

Combined Antegrade And Retrograde Endoscopic Realignment Of Traumatic Urethral Disruption

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Citation

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Abstract

Background Urethral injury is traditionally managed with an initial suprapubic cystostomy and urethral reconstruction 3 – 6 months after. Early endoscopic urethral realignment may obviate the need for extensive urethral reconstruction and prevent complications resulting from the prolonged use of an indwelling catheter. **Methods** We reviewed our patients who had endoscopic urethral alignment for traumatic urethral disruption over a 42 month period. We used combined antegrade and retrograde rigid endoscopes for the procedure. The clinical and radiological details and complications were documented. **Results** Thirty-eight patients had endoscopic realignment of the urethra. Eighteen, 19 and 1 had anterior, posterior and female urethral injuries respectively. At follow up of 6 – 48 months (median 36 months), 9 (23.7%) patients with posterior urethral injuries developed strictures. Six patients with strictures from bulbomembraneous injury were successfully managed by internal urethrotomy and a regimen of clean intermittent self catheterization lasting for 1 month while 3 (including 2 with prostatic membraneous injury) had successful anastomotic open urethroplasty following failed internal urethrotomy. No strictures was reported among patients with anterior urethral injury following endoscopic realignment. Two patients with prostatic membraneous urethral injury reported erectile dysfunction. No patient reported urinary incontinence. **Conclusions** This technique results in successful realignment of traumatic urethral disruptions and potentially prevent the development of strictures especially in the anterior urethra. Most patients who develop strictures in the posterior urethra are easily managed by internal urethrotomy followed by a short period of clean self intermittent catheterization.

INTRODUCTION

Urethral injuries are often described as rare in the literature [1-3]; it is frequently seen in our institution usually following motorcycle and motor vehicular road traffic accidents, and straddle injuries from poorly covered drainage channels [4]. It is a difficult injury to manage and there is no single method of treatment that is ideal [4, 5]. The traditional method of treatment is to insert a suprapubic catheter in the acute phase and then perform a delayed urethroplasty at least 3 months after the injury [2, 4, 6, 7]. Urethroplasty is often a very difficult and highly technical procedure to perform and many urologic surgeons are not particularly proficient with carrying out this difficult operation [1, 7]. In addition, delayed urethroplasty would also require that the patient would have an indwelling catheter for a prolonged period of time and with the attendant complications [8]. Open urethral realignment done soon after the injury is associated with a higher mortality and morbidity including bleeding, stricture, impotence and incontinence and therefore not often recommended [7, 9].

Endoscopic realignment of the urethra is associated with high success rate, less morbidity and may avoid major surgery and prolonged catheterization [10]. Several methods of achieving endoscopic urethral realignment have been described [3, 11]. In our environment, endoscopic treatment of urethral disruption is still new with very few documented reports [5]. We make use of a combined antegrade and retrograde rigid endoscopic approach as a modification of previously described procedures [3, 11] to realign urethral disruptions that present to our institution. We aim to describe our method and the treatment outcome in the short-term.

MATERIALS AND METHODS

PATIENTS AND PREOPERATIVE MANAGEMENT

All patients with urethral injury who had endoscopic urethral realignment in our institution from April 2006 to September 2009 were reviewed. Patients with penetrating or open urethral injuries were excluded from the procedure.

PREOPERATIVE CARE

After paying attention to the immediate life-threatening injuries and conditions, the initial urologic treatment of the patients was to insert suprapubic catheter to relieve the urinary retention and divert urine from the injury site. Combined retrograde urethrogram and micturating cystourethrogram were carried out 3 – 5 days after the injury to identify the site and the degree of injury. The American Association for the Surgery of Trauma (AAST) injury severity scale for the urethra was used to classify the injury. The patients were placed on broad spectrum antibiotics and other injuries were attended to by the respective specialties. The patients had endoscopic urethral realignment between day 7 and day 21 after the injury depending on their clinical conditions

