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Twin penile skin flap, is it the answer for repair of long anterior urethral strictures?

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KEYWORDS

Twin penile skin flap;
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ABBREVIATIONS

LS, lichen sclerosis;
Q_{max}, peak urinary flow rate;
VIU, visual internal urethrotomy

Abstract ***Objective:*** To present our twin ventral penile skin flap technique for the management of complex long anterior urethral strictures not caused by lichen sclerosis (LS), with evaluation of surgical outcome and complications.

Patients and methods: We retrospectively reviewed patients diagnosed with long complex anterior urethral strictures who were all referred to Ain Shams University hospital and operated on by three reconstructive surgeons. The surgical procedure was carried out as follows: exposure of the urethra through a ventral longitudinal penile skin incision and another perineal incision; two ventral longitudinal dartos-based penile skin flaps are used for urethral augmentation as onlay flaps. Clinical data were collected in a dedicated database. Preoperative, intraoperative, and post-operative follow-up data for each patient were recorded and analysed. A descriptive data analysis was performed.

Results: Between January 2012 and February 2015, 47 patients diagnosed by urethrograms as having long anterior urethral strictures, with a mean (SD, range) length of 17.56 (2.09; 14–21) cm, were managed by twin penile skin flap repair. Four patients were lost to follow-up, thus 43 patients constituted the study cohort. The mean (range) follow-up period was 31 (22–36) months. The overall success rate was 95.35% (41/43). At 12-months postoperatively, the 41 successful cases had a mean (SD, range) peak urinary flow rate of 20.26 (3.06, 14–25) mL/s and American Urological Association Symptom Score of 5.6 (1.85, 3–8). Postoperative complications included urethrocutaneous fistula in three patients (6.97%), mild sacculation of the flap in seven patients (16.52%), post-micturition dribbling in 34 patients

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(79.07%), decreased penile girth in two patients (4.65%), and chordae of < 15° with no need for repair in three patients (6.97%).

Conclusions: In the presence of a favourable urethral plate and ample non-hirsute penile skin, one-stage twin penile skin flap urethroplasty provides excellent results for non-LS related complex strictures, with minimal acceptable complications. It proved to be especially efficient in circumcised patients.

Introduction

Repair of long anterior urethral strictures has always been a challenge for urologists. Surgical options include one-stage or two-staged procedures, using either single or multiple tissue transfer, which ranges between mucosal or extragenital skin grafts and genital skin flaps.

Choosing an appropriate surgical technique is influenced by the location, length, depth, and availability of healthy non-hirsute genital skin, previous repair, and surgeon's experience [1]. As the field of urethral reconstruction has developed there has been an upward trend towards one-stage repair [2].

Advantages of the use of penile skin include its non-hirsute nature, proximity to the urethra, length, flexibility, versatility, and good vascularity, even in recurrent cases. It is a good alternative especially if buccal mucosa cannot be used, e.g. in patients with oral leucoplakia. Earlier reports have proven that penile skin is a reliable urethral substitute, particularly when the dorsal urethral plate can be preserved [3]. Even in previously circumcised men good cosmetic results can be attained using penile skin. However, lichen sclerosis (LS) is a contraindication to repair using genital skin as in our opinion it affects extragenital skin as well.

Preputial and various penile skin flaps, such as longitudinal flap, the 'hockey stick' flap, and the circular penile fasciocutaneous flap based on dartos have been used for penile urethral reconstruction. After Orandi [4] first described a longitudinal penile skin flap for single-stage urethroplasty in 1968, the technique has been the most popular method of repair for anterior urethral strictures. Quartey [5] used the same principle and described a ventral flap with a dorsal or circumferential 'hockey stick' extension, which could provide a length of up to 13 cm to repair long urethral strictures with a success rate of 90%.

A transverse penile island flap was used by el-Kasaby et al. [6] in 1986 for repair of hypospadias, also a distal circumferential/circumpenile flap, devised by McAninch and Morey [3] in 1993, became one of the most versatile flaps, which provides a full circular non-hirsute skin flap up to 12–15 cm in adults. For synchronous urethral strictures, the flap may be divided into two pieces and/or passed under a scrotal tunnel to reach up to the proximal urethra; this technique had a 79% success rate. The Q-flap is a modification of the circumferential flap extended ventrally in order to gain additional length for use in panurethral strictures. [7].

Our new technique is based on the use of a modified Orandi's longitudinal penile skin flap for the repair of long anterior urethral strictures (14–21 cm). This is achieved by the use of twin longitudinal ventral penile skin flaps, each flap is dartos based on one side of the ventral longitudinal penile incision. Its main advantage is that it can be used in repair of long strictures in which buccal mucosa is not sufficient to augment the whole stricture length, even if both cheeks and lower lip mucosae are harvested.

Patients and methods

Between January 2012 and February 2015, 47 patients with complex long anterior urethral strictures of variable aetiologies were recruited for single-stage repair using a twin penile skin flap technique. Four patients were lost to follow-up, thus 43 patients constituted the study cohort. The mean (SD, range) age was 38.37 (10.17, 19–58) years. Patients with LS were excluded after clinical examination and biopsy from the penile skin and external meatus in suspected cases. Patients with a urethral calibre of < 8F were also excluded. All patients were circumcised. The presence of ample non-hirsute penile skin was a mandatory prerequisite in all patients; it has to be sufficient for the flaps and tension-free closure of the penile incision. The causes of the strictures included: 12 post-traumatic (27.9%), 12 iatrogenic (27.9%), 11 (25.6%) idiopathic, and eight were inflammatory in origin (18.6%). In 30 patients (69.8%), stricture involved the fossa navicularis and in 13 patients (30.2%) it was spared. In all, 15 patients (34.9%) had recurrent strictures after various procedures and 28 patients (65.1%) had non-recurrent strictures (Table 1). The mean (SD, range) stricture length was 17.56 (2.09, 14–21) cm.

A detailed history was taken and a full clinical examination of the external genitalia was performed. All patients underwent a retrograde urethrogram, voiding cystourethrogram (VCUG) in patients who could void, uroflowmetry, and AUA Symptom Score assessment.