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TREATMENT OF POSTERIOR URETHRAL STRICTURE CAUSED BY PELVIC FRACTURE BY TRANSPERINEAL END-TO-END ANASTOMOTIC REPAIR: ASSESSMENT OF THE RESULTS

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ABSTRACT

Objective: During a period from 2007 to 2017, 183 patients with posterior urethral stricture caused by pelvic bone fracture have been treated by transperinealend-to-end anastomotic repair at the surgical urology department of Viet-Duc University Hospital. This paper aims at providing an evaluation of the outcomes of the transperineal end-to-end anastomosis of the urethra and at assessing the prognostic factors of this surgical approach that has been used to treat patients with posterior urethral stricture. Patients and method: This is a prospective study conducted in patients with posterior urethral stricture caused by pelvic bone fracture that have been treated by transperineal end-to-end anastomotic repair; the study have been carried out in a period from january 2007 to January 2017. Results: The mean age of the patients was 33,10 years. The mean duration from the occurrence of the pelvic bone fracture to the urethral surgical repair was 4,5 months. Preoperatively, erectile dysfunction rate was 63,38% (116), while in 36, 62% (67) of patients this normal function was not affected. The overall postoperartive out comes were assessed as good in 89, 33% of patients. The postoperative problems included urinary leakage through the perineal wound, dysuria that required catheterization, and permanent urinary incontinence. With regards to the long-term postoperative outcomes, good voiding function was found in 91,53% patients, good erectile function was found in 78,69% (144) of patients, but in other 39 (21,31%) patients their erectile dysfunction has not been recovered. Conclusion: Transperineal end-to-end anastomotic surgical repair is an effective method for the treatment of posterior urethra stricture caused by pelvic bone fracture. This isa safe surgical method, with few complications, and may result in long-term stabilized outcome.

KEYWORDS

Urethral stricture, Pelvic bone fracture and Transperineal urethral anastomosis.

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INTRODUCTION

Posterior urethral stricture resulting from injury caused by pelvic fractures may occur in 5-10% of cases. In the last three decades the treatment of traumatic posterior urethral stricture, especially of the more complex cases has been rapidly changed. To this days, end-to-end anastomotic repair is recognized by many authors as the most appropriate

method for treatment of posterior urethral stricture caused by pelvic bone fracture, and the outcome of this technique is often used as the criterion standard for the assessment of the other methods[4,5]. We have applied this technique of end-to-end anastomosis to the treatment of the patients with posterior urethral stricture caused by pelvic bone fracture who have been admitted into our Viet-Duc Hospital during some recent years[1]. This paper aims at providing an evaluation of outcome of the method in which we have utilized the transperineal end-to-end anastomotic technique for the treatment of posterior urethral stricture, and at assessing the prognostic factors of this surgical method.

Patients and methods

We have conducted a prospective study on patients with posterior urethralstricture, which is a frequent sequelae of urethral injuries caused by traumaticpelvic bone fractures. These cases have been treated in a period from January 2007 to January 2017 by transperineal end-to-end anastomotic repair of the urethra. Urethroplasty success was quantified by urethrography, direct patient questioning and cystoscopy with retrograde urethrography when necessary. Results were compared on the basis of following subjective criteria: (1) Good: Patients satisfied with urinary stream, no urethral narrowing onurethrography; (2) Fair: Patients voids with some difficulty and may need other sitting. Patients needing readmission and repeat procedure.

RESULTS

In a period from January 2007 to January 2017, 187 patients with posterior urethral stricture caused by pelvic bone fracture have been operated, of whom 4 patients have been excluded from the statistical analysis since the urethral end-to-end anastomosis technique was not able to be carried out in these cases. Therest of this series composed of 183 operated patients were eligible for the inclusion criteria of this study. The mean age of them was 33,10 years (range: 16-74 years). The patient's age has been shown to be a statistically significant prognostic factor ($p < 0,05$) that is directly associated with the outcome of this type of surgical intervention. The traumatic etiologies of the pelvic fractures included traffic accidents in 109 (60%) and work accidents in 74 (40%) patients. Mean duration from the trauma occurrence to the surgical repair of the injured posterior urethra was 4, 5 months (range: 2-24 months). Significant correlation between this duration and the outcome of the urethra surgical repair has not been demonstrated ($p > 0,05$). Diagnostic procedures for all patients consisted of the following imaging tests: X-ray of the pelvis, retrograde urethrogram, and voiding cystourethrogram. Pelvis bone fracture is not only the cause of posterior urethral damage but also the most essential factor that affects the outcome of urethral stricture management. Using the Tile classification system, patients in our series were included in three different types with the following frequencies (percentages): 139 (75,95%) patients in type B, the most common type; 39 (21,31%) patients in type A; and 5 (2,74%) patients in type C.

