

Urethrocutaneous fistula repair after hypospadias surgery

M. CIMADOR, M. CASTAGNETTI and E. DE GRAZIA

Paediatric Surgery, University of Palermo, Palermo, Italy

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OBJECTIVE

To evaluate and compare the success rates of simple and layered repairs of urethrocutaneous fistulae after hypospadias repair.

PATIENTS AND METHODS

The charts of 72 children who developed fistulae after hypospadias repair were

reviewed; 39 had a simple closure of the fistula, whereas 32 had a 'pants over vest' repair, in all cases after excluding an impairment of urine outflow.

RESULTS

The success rate at the first attempt was 74% for simple closure and 94% for the layered repair; at the second attempt it was 80% and 100%, the difference being statistically significant for both repairs.

CONCLUSIONS

Although probably far from an optimal technique for repairing urethrocutaneous fistulae, the pants-over-vest repair allows a good success rate for penile shaft fistulae.

KEYWORDS

fistula, hypospadias, children, outcome, repair

INTRODUCTION

Urethrocutaneous fistula (UCF) after hypospadias repair remain a frustrating problem for paediatric urologists. Furthermore, with the improvement in suture materials and surgical techniques, such complications are increasingly unacceptable. The occurrence of UCF precludes a goal of hypospadias surgery, i.e. an early one-stage repair of the defect.

During the last decade many principles of an ideal repairing technique have been clarified. Delicate tissue handling, inversion of the urethral mucosa after excising the epithelialized tract of the fistula, a multilayer repair with well-vascularized tissues, avoiding overlapping sutures and nonabsorbable or thick suture materials, a tension-free closure, use of optical magnification and needle-point cautery for coagulation are currently considered mandatory [1]. However, regrettably, a single universally effective repair technique has not been found.

The problem is exacerbated because UCF not only occur but also recur, sometimes requiring many procedures in the same patient [2], with all the potential harmful physical and psychological consequences. For this reason, Ehle *et al.* [3] recently suggested as a reasonable option adopting a two-stage procedure to reduce the recurrence rate.

At our institution, in the last decade we have changed the surgical technique for managing UCF from a simple closure [4] to a 'pants-over-vest' technique [5,6]. The aim of the present study was to analyse retrospectively the influence of this change on the recurrence rate of UCF at our institution.

PATIENTS AND METHODS

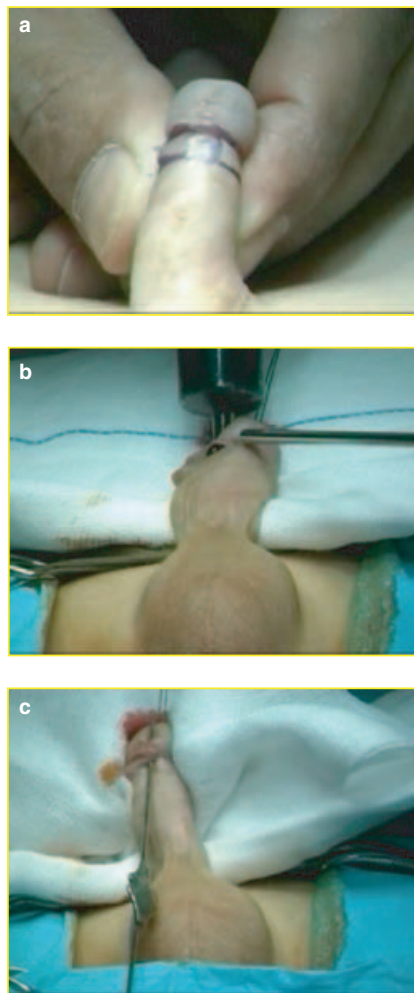
From January 1991 to December 2001, 535 boys with hypospadias were referred to our hospital; only 72 who developed fistulae were considered in the present study, to obtain a sample that was as uniform as possible. All these children had had a similar distal hypospadias and underwent a similar type of repair by the same skilled surgeon (E.D.). The procedure used was a Mathieu urethroplasty with or without excision of the fibrous tissue near the urethral plate, according to the presence of chordee [7,8].

