Reconstruction of Urethral Strictures in Patients with a Long History of Blind Urethral Dilatation

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Purpose: To compare urethral reconstructions in patients after several years with or without blind urethral dilatation.

Materials and Methods: A retrospective study of 107 patients with urethral reconstructions was performed. Sixty patients with a long history of blind urethral dilatation (group 1) were compared with 47 patients without prior dilatations (group 2).

Results: The type of surgery planned according to urethrography and endoscopy findings was appropriate in 37/60 (61.6%) patients in group 1 and in 39/47 (83%) patients in group 2 ($P < .03$). Anastomotic repairs were more frequent among the patients in group 2 ($P < .001$). Eighty five out of 107 patients were available for the 24 months follow-up. The success rate was higher in group 2 (91.4%) than patients in group 1 (70%) ($P < .04$). The greatest improvement in symptoms and quality of life occurred three months after the surgery ($P < .05$). Postoperative infection was persistent in 20/107 (18.7%) patients.

Conclusion: Urethral strictures with a long history of blind dilatation are separate entity. They are more difficult to image, require more augmentation and staged procedures and have a lower success rate.

Keywords: dilatation; intermittent urethral catheterization; adverse effects; recurrence; urethral stricture; therapy; surgery; treatment outcome.

INTRODUCTION

Reconstructive urethral surgery is traditionally considered as a demanding discipline due to different etiology and variety of surgical options. The reliability of preoperative radiological evaluation is lower in cases with spongiofibrosis[1] and requires a surgeon with adequate experience and the ability to change operative strategy during the surgery.[2,3]

Urethral dilatation (especially a blind one) was a preferable type of treatment during previous decades due to its simplicity and immediate results. Dilatations are rarely curative but are performed anyway by 31-33% of the urologists in the USA, even though failure is predictable.[4] Another reason is that 57.8% of urological surgeons never perform urethral reconstruction and only 4.2% perform buccal graft surgery,[4] which is currently the most frequent augmentation procedure. The increasing frequency of urethral reconstructive procedures means that numerous patients are looking for more durable solution after many years of prior dilatations.

The aim of this study is to analyze the difference between urethral reconstructions in patients with long history of blind urethral dilatations and patients without it.

MATERIALS AND METHODS

A retrospective study of 107 patients with urethral stricture disease, operated between 2003 and 2010 was performed. Surgery was done in all patients by a single well trained surgeon (I.I.). Standard diagnostic procedures in all patients included urethrography (retrograde and voiding), ultrasound evaluation of the kidneys, bladder, residual urine and endoscopic evaluation of the urethra. Repeated blind urethral dilatations were performed in 60 patients (group 1) at least two years before the surgery, with or without direct visual internal urethrotomies (IU). The other 47 patients had neither previous dilatations nor IU (group 2). Absence of infection was confirmed in 78/107 (72.9%) patients before the surgery. In 29/107 (27.1%) patients with persistent positive urine culture, targeted antibiotic therapy was initiated three days before the surgery and continued for at least seven days. The type of surgery was planned according to urethrography and endoscopy findings. In patients with ≥ 3 cm length of the stricture and well defined endoscopic distinction, anastomotic repair was performed. In longer strictures and non-distinct appearance of the healthy mucosa, augmentation ventral buccal graft was planned. In cases with the long complete obliteration of the urethra staged procedure was planned.

Plan of the surgery was considered as "appropriate" in patients when the surgery planned according to the preoperative evaluation was possible. In "inappropriate" patients the plan of surgery was changed due to length of the stricture (longer than expected) or long "grey urethra" augmentation instead of the anastomotic repair. Staged procedures were required in cases with the absent urethral plate or unexpected pus in the urethral lumen. Success was defined as: no need for additional instrumentation during the follow up, absent residual urine and maximum flow rate (Qmax) > 15 mL/s. Symptoms and quality of life (QoL) in successfully repaired patients were evaluated with the International Prostate Symptom Score (IPSS) and IPSS quality of life score (IPSS-QoL) before and after the surgery . The nonparametric Yates corrected Chi square test was used for statistical analysis.