OPERATIVE PROCEDURE

The patients had caudal block regional anaesthesia or general anesthesia and were placed in the Lloyd-Davis position which was modified in patients with lower extremity fractures. The abdomen and the perineum were prepped and draped and the suprapubic catheter removed. Lignocaine gel 2% was instilled into the urethra and the suprapubic ostium. Antegrade endoscopy was carried out using a rigid cystoscope with 30 degree telescope introduced into the bladder via the suprapubic ostium. The bladder mucosa, bladder neck and the prostatic urethra (as much as possible) were inspected for any injury. A size 6 French gauge ureteric catheter was introduced via the cystoscope channel into the prostatic urethra and the end of the catheter placed as distally as possible. The ureteric catheter was left in situ and the cystoscope removed. Retrograde endoscopy was then carried out with a Sachse optical urethrotome with twelve degree telescope passed up to the site of urethral disruption and direct vision optical urethrostomy was carried out at 12 'O' clock position until the ureteric catheter was visualized. The ureteric catheter was then followed into the bladder and a Foley's urethral catheter inserted into the bladder via a catheterizing sheath thereby realigning the urethra. Sometimes it might not be possible to follow the ureteric catheter into the bladder in patients with displaced prostatomembranous segment or the so called 'high-riding prostate'. In such situations, the ureteric catheter was grasped with a forceps and brought out through the external urethral meatus and a Foley's catheter attached to its end was passed through the urethra into the bladder by pulling on the proximal end of the ureteric catheter at suprapubic ostium. Antegrade cystoscopy is repeated via the suprapubic

ostium to confirm the position of the Foley's catheter in the bladder.

POST-OPERATIVE FOLLOW-UP

The patients were usually discharged home 72 hours after the operation or they were discharged to the other specialties if they have associated injuries that would require them to remain in the hospital. The follow-up included retrograde pericatheter urethrogram at 4 weeks after the endoscopic realignment. The urethral catheter was removed at 4 weeks after endoscopic realignment if the pericatheter urethrogram shows good inflow of contrasts into the bladder and no extravasations. Removal of the urethral catheter was delayed till 8 weeks after endoscopic realignment if extravasations are seen at pericatheter urethrogram. The urinary stream was observed and crude flow rate was estimated after removal of the urethral catheter.

RESULTS

PATIENTS' CHARACTERISTICS

Forty-two patients presented with urethral injury over 42 months. Four (12.5%) patients with open urethral injury (rectum and perineum) were excluded from the procedure. Therefore, 38 (90.5%) patients (37 males and 1 female) had endoscopic urethral realignment. The mean and median ages were 35.5 and 32 (range 13 – 70) years respectively. Table I summarizes the characteristics of the patients who had combined antegrade and retrograde endoscopic realignment of the ruptured urethra over the period of the study.

THE INJURIES

The injuries involved the posterior urethra in 19 (50.0%) patients, the anterior urethra in 18 (47.4%) patients and the female urethra in 1 (2.6%) patient. Fifteen posterior urethra injuries and 1 female urethral injury occurred from road traffic accident while 4 posterior urethral injuries occurred from fall from height. All the 18 anterior urethra injuries occurred from falling astride (straddle) injury. Among the patients with posterior urethra injuries, the prostatomembranous region was involved in 2 (10.5%) and the bulbomembranous in 17 (89.5%) patients. All the patients with posterior urethral injury and the female urethral injury had associated pelvic fractures. Six (15.8%) patients with posterior urethral injury also had other associated injuries including femoral shaft fracture in 3 patients, soft tissue knee injury, head injury and splenic trauma in 1 patient each.

Two (5.3%), 14 (36.8%), 20 (52.6%) and 2 (5.3%) patients

had AAST grades 2, 3, 4 and 5 of injuries respectively. Among the 18 patients with anterior urethral rupture, partial injuries were found in 4 and complete rupture in 14 patients. Figures I (A-D) illustrate the radiographic findings of a typical patient who had endoscopic urethral realignment after a traumatic urethral disruption.

