disorders was investigated using the International Index of Erectile Function-5 (IIEF-5) questionnaire during follow-up. If the patient can able to void per urethra in a well manner and Qmax>15 mL/s then repair was defined successful.

**Result :** Success rate of perineal anastomotic urethroplasty for posterior urethral distraction defect was 83.33.%. 18 patients were included in the study. The mean age was 28.27 years. 17 patients were able to void successfully after surgical procedure but among those 2 patients had urinary flow rate < 15 ml/sec and one patient didn't able to void. 3 patients had developed wound infection, 3 patients developed erectile dysfunction.

**Keywords:** Posterior urethral distraction, Anastomotic urethroplasty, Erectile dysfunction

**Conclusion :** Perineal anastomotic urethroplasty is gold standard for treatment of posterior urethral distraction defects. Long term follow up is needed to give an opinion regarding the ultimate outcome of the surgical procedure and that have give a good idea for future management.

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**Introduction:**

When the urethral continuity is totally destructed, the term of *urethral distraction defect* will be used<sup>1</sup>. The treatment of choice for this condition is perineal anastomotic urethroplasty<sup>2-5</sup>. Following a pelvic bone fracture with the destruction of posterior urethral continuity, a surrounding hematoma-fibrosis complex will be formed between the two urethral ends<sup>1</sup>. Therefore, instead of "stricture," the term of "defect" is usually used for the posterior urethra<sup>1</sup>. The prevalence of posterior urethral defects in pelvic fractures had been estimated to be 5% to 10% in the earlier reports<sup>7</sup>. In the latest studies, it has been estimated to be between 3% and 25%.<sup>8</sup> The incidence of double injuries of the urethra and bladder in men has been reported between 10% to 20%.<sup>9</sup> It is generally believed that the posterior urethral defects can be caused by disruption of the membranous urethra after pelvic fracture<sup>10</sup>. However, Mundy showed that the disorder is accompanied by avulsion of the bulbomembranous junction in two-thirds of the cases and avulsion of the proximal bulbar urethra in one-third<sup>1</sup>. Urethral injuries in these patients are often accompanied by butterfly fracture of symphysis pubis with or without diastasis of one sacroiliac joint<sup>11</sup>. The most common etiologies of strictures or defects of the posterior urethra are motor vehicle accidents<sup>12-16</sup>. The interval between the initial urethral injury and definitive repair of the resulting urethral stricture or defect depends on the magnitude of the pelvic trauma. Generally, the repair should be postponed until the local healing reaction is complete. Turner-Warwick<sup>17</sup> suggested that this process takes at least 3-4 months, and longer if the haematoma is large. Webster<sup>18</sup> advised that repair should be delayed for 4-6 months. In the present author's experience the minimum interval is 6 months after most PFUIs, and in cases of severe injuries, the interval can be extended to 8 months. If an earlier repair is attempted, the surgical dissection will be more difficult and the chance of a successful result might be less.<sup>19</sup>

Posterior urethral distraction defect (PUDD) is a challenging problem in urology that can lead to disabling complications, including urinary incontinence and the inability to void<sup>20</sup>. Although the worldwide incidence of PUDD has recently decreased, a greater number of PUDD cases are reported in developing countries where agricultural activities are still prevalent, the prevention of accidents in the workplace has not greatly increased, and bicycles and

motorcycles are the most popularly used vehicles<sup>21</sup>. The appropriate management of PUDD is crucial for reducing the risk of disability.

Although multiple strategies are currently available for managing PUDD, anastomotic urethroplasty remains the cornerstone. Numerous clinical studies have shown that anastomotic urethroplasty has excellent success rates in cases of posterior urethral strictures<sup>22</sup>. Postoperative recurrence of stricture is also a problem with this procedure. Although recurrence and complications after transperineal bulboprostatic anastomosis for PUDD have been discussed in broader reports of operative outcomes, however, they have not yet been systematically described.

In the present study, we want to see the surgical outcome of perineal anastomotic urethroplasty that is patients own ability to void perurethra and the surgical complications and patients erectile function status.