RESULTS

The mean age of the patients was 66.4 ± 7.4 years (range, 21-81 years). Etiology and position of the strictures are shown in Table. There was no significant difference between groups regarding etiology and location of the strictures. Preoperative decision regarding the type of surgery was appropriate in 37/60 (61.6%) patients in group 1 and in 39/47 (83%) patients in group 2 ($P < .03$). Acquired bladder diverticula were found in 12 patients. Eighty five out of 107 (79.4%) patients (35 from group 2 and 50 from group 1), were available for the evaluation 24 months after the surgery. The success was confirmed in 32/35 patients in group 2 (91.4%) and in 35/50 (70%) patients in group 1 ($P < .04$). Six out of the 107 patients (5.6%) had a primary failure (graft necrosis). Deterioration occurred during the follow up in 18/85 (21%) patients. Total number of patients who were lost from the follow-up was almost equal in both groups; 9 (8.4%) in group 2 and 7 (6.5%) in group 1, totally 16 (14.9%) in both groups. The drop-out of patients occurred one year after the surgery without complications (Figure 1).

Figure 2 shows the combined data for the stricture length and the type of surgery. Strictures longer than 5 cm were more frequent in group 1 ($P < .01$). Anastomotic repairs were performed in 32/47 (68%) patients in group 2 and in 16/60

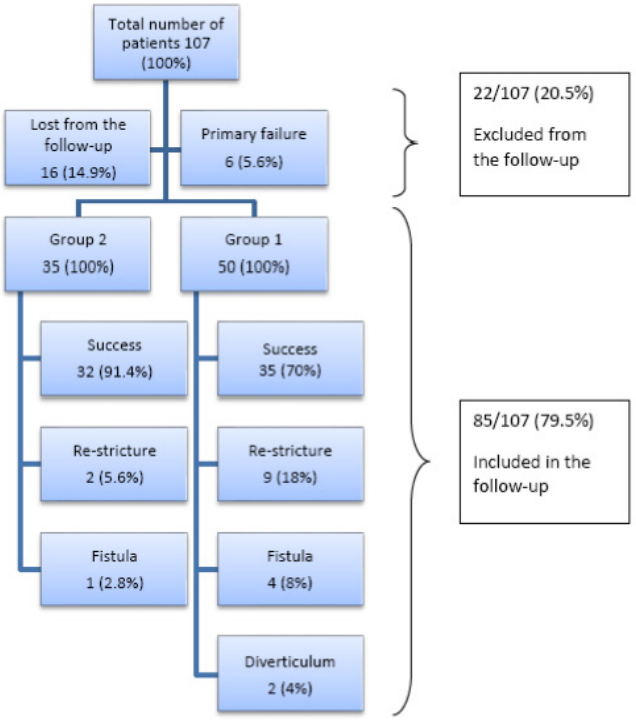

Figure 1. Follow-up and complications of surgery.

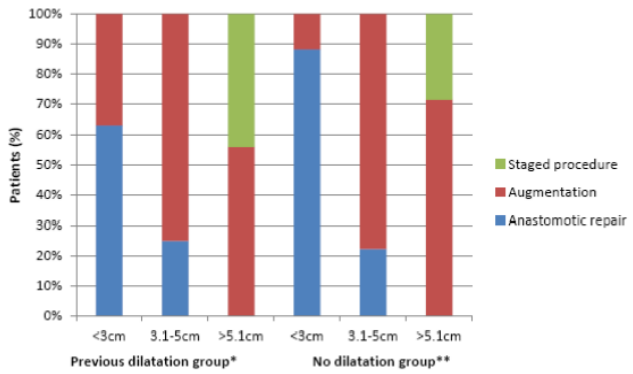

Figure 2. Type of surgery and length of the strictures.
* Significantly more frequent strictures longer than 5 cm ($P < .01$)
** Anastomotic repair was more frequently possible among no previous dilatation strictures 0-5 cm ($P < .001$).

(26.7%) patients in group 1 ($P < .001$). Augmentation procedures were performed in 33/60 (55%) patients in group 1, and in 14/47 (29.8%) patients in group 2 ($P < .02$).

