

## A Rationale for Procedure Selection to Repair Female Urethral Stricture Associated with Urethrovaginal Fistulas

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**Purpose:** We investigated a rationale for procedure selection to repair female urethral stricture associated with urethrovaginal fistula. We compared the outcomes of the 5 techniques used.

**Materials and Methods:** Between January 1999 and October 2011, 44 female patients with urethral stricture associated with urethrovaginal fistula were treated using a total of 5 techniques. The surgical techniques were labial pedicle flap urethroplasty in 24 patients, vulvar flap urethroplasty in 3, anterior vaginal flap urethroplasty in 11, end-to-end anastomosis in 4 and bladder flap urethroplasty in 2. Supplementary procedures were performed in some patients during urethroplasty, including bladder neck reshaping for incontinence in 5, intestinal-vaginal fistula repair in 3, colpoplasty for island vulvar skin flaps in 3, middle vaginal stricture vaginoplasty in 2 and enlargement of the vaginal introitus in 1.

**Results:** Average postoperative followup was 42.3 months (range 6 to 140). Urethrovaginal fistula recurred in 2 patients because of infection, urethral stricture developed in 1 and stress incontinence appeared in 1. The other patients voided normally with an average maximum urine flow greater than 15 ml per second (range 16.7 to 46). The overall anatomical success rate was 93.18% (41 of 44 cases) and the functional success rate was 90.91% (40 of 44).

**Conclusions:** Surgical procedures for treating female urethral strictures with urethrovaginal fistulas should be based on fistula location, stricture length and vaginal anatomy. A transvaginal approach might be optimal if the vagina is wide and easily dilated. Pedicle labial flap urethroplasty was a reliable technique for complex strictures.

**Key Words:** urethra, vagina, fistula, urethral stricture, female

URETHRAL stricture or defects associated with urethrovaginal fistulas are rare occurrences that usually result from blunt trauma, iatrogenic injury or infection. In developed countries the most common cause of urethral damage is iatrogenic injury resulting from a surgical complication,<sup>1-3</sup> whereas blunt or pelvic trauma is a more frequent cause in developing countries.<sup>4,5</sup>

Various surgical techniques are available to repair female strictures. Some methods are relatively compli-

cated and cumbersome, and many require knowledge or experience with tissue transfer techniques.<sup>6-15</sup> Nevertheless, there is no generalized consensus on the best surgical strategy.

### MATERIALS AND METHODS

#### Clinical Materials

Between January 1999 and October 2011, 44 female patients with a mean age of 28 years (range 5 to 52) who had urethral stricture associated with a urethrovaginal