OPERATIVE OUTCOME

The procedure of endoscopic urethral realignment was successfully carried out in all the patients. Caudal block anaesthesia was used in 32 (84.2%) patients and general anaesthesia in 6 (15.8%) patients (4 patients with failed caudal block anaesthesia, 1 young boy and 1 young woman who would not co-operate to have the procedure done under caudal block anaesthesia).

The time from injury to endoscopic realignment ranged from 7 – 21 (mean 10) days. The mean duration of completion of the operation was 10 (range 8 – 18) minutes in patients with anterior urethral injury and 20 (range 15 – 35) minutes in those with posterior urethral injury. Pericatheter urethrogram performed at 4 weeks after the operation showed urinary extravasations in 3 patients and the catheter was kept in situ till 8 weeks after endoscopic realignment in these patients. After the removal of the catheter, urinary flow rate was satisfactory in 34 (89.5%) patients (16 and 18 patients with posterior and anterior urethral injuries respectively). The mean crude flow rate at 8 weeks after endoscopic urethral realignment was 20 ml/second (Range 14 – 26 ml/second). At follow-up of 6 – 42 months (median 36 months), there was no urethral stricture recorded among the 18 patients with anterior urethral injury. Nine (23.7%) patients with posterior urethral injury (2 prostatomembranous and 7 bulbomembranous) have developed symptomatic urethral strictures during the follow-up period. Six patients with bulbomembranous stricture were successfully managed by direct vision internal urethrotomy and a regimen of subsequent clean intermittent self catheterization lasting for 4 weeks [5]. Direct vision internal urethrotomy was not successful in the remaining 3 patients (including the 2 patients with prostatomembranous injury) because of dense stricture. End-to-end anastomotic urethroplasty was carried out in these 3 patients with good outcome.

None of the patients with anterior urethral injury reported any erectile dysfunction or urinary incontinence. While none of the patients with posterior urethral injury had urinary incontinence, 2 (5.3%) patients with posterior urethral injury reported erectile dysfunction which is related to the severity

of the pelvic trauma that these patients sustained. There was no case of postoperative pelvic or urethra infection or septicaemia following the procedure of endoscopic urethral realignment.

DISCUSSION

The management of urethral injuries has remained controversial because of the relative rarity of the injuries and limited experience of most urologists [1, 7]. The classical treatment was to insert a suprapubic catheter in the acute phase and plan for delayed urethroplasty after 3 months [12]. Before now, patients with urethral injury in our environment were usually offered an initial suprapubic cystostomy and a definitive urethroplasty at a much later time. Many of these patients while awaiting the definitive urethroplasty would need to wear indwelling catheter for a prolonged period of time with attended complications [8]. Our present protocol has significantly reduced the number of patients on prolonged catheterization and the associated problems. In addition, endoscopic realignment would result in minimal manipulation of the injury site and therefore reduce risk of bleeding, stricture, incontinence and erectile dysfunction [12, 13].

As demonstrated in previous studies [3, 14], we have also found that, anterior urethral injuries can be successfully managed with endoscopic urethral realignment with excellent postoperative result. It is possible that this procedure would prevent urethral stricture and therefore obviate the need for extensive urethroplasty in virtually all patients who sustain injury to the anterior urethra. The incidence of stricture however in patients with posterior urethral injuries after endoscopic realignment is quite high. This may be related to the severity of the injury. However, by realignment of the urethra, the stricture that is formed can most of the time be effectively treated by internal urethrotomy or urethral dilatation [5, 15]. In addition urethroplasty would be made easier in those who would require it than when the urethral ends are completely distracted and buried in dense fibrosis [6, 15].

