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Predictors for success of internal urethrotomy in patients with urethral contracture following perineal repair of pelvic fracture urethral injuries

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ABSTRACT

Introduction: Internal urethrotomy (IU) in patients with urethral contracture following perineal repair of pelvic fracture urethral injuries (PRPFUI) is troublesome. We evaluated the clinical factors affecting the surgical outcome of IU for urethral contracture after PRPFUI.

Materials and methods: We retrospectively reviewed the records of 35 patients who underwent IU for urethral contracture after PRPFUI between March 2004 and June 2013. Ages of patients ranged from 18 to 50, and their follow-up duration was more than 1 year after IU. The urethral contracture was confirmed by retrograde urethrogram or cysto-urethroscopy. Success was defined as greater than 15 mL/s of peak urinary flow rate at 1 year after IU without any clinical evidence of urethral contracture. Success rates were investigated according to the number of IU. Age, body mass index, urethral defect length before PRPFUI, time interval between the original urethral injury and the PRPFUI or between a previous operation and the PRPFUI, time interval between the PRPFUI and the urethral contracture, number of PRPFUI performed, and the type of urethral lengthening procedure were compared between patients with and without success according to the number of IU.

Results: Among the 35 patients, the overall success rate of IU was 37% (13/35) during the mean follow-up period of 53 months (range: 17–148 months). There were 8 and 5 patients with success in first and second IU, respectively. However, there was no success after third IU. Urethral defect length before PRPFUI was significantly shorter in patients with success who underwent first and second IU ($p < 0.05$). There were significant differences of success between patients with and without previous repeated failures of PRPFUI in first and second IU ($p < 0.05$).

Conclusions: Short urethral defect length and no previous surgical failures before PRPFUI are good prognostic factors for IU following PRPFUI. Only one or two IUs will be helpful in patients with urethral contracture following PRPFUI.

Introduction

Pelvic fracture urethral injuries are the result of blunt pelvic trauma and its incidence was reported ranging between 1.6% and 25% [1–3]. These injuries usually cause an avulsion of bulbomembranous junction where it is liable to rupture [4]. The ideal treatment for pelvic fracture urethral injuries consists of meticulous removal of fibrotic tissues on the urethral defect and tension-free end-to-end anastomosis [5–7]. Although surgical methods to increase success rate are well known such as a golden triad for the posterior urethroplasty that is composed of complete excision of scarred tissue, a lateral fixation of healthy urethral end mucosa, and the creation of a tension-free anastomosis, repair of pelvic fracture urethral injuries is still challenging [6,7]. Moreover, any urethral contracture following failed repair of pelvic fracture urethral injuries can be a big concern not only to patients, but also to surgeons.

Internal urethrotomy (IU) refers to any procedure that opens the stricture by incising it transurethrally. Although the risk of urethral stricture recurrence was likely to be high, it is commonly performed for urethral strictures because it is simple and less invasive compared with an open urethroplasty [8,9]. However, there are very limited data on the surgical outcome of IU in patients with urethral contracture, unlike urethral stricture, which is an obliterative process in the posterior urethra caused by urethral distraction injury such as pelvic fracture urethral injuries. In addition, to our best knowledge, there is no paper investigating the clinical factor affecting the surgical outcome of IU for urethral contracture

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Table 1
Success rates according to the number of internal urethrotomy.

Internal urethrotomy	Number of success	Number of failure without further IU		Number of failure with further IU		Exact 95% CI for the success rate (%)
		Not wanting further IU	Follow-up loss		Success rate (%)	
1st	8	1	1	25	23 (8/35)	10–40
2nd	5	5	1	14	20 (5/25)	7–41
3rd	0	5	1	8	0 (0/14)	0–23
4th	0	1	0	7	0 (0/8)	0–37
5th	0	0	0	7	0 (0/7)	0–41
6th	0	2	0	5	0 (0/7)	0–41
7th	0	4	1	0	0 (0/5)	0–52

IU, internal urethrotomy; CI, confidence interval.

following perineal repair of pelvic fracture urethral injuries (PRPFUI). Therefore, we evaluated relevant clinical factors to determine predictors of successful IU for urethral contracture after PRPFUI.