Pelvicbone fracture lesions were found to be closely associated with the outcome of surgical repair in terms of both urinary and erectile functions ($p <0,05$).

Preoperatively the average length of the urethra strictures was 2,75 cm (ranged from 1,5 cm to 3,5 cm). Strictures of ≤ 3,0 cm in length were found in the majority (82%) of patients. The urethra stricture length determined on the voiding cystourethrogram represents an important prognostic factor associated with the outcomes of the injured urethra surgical repair ($p < 0,05$). 116 (63,38%) patients has lost their erectile function after the accident, while in 67 (36,62%) of them this function persisted until the surgical intervention. The average operative time was 72,35 min, ranged from 60 min to 120 min. Blood transfusion was required intraoperatively in 9 patients, each of them received 2 blood units; blood loss in these cases occurred in great amount because of the fibrous nature and the significant length of the urethra stricture that required difficult dissection and prolonged operative time (120 minutes). The postoperative indwelling catheterization time averaged 18, 2 days (range: 12-21 days). Mean duration of hospitalization was 10, 9 days (range: 1-22 days).

Voiding dysfunction after Foley catheter removal

Urinary leakage through the perineal wound occurred in 5 patients. This postoperative complications were treated by continuing permanent Foley catheterization, and administration of culture-specific antibiotics. Urinary leakage disappeared about 7 days after this medical therapy; the patients' voiding has become normal, and the Foley catheter was removed.

Urinary incontinence occurred in 8 patients: In these cases cystoscopicreinspection of the bladder and urethra was done. The cystoscope was inserted through the urethra without any difficulty and good healing at the site of urethral anastomosis was apparent. Thereafter these patients have been given training instructions for improving them self their voiding dysfunction and they were also asked to return for follow-up examination one month after;

In 4 patients after Foley catheter removal dysuria occurred that was manifested by an urinary flow rate of 12ml/s. In these patients regularly intermittent catheterizations was scheduled. After one month of management in which the patients were catheterized weekly, 2/4 patients have been able to void normally and the Foley catheters were then removed. However, the management failed in the remainder (2/4 patients), who eventually should live the rest of their life in a "catheter-dependent" condition.

Long-term outcome

Postoperative voiding function: Postoperative outcome of voiding function was evaluated as good in 167/ 183 (91,25%) patients. But bad outcome was found in 8 patients with dysuria that required surgical intervention for repairment: one of these 8 patients underwent an endoscopic internal urethrotomy and the other was reoperated. In addition, permanent urinary incontinence occurred postoperatively in 8 patients of whom 3 had been successfully treated by plastic surgery of the bladder neck.

Postoperative erectile function: Postoperative result of erectile function was evaluated as good in 148 (80,87%) patients, medium results in 22 (12, 02%). But 13(67,11%) patients remained impotent until the last follow-up examination.