In patients with prostatomembranous rupture and “high riding prostate” as well as when the urethral ends are completely distracted, initial antegrade cystourethroscopy and insertion of a ureteric catheter as guide to locate the distracted posterior urethra makes the procedure of primary endoscopic realignment successful virtually at all times. This also has the potential of reducing the operation time as the distracted posterior urethral end bearing the ureteric catheter

is easily located and followed into the bladder or the ureteric catheter used as a guide to railroad a Foley’s urethral catheter into the bladder. In our experience, we had no case where the procedure was unsuccessful or abandoned unlike previously reported [5]. The shorter duration of operation may also explain why we had no case of urethral infection or septicaemia in our patients [5].

The female urethra is rarely involved in pelvic fracture urethral distraction injuries [7]. In our series, we had 1 female urethral injury. The urethra showed a complete tear not involving the vagina. She was successfully realigned endoscopically and had no incontinence of urine postoperatively.

In conclusion, we suggest that primary endoscopic realignment should be considered the initial mode of treatment for all patients with urethral injury. Although the incidence of stricture formation in posterior urethral injury after primary endoscopic realignment is high, the procedure would reduce morbidity, the catheterization time and make the resultant strictures easier to manage.

Figure 1

Table I: Clinical features of patients who had combined antegrade and retrograde endoscopic urethral realignment

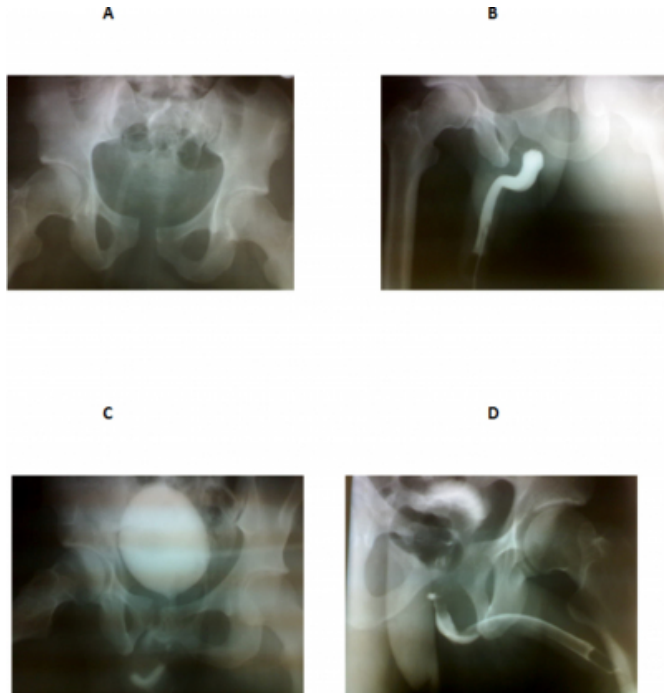
Variable	Frequency	(%)
Age		
<35years	30	(78.9)
≥35years	8	(21.1)
Sex		
Male	37	(97.4)
Female	1	(2.6)
Aetiology		
RTA	16	(42.1)
Fall from height	4	(10.5)
Straddle injury	18	(47.4)
Injury site		
Posterior urethra	19	(50.0)
Anterior urethra	18	(47.4)
Female urethra	1	(2.6)
AAST grade of injury		
1	0	(0.0)
2	2	(5.3)
3	14	(36.8)
4	20	(52.6)
5	2	(5.3)
Complications*		
Strictures	9	(23.7)
Impotence	2	(5.3)
Incontinence	0	(0.0)
Sepsis	0	(0.0)

*Complications were recorded only in patients with posterior urethral injury

RTA=road traffic accident, AAST=American Association for the Study of Trauma

Figure 2

, Plain pelvic radiograph showing distruption and diastasis of the pubic symphysis, , Retrograde urethrogram and micturating cystourethrogram respectively of the same patient showing bulbomembraneous urethral distruption and no flow of contrast beyond injury site, and , pericatheter retrograde urethrogram of the same patient 4 weeks after endoscopic urethral realignment showing good urethral realignment and contrast flow into the bladder.



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