Use of Pedicle Flap from the Labia minora for the Repair of Female Urethral Strictures

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Key Words
Female urethral stricture • Pedicle labial flap • Female urethral injuries

Abstract
Introduction: We present the method of pedicle labial urethroplasty for urethral reconstruction in female patients treated for urethral strictures. Patients and Methods: We performed urethral reconstruction using a pedicle labial flap in 2 female patients (23 and 70 years old) for urethral stricture (posttraumatic and postinflammatory origin). We used as a patch a pedicle skin flap obtained from the labia minora. The pedicle flap is slid beneath the vulvovaginal wall, until the urethra is reached. Results: In both cases a normal micturition was obtained, and cystourethrography after 24 months showed a good urethral silhouette, without residual urine. Conclusion: The pedicle labial urethroplasty seems to be a reliable technique for the repair of urethral strictures.

Introduction
Urethral strictures in females are uncommon urological findings, resulting from pelvic trauma, iatrogenic injuries, and inflammatory disease. The surgical treatment of these cases is still debated. We present the technique of urethroplasty using a pedicle flap from the labia minora for the repair of urethral strictures in 2 females. We chose the labial skin because it is a hairless, naturally wet, elastic, and easily available tissue.

Materials and Methods

Patients
Case 1 was a 23-year-old woman with a previous pelvic trauma; she had undergone a primary bladder neck-urethra anastomosis for urethral complex lesions due to pelvis fractures. Case 2 was a 70-year-old woman having diabetes and a history of recurrent urinary tract infections. Both patients had undergone repeated urethral dilations without satisfactory results. We performed a single-stage urethroplasty using a pedicle skin flap obtained from the labia minora.

Description of the Technique
The urethra is exposed through a longitudinal incision of the anterior vaginal wall, starting from the urethral meatus. The vaginal wall is separated from the urethral bed. To obtain a good exposition
Fig. 1. The flap is marked on the skin of the labia minora.

Fig. 2. The flap is mobilized on its vascular pedicle.

Fig. 3. Transposition of the flap to the urethra.

Fig. 4. The flap is sutured to the margins of the open urethra and stented with a fenestrated catheter.
of the urethra, the dissection continues circumferentially in the perirethral connective tissue. An incision through the entire thickness of the ventral urethral wall is done, from the meatus into the healthy urethra proximal to the stricture, the distal tip of which is identified by probing the urethral lumen with a metal sound. An appropriately sized and shaped flap is marked on the skin of the labia minora (fig.1); it is cut along these outlines and mobilized on its vascular pedicle (fig. 2). The flap is carried down to the urethra, running through a tunnel below the vulvovaginal wall (fig. 3). The epidermic surface of the flap is turned over the urethral lumen and then sutured to the margins of the urethra. A continuous anastomosis is done along both sides of the open urethra, stretching the skin during the procedure. The urethra is stented with a fenestrated 18-Fr silicone Foley catheter (fig. 4). After 2 weeks, the catheter is removed, if the X-ray examination reveals normal results.

Results

In both cases a normal micturition was obtained with absence of urinary leaks, and cystourethography after 24 months showed a good urethral silhouette, without residual urine. The cosmetic results are satisfactory too, and the younger patient has no dyspareunia.