Materials and methods

Patients

After acquiring approval from the institutional review board at CHA Bundang Medical Center, we reviewed the medical records of 226 patients who underwent posterior urethral reconstruction for pelvic fracture urethral distraction defects between March 2004 and June 2013. The need for written informed consent was waived because this study was conducted by retrospective chart review. We identified 39 patients aged ≥18 years who underwent IU for urethral contracture following PRPFUI. Patients with neurogenic issues that might affect voiding function were excluded. Patients who conducted urethral dilation after IU were also excluded.

Inclusion criteria were (1) age range from 18 to 50, (2) short and passable urethral contracture after PRPFUI (less than 10 mm on retrograde urethrogram), and (3) more than 1 year of follow-up after IU. Thirty five patients met the inclusion criteria.

Preoperative and operative procedures

The length and patency of the urethral contracture were assessed by retrograde urethrography. The procedure was performed with each patients placed in a lithotomy position and under spinal anesthesia. A cold knife urethrotome was used to incise the urethral contracture. An incision was made at the 12-o'clock position along its entire length and depth.

Definition of internal urethrotomy success

A successful outcome was defined as meeting the following criteria: (1) peak urinary flow rate greater than 15 mL/s at 12 months postoperatively, (2) no evidence of urethral contracture on retrograde urethrogram or cysto-urethroscopy postoperatively, and (3) no obstructive urinary symptoms for the follow-up period. The outcome was regarded as a success when the result of the final IU met the success criteria, even if the result of a previous IU was a failure. Patients were divided into one of two groups, success or failure. Success rates were investigated according to the number of IU.

Follow-up

The urethral catheter was removed three days postoperatively. Follow-up was scheduled at 1st, 3rd, 6th, 9th, 12th, 18th, 24th month, and every 12 months thereafter. Uroflowmetry and post-void bladder scanning were performed regularly on each follow-up visit and also performed as needed when patients complained of any obstructive symptom (hesitancy, abdominal straining, sense of incomplete sensing, decreased urinary stream). Retrograde urethrography was performed when the maximum flow rate was less

Table 2
Comparison between patients with success and failure who underwent first internal urethrotomy for urethral contractures following perineal repair of pelvic fracture urethral injuries [Data are presented as the mean (standard deviation)].

Characteristics	Total	Success	Failure	P Value*
Number of patients	35	8	27	
Age (years)	37 (9)	33 (10)	38 (9)	0.187[a]
BMI (kg/m^2)	23.7 (3.1)	23.5 (3.4)	23.7 (3.0)	0.827[a]
Urethral defect length before PRPFUI(cm)[c]	3.0 (1.4)	2.1 (0.8)	3.3 (1.5)	0.031[a]
Time interval (month)[d]	10.7 (6.5)	6.4 (6.1)	12.0 (6.1)	0.028[a]
Time to urethral contracture (month)[e]	5.9 (5.7)	8.1 (7.0)	5.2 (5.2)	0.210[a]
Number of PRPFUI performed (only once/more than once)	17/18	7/1	10/17	0.036[b]
Lengthening procedure				0.842[b]
UM	2	1	1	
UM + CS	9	2	7	
UM + CS + IP	5	1	4	
UM + CS + IP + UR	19	4	15	

SD = Standard deviation; UM = urethral mobilization; CS = corporal separation; IP = inferior pubectomy; UR = urethral rerouting.
* $p < 0.05$ was considered statistically significant.
[a] *t*-test.
[b] Fisher's exact test.
[c] Perineal repair of pelvic fracture urethral injuries.
[d] Time interval between the original urethral injury and the PRPFUI or between a previous operation and the PRPFUI.
[e] Time interval between the PRPFUI and the urethral contracture.

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