**Materials and methods:**

This was a prospective experimental study. This study was done in a single unit of the department of Urology of Dhaka medical college hospital and operation was performed by single surgeon who had started this surgery individually after one and half year of his learning curve. Those who were suffering from posterior urethral distraction defect with suprapubic catheter in situ were included and underwent perineal anastomotic urethroplasty from the period of January, 2018 to October, 2019. Purposive sampling was done. Exclusion criteria included : age less than 18 years, female patients, inflammatory urethral strictures, history of urethral injury less than 6 months, non traumatic disruption of urethra (i.e. radical prostatectomy, urethral surgery and/or pelvic radiation therapy), failed anastomotic urethroplasty cases pre-existing urethro-rectal fistula, inability to have squatting position, symptoms of urinary outflow obstruction prior to urethral injury, patients with stroke and spinal cord injury, refusal of consent, were excluded. Pre-operative evaluation included detail clinical history including mechanism of injury, duration and events after trauma, erectile function status, suprapubic catheter status, physical examination and patients movement status like sitting in squatting position or not and relatives investigations like urine routine and microscopic examination and culture, and retrograde urethrogram and micturating

cystourethrogram (RGU & MCU) and uroflowmetry during follow up was done. Patients were prepared for operation after adequate counseling. All patients underwent perineal anastomotic urethroplasty in lithotomy position. Initially the length of stricture was assessed with radiographic picture of RGU and Anti grade cystourethrogram and preoperatively with antigrade cystourethrosopy and retrograde urethrocystoscopy. At the same time associated bladder neck injury and bladder wall pathology were observed. A stepwise approach for urethral mobilization was performed consisting of complete circumferential mobilization of urethra, complete excision of existing fibrotic scar, and achievement of a tension free anastomosis apposing urethral epithelium done in every cases. Separation of crura, and inferior pubectomy were performed when it was difficult to perform tension free anastomosis. Proximal lumen was confirmed by inserting bougie dilator through SPC site. Spatulation was performed anteriorly on the proximal urethra and posteriorly on distal urethra. Spatulation ensures an anastomosis of wide calibre. Both sides of urethral stumps were anastomosed with 6-8 interrupted suture, using 4/0 vicryl. We did not perform supra-crural re-routing in any cases. A 14 Fr Foley catheter was placed in urethral lumen and 16 Fr catheter in SPC site. A latex strip drain was placed for perineal wound. Drain was removed after 48 hours of operation and fresh dressing done on 3<sup>rd</sup> post-operative day (POD). Patients were usually discharged in between 5<sup>th</sup> to 7<sup>th</sup> POD with definite follow up protocol and medications with supra pubic catheters (SPC) and per urethral catheters in situ. On 21 POD urethral catheter was removed. SPC was removed after 7 days if patient can void normally. 1<sup>st</sup> and 2<sup>nd</sup> follow up were done at the completion of 3<sup>rd</sup> and 6<sup>th</sup> month respectively. During each follow-up; clinical history, physical examination, urine routine microscopic examination & culture, uroflowmetry were performed. The prevalence of post-operative sexual disorders was investigated using the International Index of Erectile Function-5 (IIEF-5) questionnaire during follow-up. Evaluations were performed at three time points: pre-injury and during 1<sup>st</sup> and 2<sup>nd</sup> follow-up . For evaluation of pre-injury erectile function, the patients were asked to recall their erectile function before trauma. Data were collected in a pre-designed and pretested semi structured data collection sheet; direct input was given in MS Excel and MS Access data entry form.

**Result :**

Initially 21 patients were included during the study period. All underwent Perianal anastomotic

urethroplasty. 3 patients didn't attend the follow up. So finally 18 patients were included in the study. The age limit was 18 years to 51 years and mean age was 28.27 years. The lower age patient was 19 years and the upper age limit of the patient was 46 years. 17 patients were able to void successfully after surgical procedure but among those 2 patients had urinary flow rate < 15 ml/sec and one patient didn't able to void.

Age	No. of patients	Percentage:
18-25 years	4	22.22%
26-40 years	11	61.11%
41-55 years	3	16.67%

Mode of trauma to urethra:		
Mode of trauma	No. of patients	Percentages
RTA followed by pelvic fracture	15	83.33%
Straddle type injury	3	16.67%

The table showed the mode of events of urethral injury. 15 patients had urethral injury following pelvic fracture due to road traffic accident and 3 patients had straddle type injury.

Complications of Surgery :		
Complications	No. of patients	Percentages
Wound infection	03	16.67%
Urethrocutaneous fistula	00	
Erectile dysfunction	03	16.67%
Not able to micturate	1	5.55%

The study showed that 3 patients had developed wound infection, 3 patients developed erectile dysfunction and one patient didn't able to micturate after catheter removal .