UCF were scheduled for surgical repair only if they persisted for 1 month after the intervention. All the UCF repaired were scheduled for ≥ 6 months after the last procedure, so that any local inflammation could resolve completely. Urethral calibration was always used before surgery to exclude meatal or urethral strictures. Thereafter, the presence, number and location of UCF were assessed, probing every pit in the skin with an ophthalmic teardrop probe

and injecting, under pressure, an iodine solution with the tip of a small syringe inserted in the terminal portion of the neourethra (Fig. 1a–c).

The margins of each fistula were excised and the fistula closed. From 1991 to 1995 (group A) the repair consisted of simple closure, taking care to invert the fistula edge into the urethral lumen (39 boys) according to Goldstein and Hensle [4]. From 1996 to 2001 (group B) we adopted a triple-layered double-flap closure, the 'pants-over-vest' repair, covering the simple closure of the fistula with two overlapping cutaneous flaps, one of which was deprived of the external skin layer (33 boys) [5,6]. This technique starts by surrounding the urethrocutaneous orifice(s) and preparing the two lateral skin flaps (Fig. 2a,b), as previously drawn (Fig. 1a). After accurately removing all the margins of fistula orifice(s), the last one is closed with a few interrupted 6/0 absorbable sutures (Fig. 2c). One of the lateral skin flaps (usually the thickest) then has the external skin layer removed and is reduced to only a dermal flap. This flap is now bridged over the previous fistula orifice, so that the suture lines do not overlap the fistula sutures (Fig. 2d–e). After sectioning the dermally deprived skin layer (Fig. 2f) the whole opposite flap, previously prepared, is now bridged over and sutured with the contralateral penile skin (Fig. 2g–h). A transurethral catheter is inserted for a few days (Fig. 2i).

FIG. 1. A sub-coronal UCF.

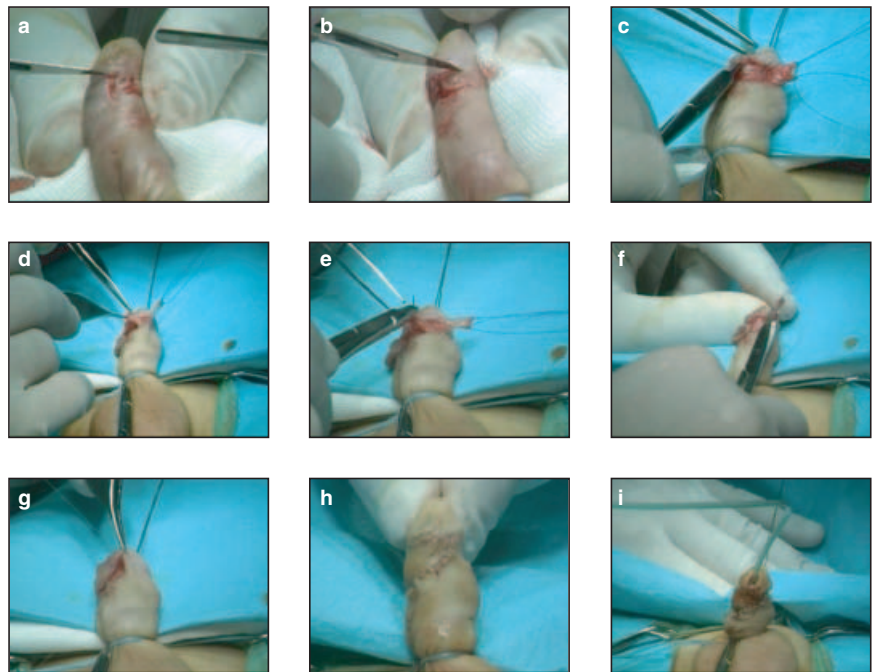


In both groups the repair was by 6/0 absorbable (polyglycolic acid or polydioxanone) sutures and using optical loupes. The transurethral catheter was maintained for the first 4 days after surgery in both groups; no suprapubic diversion was used. The outcome was compared using a *t*-test, with $P < 0.05$ taken to indicate significance.