Discussion

A true organic stricture of the adult female urethra is not common. In many cases, the etiology is posttraumatic (frequently associated with complex pelvis fractures or with childbirth), iatrogenic (during excision of a urethral diverticulum, bladder neck suspension, or other vaginal repair), or secondary to acute or chronic urethritis, but often the causes are unknown. However, the basic mechanism causing the urethral narrowing is perirethral fibrosis. The principal symptoms of stricture are persistent hesitancy in initiating micturition and a slow or interrupted urinary stream, burning, frequency, and urethral pain resulting from secondary infection of the bladder. Urinalysis often reveals the presence of bacteriuria and pyuria. A voiding cystourethrogram may reveal an open vesical neck and a dilated portion of the urethra proximal to the stenosis, with a variable degree of residual urine. The definitive diagnosis is made by performing a cystoscopy that may demonstrate the point of narrowness and its extension and may show the local condition of the urethral bed. The simplest treatment modality is overdilatation of the urethra, but a recurrence of the stricture is not rare (as in our experience). The definitive procedure in cases of female urethral stricture depends on: (1) the site of the stenosis, (2) the length of the proximal healthy urethra, and (3) the bladder neck integrity. In few selected patients with a short stenosis, an internal urethrotomy may be effective; in patients with a distal stricture and a normal proximal urethra, the creation of a neomeatus is effective too. Patients with partial urethral loss, complete destruction of the urethra, or previous ineffective treatment should undergo a urethral reconstruction. The goal of the surgical reconstruction is the resolution of the obstruction while keeping the urinary continence. For this reason, before surgery, every patient should be carefully evaluated to rule out the concomitant presence of associated anomalies, such as vesicovaginal fistula, vesicoureteral reflux, internal sphincter incompetence, or unstable bladder activity. Although detrusor instability or a reduced compliance may be present preoperatively, these conditions often diminish after surgical treatment. The urethral reconstruction needs the observation of some general surgical rules: (1) an efficient exposition of the urethral bed, (2) a large mobilization of the flap to prevent suture stretching, (3) a careful preparation of the island flap, warranting a good vascular pedicle, and (4) a concomitant pubovaginal sling, if there is a bladder neck incompetence. Mundy [1] presented a series of 30 total urethral substitutions in female patients with urogenital sinus abnormalities and postirradiation vesicourethrovaginal fistulae. He used five different surgical techniques, in particular, he chose a pedicle labial skin tube urethroplasty when no other tissue was available and always wrapped the neourethra with either labial fat or omentum. Falandry et al. [2] reported their experience using a single or double face pedicle flap obtained from the labia minora or maiora for the urethral reconstruction in patients treated for extensive urethral damage after obstetrical injury. They treated 56 female patients (average age 18 years) using a patch in 27 cases, a tubularized flap for complete reconstruction of the urethra in 18 patients, and a double-faced urethroplasty in the other 11 cases. These authors combined the treatment with a Martius sling procedure and in 11 cases with a colposuspension. The average follow-up period was 23 (range 5–47) months. The global success rate was 82%. Recovery of normal micturition and absence of urinary leak were obtained in 36 cases (69%). These authors concluded that the pedicle labial flap is a highly suitable treatment for the management of extensive urethral cervical damage after obstetrical injury. Blaivas and Heritz [3] presented a retrospective study of one-stage urethral reconstruction using a vaginal flap in 47 female patients with anatomical damage to the urethra or the vesical neck. They combined a fascial pubovaginal sling in 41 patients, a modified Per-
eyra procedure in 5 patients, and a Kelly plication in 1 case; continence was obtained globally in 42 subjects. Ahmed and Neel [4] treated 3 young girls (average age 3 years) with major urethral injury following a blunt trauma with fractured pelvis. Two girls with complete loss of the urethra and a close bladder base underwent a reconstruction of a neourethra using a flipped anterior bladder wall tube. Both patients were continent: 1 presented a normal micturition and 1 patient needed an intermittent catheterization. Also Hemalet al. [5] managed a complete urethral loss resulting in stricture with a bladder flap tube neourethra in 3 girls with complex urethral injury accompanying pelvic fracture. All patients were continent, although 1 required a clean intermittent catheterization for a short period. We evaluated at our clinic 2 female patients with urethral stricture of posttraumatic and postinflammatory origin. Both patients had undergone repeated urethral dilatations without satisfactory results. We decided to perform a single-stage urethroplasty using a pedicle skin flap obtained from a labia minora. The minor labial skin presents many suitable features for creating an island flap; in fact it is a hairless, naturally wet, elastic, and easily available tissue. The labial flap is carried down to the urethra (through a tunnel below the vulvovaginal wall) and used as a patch on the ventral wall of the open urethra after stricturotomy. After 24 months both patients presented a good micturition without urinary leaks. In our experience, the use of a pedicle flap obtained from the labia minora for the one-stage urethroplasty in the reconstruction of female urethral strictures is a suitable and effective surgical treatment.

References