**Characteristics of 44 patients**

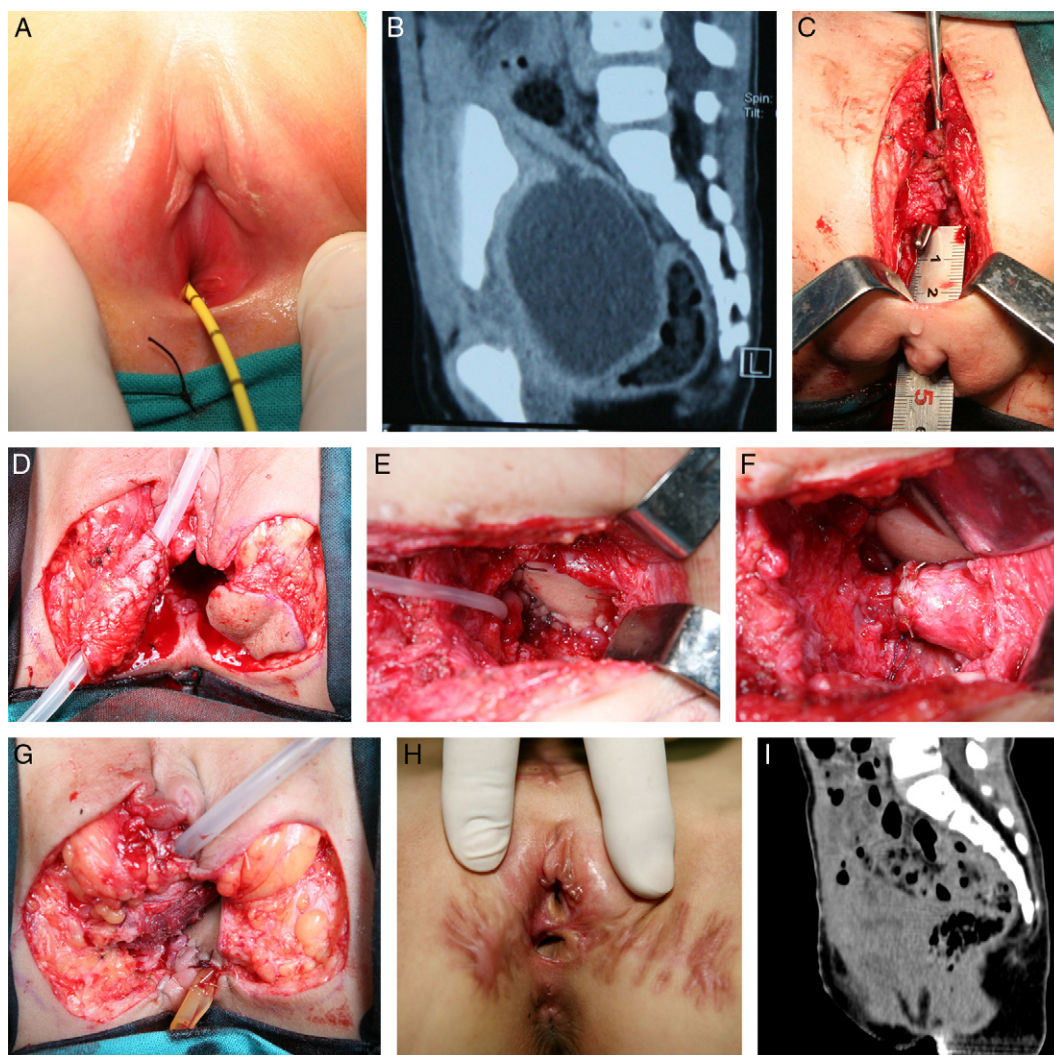
	No. Pts (%)
<b>Etiology:</b>	
Pelvic fracture after traffic accident	35 (79.55)
Local inflammation	2 (4.55)
Local injury	3 (6.82)
Iatrogenic injury	4 (9.09)
<b>Urethrovaginal fistula urethral site:</b>	
Proximal third	10 (22.73)
Middle	25 (56.82)
Distal third	9 (20.45)

fistula were treated at our hospital. The table lists the characteristics of the 44 patients. Condition history ranged from 1 to 23 years (mean 4.3). The length of the

urethral stricture or defect ranged from 0.5 to 3.5 cm (mean 2.4). Urethral stricture was associated with an ileovaginal fistula in 2 patients and with a rectovaginal fistula in 1. Six patients presented with vaginal stricture. A large hydrocolpos was in the proximal vagina in 3 girls (fig. 1, A and B), resulting in obvious voiding difficulty. In 2 girls decompression procedures by puncture and drainage had been done several times elsewhere. Before hospital admission suprapubic cystostomy was performed in 30 patients and sigmoid colostomy was performed in 1 at the same time.

**Preoperative Evaluations**

Preoperative evaluation included history, physical examination and routine laboratory investigations. Voiding and retrograde cystourethrography, and urethroscopy were performed to evaluate the bladder neck and assess the



**Figure 1.** Use of vulval island skin flaps to reconstruct urethra and colpoplasty. A, vulval examination showed narrow vaginal orifice and only 3Fr ureteral tube could be passed. Patient had no urethral meatus. B, computerized tomography revealed severe hydrocolpos in proximal vagina. C, urethral defect was 3 cm long. D, right island vulval skin flap was obtained to construct neourethra. E, lateral vaginal wall was incised. Left island vulval skin flap was inserted in vaginal lumen and sutured to vaginal wall to enlarge vagina. F, end-to-end anastomosis was performed between proximal urethra and neourethra. G, rectus flap was inserted in space between urethra and vagina. H, external urethra and vagina 5 months postoperatively. I, hydrocolpos in proximal vagina was no longer visible on computerized tomography.

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