Surgical outcome evaluation with uroflowmetry		
Uroflowmetry : Qmax	No. of patients	Percentage
< 15 ml/sec	2	11.11%
15-20 ml/sec	3	16.67%
20-25 ml/sec	11	61.11%
>25 ml/sec	2	11.11%

In this study, 11 patients had urinary flow rate within 20-25 ml/sec, 3 patients had within 15-20 ml/sec and 2 had within >25 ml/sec and 2 had urinary flow rate <15 ml/sec. The mean urinary flow rate was 21.25 ml/sec.

Evaluation of erectile function :		
IIEF-5	Normal (22-25)	No. of patients
	Mild ED (17-21)	
	Mild-moderate ED (12-16)	1
	Moderate ED (8-11)	
	Severe ED (5-7)	2

### Discussion :

Perineal anastomotic Urethroplasty is hard to perform and had been a challenge since long<sup>23</sup>. First end-to-end urethroplasty was performed by Heusner in 1883, initial success with stricture excision and sutured anastomosis was poor<sup>24</sup>. 1Waston and Cunningham reviewed 13 patients in 1908 more than 1 year after surgery and found only five patients who had satisfactory outcome<sup>25</sup>. One article published by Subhani GM et al. showed his success rate 87.5%<sup>23</sup>. Gorraz Ortizma et al. evaluated long term results of end-to-end Urethroplasty and obtained 92% success results<sup>26</sup>. Hafiz et.al.<sup>27</sup> showed in their study that the outcome of perineal anastomotic urethroplasty was fairly good and success rate was

93.87%. The results were considered successful when the patient can able to void per urethra in a well manner and Qmax>15 mL/s. In our study the outcome of perineal anastomotic urethroplasty is nice and success rate was 83.33.% (15 patients). The urinary flow rate Qmax <15 ml/s, the need for periodic dilation, optical urethrotomy, or repeat urethroplasty if needed in a postoperative patient considered as failure. Our failure rate was 16.67% which is nearly similar, carried out in most advanced center. Orabis S. did Urethroplasty in children with good result<sup>23</sup>. 17/23 In our study we did not included the patient less than 18 years old. We have encountered some complications after surgery such as wound infection, failed anastomosis and erectile dysfunction. The major cause of recurrence is the incomplete excision of the scar tissue around the urethra during surgery. In our study, one patient not able to void after surgery and later on during 1<sup>st</sup> follow up, evaluation was made by doing RGU and MCU and the recurrences were short in

length, occurred at the anastomotic site and redo anastomotic urethroplasty was performed. In another 2 patients whose urinary flow rate was less < 15 ml/sec, urethrocystoscopy was performed and urethral dilation done in one and OIU performed in one cases. Similarly, other investigators have reported successful endoscopic management of recurrent anastomotic strictures and attributed this success to the short length of the stricture as well as a decrease in periurethral fibrosis after perineal repair<sup>28,29</sup>. 21, 22 /27,28 We are concerned about erectile dysfunction and we will do further study for reducing the rate of iatrogenic erectile dysfunction.

We agree that urethral anastomosis should initially be attempted by a perineal approach alone. Most strictures were amenable to direct anastomosis without pubectomy. We believe that careful and complete excision of periurethral scar tissue is the single most important detail for achieving a successful outcome for posterior urethral reconstruction.

The present study has got some limitations. There was a selection bias because this study did not include patients less than 18 years or injury, rectal fistula, false passage and bladder neck injury. We did not measure the stricture length of the urethral injury preoperatively. The relation of ED with operative procedure was not measured statistically. Finally, the follow-up duration was only 6 months and if we can follow-up for longer period like one year or more, recurrence rate may be a little higher. Besides the study was performed by a surgeon whose learning curve is only one and half years and this study was done in only one unit of urology department of DMCH.

### Conclusion:

Pelvic fracture urethral injuries are really difficult for urologists to treat. Since development of anastomotic urethroplasty, it has been possible to resolve this cumbersome problem to a great extent. We have seen that the success rate of this operation always more than 90% in developed countries but in our country we find a good number of patients are always recycling and we don't have the exact data of these patients.

This study was conducted to see the outcome of these patients in one of the major institutes of the country and what others steps can be done in future to improve the outcome. Though the surgical procedure is associated with multiple complications, they can be avoid to a great extent by proper preoperative

evaluation to define the anatomy, location and length of stricture and meticulous intraoperative manipulation. If these patients can be followed up for a period of 5 to 10 years and by this time managing the complications they develop, those can provide valuable information regarding proper management plan for them.

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