DISCUSSION

The operation of bulbar and prostatic urethral anastomosis for treatment of posterior urethral stricture, a frequent sequelae from pelvic bone fracture, was first performed by Turner-Warwick in 1969[4]. Currently this method becomes one of the preferred options for many surgeons. The plastic surgery is usually carried out when the patient's performance status has been sufficiently ameliorated and the local lesions have been significantly stabilized, when the haematoma had been completely resorbed. Koraitim suggested that in almost of cases of posterior urethral injury caused by pelvis bone fracture the delay time should be at least 6 months from the occurrence of the trauma to the period appropriate for its repair[2]. In the cases of severe urethral injuries, with great gap between the sectioned prostatic and membranous urethral, urethral surgical repair may be delayed even for 9 months. However, this delay time may vary according to the experience of different authors: it is 3 to 4 months according to Turner-Warwick[7] and is 4 to 6 months according to Webster[8]. In our present study the mean duration from the occurrence of pelvic bone trauma to the plastic surgery for urethral repair was 4, 5 months. We believe that the favorable interval between these two events should be of 3 months, because this period of time may be sufficient not only for the patient's performance status be sufficiently recovered but also for the inflammated tissues and haematoma surrounding the injured urethra be completely resorbed. These local conditions are in fact very important factors that may affect the surgical intervention outcome. Moreover, in pelvic bone traumas the urethral injuries are always accompanied by damaged vessels and nerves that involve in the erectile function and in blood supply of the urethra. A period of 3 months may be sufficient for both local inflammation resorption and revascularization of the injured urethra that provides good nutrition to the local tissues, an essential condition for the success of the surgical intervention and for the prevention of postoperative stricture formation at the site of urethral anastomosis. Diagnostic imaging may help to determine the length of the urethral stricture. In the series of these 183 studied patients

the urethral strictures were 2, 7 cm in average length. But in the majority of them (80%) the urethral stricture length measured less than 3 cm. Urethral stricture length of more than 3 cm was seen in 36 patients (20%). The length of urethral stricture determined in x-ray films closely correlated with the outcome of surgical intervention ($p < 0,05$). In our series the mean follow-up period was 80, 05 months after the urethral surgical repair (range: 4 - 118 months). The long-term outcome of stabilized voiding function was found in 89 - 90% of cases. The postoperative erectile function was recovered but with slower rate, and even in a smaller number (10) of patients the erectile dysfunction persisted until the last follow-up examination.

Postoperative urinary incontinence in urethral anastomotic repair urinary incontinence occurring after urethral anastomotic surgical repair is attributed by many authors to the injured external (striated) sphincter of the urethra caused by the traumatic pelvic bone fracture. In the majority of patients with urethral injury caused by pelvic bone fracture the external sphincter of the urethra may be damaged at some degree. In these cases urinary continence depends only upon the intact internal sphincter that locates at the neck of the bladder. If the external and internal sphincters are both damaged urinary incontinence should become evident problem occurring after the surgical interventions[2]. In our present study the rate of postoperative urinary incontinence occurrence was 4, 37% (8/183 patients). Three of these 8 patients had been treated with plastic surgery of the neck of bladder, which resulted in good urinary continence after the intervention. In a study in which a comparison had been made between 8 patients with postoperative urinary incontinence and those without this complication Webster[9] noted that, the voiding cystourethrograms showed an widely opened segment of prostatic urethra and bladder neck of which the total length is not the same in patients with and without postoperative urinary.

Incontinence: in the formers this widely opened segment of the urethra was 1, 86 cm in average length, while in the latters the corresponding value was only 0,9 cm. This difference is statistically significant. Afterwards the 8 patients with postoperative urinary incontinence were treated successfully by Webster with the following methods: artificial sphincter in 2 patients, plastic surgical treatment of the bladder neck in 5 patients, collagen injection in 1 patient. These approaches was reported to have gained postoperative good outcome.

CONCLUSION

In a period between January 2007 and January 2017, 183 patients with posterior urethral stricture caused by pelvic bone fracture have been treated in our urological department by transperitoneal end-to-end urethral anastomotic repair. Mean age of the patients was 33, 10 years. The mean duration from the trauma occurrence to the repair surgical intervention was 4, 5 months. The postoperative erectile dysfunction rate was 63, 38% (116 patients); preoperatorily 36, 62% (67) of patients had normal erectile function. Postoperatively good outcome in voiding function was found in 89,57% of patients. Short- and medium-term problems occurring after urethral surgical repair included urinary leakage through the perineal wound, voiding failure that requires catheterization, and permanent urinary incontinence. Long-term good outcome of voiding function was found 91, 53% of patients, good erectile function was found in 80, 99% of patients, but 10 (5, 46%) patients still remained impotent. However, urinary incontinence and erectile dysfunction (impotence) were actually the complications caused by pelvic bone fracture but not by urethral anastomotic repair. The patient's age, the type of pelvic bone fracture and the urethral stricture length are the statistically significant prognostic factors ($p < 0,05$) that directly associated with the outcome of the surgical repair of the injured urethra.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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