Improvement of symptoms and QoL was significant in both groups (Figures 3 and 4). The highest improvement occurred three months after the surgery ($P < .05$). IPSS was better three months after the surgery in the group 2 than in group 1, but without statistical significance. The most frequent postoperative bothersome symptom was urgency. Infection was persistent after the surgery in 20/107 (18.7%) patients without statistical significance between 2 groups.

DISCUSSION

The etiology of urethral strictures has changed over the recent decades. Today, infective etiology is less important, but traffic accident, trauma, iatrogenic and idiopathic causes became more frequent.[5]

The most important recognizable cause of urethral injury, according to our results, was iatrogenic trauma. Investigations of avoidable iatrogenic complications showed that educational support regarding urethral catheterization was generally poor, even in highly developed medical systems.[6] An

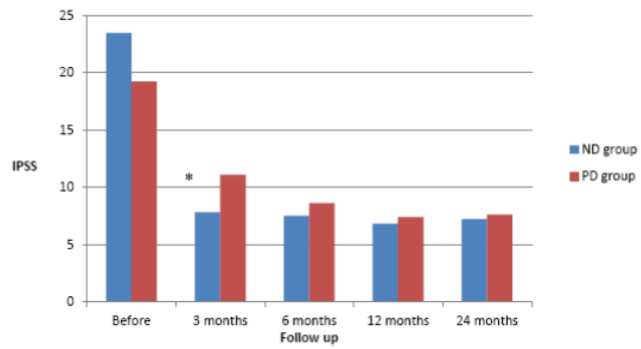

Figure 3. Mean values of International Prostate Symptom Score before and after the urethral reconstruction.
Keys: IPSS, International Prostate Symptom Score; ND, no previous dilatation; PD, previous dilatation.
*Significant difference ($P < .05$).

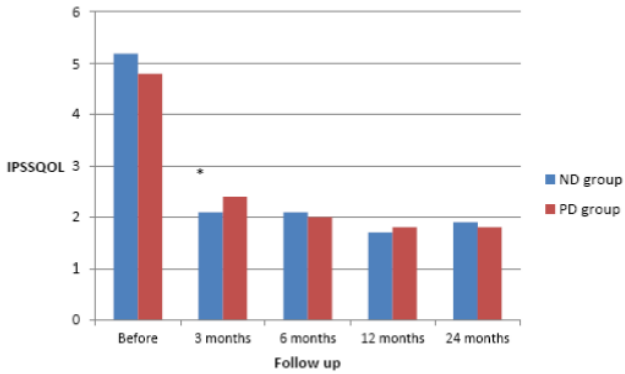

Figure 4. Mean values of International Prostate Symptom Score quality of life score before and after the urethral reconstruction.
Keys: IPSS, International Prostate Symptom Score; IPSSQOL, IPSS quality of life score; ND, no previous dilatation; PD, previous dilatation.
*Significant difference ($P < .05$).

Figure 5. Multiple dilatation "channels" performed after several years of "blind" dilatation in the bulbar urethra four weeks after cystostomy.

overuse of urinary catheters was evident, with only 47% of the physician orders for catheters documented in hospital departments. Urinary catheter related morbidity resulted from interns performing catheterization in 74% of case.[6,7] Iatrogenic injury, in our series, occurred more frequently in non-urological departments (traumatology, neurosurgery, cardiac surgery and neurology).

Preoperative evaluation was significantly less reliable with respect to operating strategy in the group 1. Other reports have demonstrated the relatively high reliability of urethrography in cases without spongiofibrosis.[1] In our series of patients, reliability was less than reported in the group 1, which can be attributed to the repeated trauma (spongiofibrosis).

Urethral dilatation and IU are rarely curative and associated with progressive deterioration and frequent inflammatory complications.[8] These procedures are frequently abused in the developing world,[8] such as in our series in the group 1. It should be recommended only in selected patients, who are recurrence free after 3 months.[9] Considerable evidence is accumulating that, patient undergoing more than two IU have a lower probability of success and negative effect on the length of the stricture.[10] Because of that numerous alternative techniques are developed.[11] The mean number of repeated urethrotomies suggests that IU contributed to the length of the stricture and decreased probability of success.[12,13] No uniform approach exists among the urologists worldwide regarding the treatment of urethral strictures. One reliable study from Netherlands suggests that almost all urologists perform IU, and 49% of them will suggest it even for 3.5 cm long strictures and consider urethroplasty only after failure of IU.[14]