RESULTS

The UCF was subcoronal in 30 boys in group A and 31 in group B. In most the fistula orifice was about at the level of the original meatal location, with the remainder at the coronal groove. Three boys in group A and one in group B had a larger urethral orifice, of >2 mm, whereas two in group A and five in group B had many pin-point fistulae. There

FIG. 2. (a–i) The Dennis-Walker 'pants-over-vest' repair.



were no glanular or proximal shaft fistulae in this selected sample. After the first repair the fistula recurred in 10 boys in group A and in two in group B. The overall success rate of first repair was 74% in group A and 94% in group B ($P < 0.05$). Fistulae originally in the balanic groove recurred in five boys in group A. For the second repair the same technique was used as for the first. After the second repair there was no recurrence in group B, while there was in two of 10 boys in group A. A simple closure was used again in one of these boys while the other had a 'pants-over-vest' repair. To date, after a mean follow-up of 5.3 (range 0.6–10.5) years, there have been no further recurrences.

DISCUSSION

As with hypospadias surgery, there are no perfect techniques for repairing UCF. Many variables could influence the surgical management and outcome, i.e. the time of occurrence after urethroplasty, the location (glanular, coronal, mid-shaft, etc.), size (pin-point, large), the number and the conditions of local tissue [9]. However, Waterman *et al.* [10] reported no significant difference in outcomes comparing some variables, e.g. the use or not of a stent or catheter, optical

magnification, patient age and interval between surgery at time of fistula repair, type of original hypospadias procedure, and number of previous fistula repairs. As no one technique is effective some failure rate is expected in every series [1–3,6,9,11–14]. Flexible approaches have been also proposed, trying to define a decision-making algorithm and different management according to the different type of UCF [1,11].

The present series is a single-institution experience in managing penile shaft hypospadias. The 'pants-over-vest' technique seemed to be effective and not too difficult when compared with the common skills required for modern urethroplasty. The success rate of the first and second repair for layered or simple repair are similar to the mean success rates reported in published series (90% vs 77%) [11]. This is in agreement with previously reported data on the effectiveness of multiple layers in preventing fistulae both after urethroplasty [15,16] and fistula repair [1,3,5,6,11,14], but contrasts with the first report on simplified closure by Goldstein and Hensle [4], who reported complete success with a technique similar to the present. Nevertheless, such a high success rate has not been confirmed in later series [12]. There are many possible reasons to

justify such differences, e.g. patient selection, technical details not reported in the papers, the use of urinary diversion, but it is not possible to draw firm conclusions.

Thus we think that the 'pants-over-vest' technique can be considered the technique of choice in subcoronal to proximal shaft fistulae, whereas it has some limitations for glanular and coronal ones. In glanular fistulae there is insufficient local tissue to harvest the flaps. In coronal fistulae it is very difficult to use because horizontally orientated flaps have to be fashioned, and this is a relatively less vascularized site, critical for healing [11]. We also have some concerns about using this technique for fistulae near the scrotum, as the inclusion of hair-bearing tissue might be difficult to avoid. Otherwise, the technique works very well even in large or multiple pin-point fistulae, where all orifices can be covered by the same flaps. It also seems to be effective for recurrent fistulae, and in the present series it ensured complete success at the second repair. There were no problems in obtaining a tension-free closure, and there was no distortion of the penile shaft skin or waist-like narrowing after surgery.

As originally proposed by Dennis and Walker [5], the repair can be successful without transurethral stenting. We have always used such stents because an indwelling catheter, inserted for few days, can support the healing urethra and prevent recurrences.

In conclusion, the present results suggest that although this may be far from an optimal technique for repairing UCF, that the 'pants-

over-vest' method provides a good success rate for penile shaft fistulae after hypospadias surgery.

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Correspondence: M. Cimador, MD, Via Tramontana 28, 90144 Palermo, Italy. e-mail: mcimador@unipa.it

Abbreviations: UCF, urethrocutaneous fistula.