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Repair of hypospadias fistula using a penile skin advancement flap with penile dartos interposition

A.G. Neilson^{a,*}, G. Nicholls^b

^a Department of Paediatric Surgery, Bristol Royal Hospital for Children, Upper Maudlin Street, Bristol BS2 8BJ, United Kingdom

^b Department of Paediatric Urology, Bristol Royal Hospital for Children, Upper Maudlin Street, Bristol BS2 8BJ, United Kingdom

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Abstract *Objective:* We aim to report a single surgeon's experience of using a penile skin advancement flap with penile dartos interposition for hypospadias fistula repair.

Patients & methods: All hypospadias fistula repairs performed in our unit by this paediatric urologist between 2000 and 2012 were identified from a prospectively recorded database. Patients' case-notes were reviewed retrospectively gathering data on surgical technique, post-operative care and fistula recurrence on follow-up. Only those boys having repair by this advancement flap technique were included. A urethral catheter was left in situ in all patients for 5–7 days. Repairs performed using other techniques were excluded.

Results: 20 consecutive patients had fistula repair by the advancement flap technique. This was the primary repair in 19 boys, and was repair of a third fistula occurrence in one. The median age at fistula repair was 3.7 years (1.6–15.3). The median follow-up was 4 months (3–73). One boy failed to attend any follow-up. No recurrence has yet been identified in any of the 20 patients.

Conclusion: The penile skin advancement flap with dartos interposition technique was very successful in our series in both primary fistula repair, and in a patient who had multiple previous operations.

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* Corresponding author. Tel.: +44 117 923 0000; fax: +44 117 342 8831.

E-mail addresses: andrew.neilson@uhbristol.nhs.uk (A.G. Neilson), guy.nicholls@uhbristol.nhs.uk (G. Nicholls).

Introduction

Fistula formation is a common and frequently discussed complication of hypospadias surgery. Repair of urethrocutaneous fistulas is challenging, with contemporary series reporting recurrence rates ranging from 0 to 27% (Table 1) [1–7]. A variety of surgical techniques have been described and it is accepted that no single technique is suitable or effective for all patients. We report a single surgeon's experience of one such technique.

Materials and methods

We performed a retrospective case-note review of all hypospadias fistula repairs performed by a single surgeon (GN) in our centre. Cases were identified from a prospectively recorded database of all patients undergoing surgery for hypospadias between 2000 and 2012. A retrospective case-note review was performed with permission from our Hospital Trust Audit committee. Data collected included hypospadias type, initial operation, fistula repair technique, post-operative care and follow-up findings. All hypospadias fistula repairs performed using the advancement flap technique described below were included. Fistula repairs performed using any other technique were excluded.

All patients had a single dose of intravenous antibiotics on induction of general anaesthesia. Magnifying loupes $\times 2.5$ were used. A urethral catheter (8–12 French, as directed by patient size) was passed at the start of the procedure. This remained in situ post-operatively as a urethral stent, and also served to exclude meatal stenosis or urethral stricture distal to the fistula.

Planned incisions were marked (Fig. 1a). A penile tourniquet was applied. The fistula was circumscribed, and a lateral advancement flap of penile skin was raised (Fig. 1b). Care was taken to excise all epithelium from around the fistula prior to closure of the urothelium using 6-0 or 7-0 polydioxanone (PDS, Ethicon Inc). A flap of penile dartos was raised from the infero-lateral aspect of the penis opposite the advancement skin flap and was mobilized to reach the midline fistula closure (Fig. 1c). This

waterproofing dartos layer was brought over the urethral closure and was tacked using 6-0 or 7-0 polydioxanone. Finally, the skin flap was advanced (Figs. 1d, 2). Skin closure was performed using rapidly absorbed 6-0 or 7-0 polyglactin 910 (Vicryl Rapide, Ethicon Inc). The urethral catheter was left in situ for 5–7 days post-operatively. No patient had suprapubic diversion. Prophylactic antibiotics were continued whilst the urethral catheter was in situ. Most operations were performed as day cases. All patients were invited to at least one post-operative follow-up (Fig. 3).

Results

28 patients underwent hypospadias fistula repair during the study period. The advancement flap technique was employed in 20 patients operated between Jan 2002 and Jan 2012. This technique was not suitable in four boys. They underwent re-do urethroplasty ($n = 2$), re-do glansplasty ($n = 1$), and penile skin advancement flap with scrotal dartos interposition ($n = 1$) respectively; none have recurred. The other 4 patients were operated prior to introduction of the advancement flap technique. They underwent simple closure; two fistulas recurred.

Characteristics of the 20 patients included who underwent fistula repair by penile skin advancement flap with penile dartos interposition are detailed in Table 2. Initial hypospadias repair had been performed in our institution in 17. Three boys were referred with fistulas following surgery in other centres. Details of the type of hypospadias and initial operation performed were not available for two of these boys. The median age at fistula repair was 3.7 years (1.6–15.3). The median duration since most recent penile surgery was 2.1 years (0.6–11.3). Median follow-up was 4 months (3–73), and median age at follow-up was 5.1 years (2.1–16.4). One boy failed to attend any follow-up and attempts to contact his parents were unsuccessful.

No recurrence has yet been identified in any of the 20 patients who had fistula repair performed using the advancement flap technique. In 19 boys, this was their first hypospadias fistula repair. The remaining patient was referred to us with a complex background. He developed

Table 1 Contemporary series of hypospadias fistula repairs.

Author	Year	Number of patients	Fistula size/type	Surgical technique	Recurrence rate
Muruganandham K et al. [1]	2010	17	<2 mm	Simple closure	24%
		21	2–4 mm	Flip flap & scrotal dartos flap	10%
		13	>4 mm or multiple	Tunnelled tunica vaginalis flap	0%
Shehata SM [2]	2009	11	Non-glanular mega fistula >5 mm	Modified TIP procedure	9%
Hosseini J et al. [3]	2009	14	Various	Buccal mucosal graft	21%
Holland AJ et al. [4]	2008	123	Various	Various	27%
Routh JC et al. [5]	2006	16	Various	Tunnelled tunica vaginalis flap	0%
Landua EH et al. [6]	2003	14	Recurrent fistulas	Tunnelled tunica vaginalis flap	0%
Santangelo K et al. [7]	2003	69	Various	Simple & de-epithelialized flap or skin advancement	4%
		25	Various	Various 'complex' repairs	12%

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