Another step forward is uncritically forced blind urethral dilatation (tunneling), which resulted in completely false passage in 13 patients in both the anterior and bulbar urethra, followed by monthly subsequent dilatations and virtually no chance of success (Figure 5). These tunnels remained visible for more than four weeks, regardless of cystostomy placed before the surgery (Figure 3). Urethral dilatations, although ineffective, are highly accepted among the "non-reconstructive" urological surgeons,[15,16] with a "soft" border between allowed and non-allowed manipulation.

Anastomotic urethroplasty was performed in 47 patients. In 20 patients, strictures measuring 3-5 cm were excised from the bulbar urethra (mean 3.5 cm) and anastomotically repaired using extensive preparation, diversion of the corporeal bodies, and urethral mobilization.[17] Anastomotic urethroplasty is usually performed for strictures ≤ 2 cm.[8] There are rare, anecdotal reports regarding anastomotic urethroplasty for strictures up to 5 cm.[18] Anastomotic repairs were used less restrictively in our series, due to the age of the patients and the primary importance of complication-free voiding after the surgery and the less importance of sexual activity. Buccal graft augmentation has improved dramatically outcome of the surgery of long strictures, however, residual symptoms, as well as, complications are more frequent and numerous improvement are still under way.[19]

Our results confirmed that augmentation surgery is initially as successful as reported in the series of other authors.[2,3,20] Deterioration subsequently occurred in a considerable number of patients with the special impact on success in group 1. We were aware of the impaired durability and worse long-term outcome of an inflammatory stricture repair.[22] Persistent urinary infection (12%) is a common problem during the first postoperative months in other reports.[23] In our subjects, infection was present in 14.9% patients in the group

Table . Etiology and location of the strictures.

Voiding	Previous Dilatation Group	No Dilatation Group	Total no. (%)
Etiology of the stricture*			
Infection	7	2	9 (8.4)
Accident	8	5	13 (12.1)
Iatrogenic	28	20	48 (44.8)
Idiopathic	25	12	37 (35.5)
Location of the stricture*			
Pendular	14	8	23 (21.5)
Bulbar	37	30	67 (62.6)
Membranous	11	6	17 (15.9)

* There were no significant differences regarding the etiology and position of the strictures in the study groups.

2 and 21.6 % of patients in the group 1 ($P > .05$). This could be partially explained by the chronically infected bladder diverticula, which appeared in 12 cases (all in group 1) due to long-acting subvesical obstruction.

Residual symptoms were not the same in all cases, regardless the anastomosis was clinically patent. The highest symptomatic as well as QoL improvement, occurred three months after the surgery in group 2, probably due to less frequent infection and more frequent anastomotic repairs. The main complaint after the surgery was urgency. Symptoms declined together with infection and the mean IPSS remained between 6.8 and 11.1. The IPSS and IPSS-QoL are simple and reliable, although not disease specific. They were previously used for the evaluation of the outcome of surgery. Patients in our series had higher values of IPSS than some that have been reported,[25] which could be explained by the advanced age of our patients, as well as coexisting morbidity (prostate hyperplasia, bladder diverticula and etc.). A patient reported outcome measurement tool has recently become available.[26] There is confirmed evidence that the IPSS-QoL questionnaire also has a moderate to high correlation with the outcome of surgery.[27] Clearly, although anatomical patency is a "must" for the successful reconstruction, residual symptoms could not be neglected.

The strength of the present study is sufficient number of patients, single operating surgeon and enough follow-up period. However, its weaknesses are the retrospective nature, certain number of patients was lost from the follow-up and the lack of data about sexual life.

CONCLUSION

Repeated dilatations are not a good treatment, although commonly performed, due to relative ease of the procedure and a lack of awareness in the medical community. They are correlated with the less reliable preoperative decision making, more frequent augmentation procedures and worse outcome of the surgery. Surgeon must be flexible in their approach as the type, location and degree of spongiofibrosis can affect the type of the surgery chosen for the repair.

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CONFLICT OF INTEREST

None declared.

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