Journal of Pediatric Urology (2014) 10, 1133—1138

Journal of Pediatric Urology

Byars two-stage procedure for hypospadias after urethral plate transection

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Received 11 December 2013; accepted 15 May 2014
Available online 2 June 2014

KEYWORDS
Hypospadias;
Penis;
Surgery;
Urethroplasty

Abstract *Objective:* To report on the outcomes of primary hypospadias repaired with the Byars two-stage procedure.
Materials and methods: Primary hypospadias repairs with the Byars two-stage procedure, between 2009 and 2012, were retrospectively reviewed. Medical charts were reviewed and analyzed. Follow up was at two weeks, three months, six months and one year after surgery. Complications, which included fistula, glans dehiscence, meatal stenosis, urethral stricture, diverticulum, recurrent penile curvature and others, were documented and analyzed.
Results: One hundred and twenty-eight cases were included in the present study. The median follow up was 30 months (range 13—44 months). All flaps took successfully after the first stage. Overall complication rates were 11.8%. Complications included: seven cases of fistula; five glans dehiscence; two urethral strictures, which developed after fistula repair; and one concealed penis. No recurrent penile curvature was recorded.
Conclusions: The Byars two-stage procedure is an option for primary hypospadias when the urethral plate is transected. It had an 11.8% complication rate in this present study.

Introduction

The mainstay of hypospadias repair is to preserve the urethral plate and use it for urethral reconstruction. One-stage flaps and grafts, and two-stage flaps and grafts can be used to reconstruct the urethra if the urethral plate cannot be preserved [1—3]. The present study reports on the outcomes of a tertiary institution's experiences with the Byars two-stage procedure for the repair of primary hypospadias

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http://dx.doi.org/10.1016/j.jpurol.2014.05.002

after urethral plate transection. The Institutional Review Board of Guangzhou Women and Children's Medical Center (Guangzhou, China) approved the present study.

Materials and methods

People with primary hypospadias, who underwent a Byars two-stage repair after urethral plate transection by three experienced surgeons between 2009 and 2012, were identified. Medical charts were thoroughly reviewed and analyzed. Intraoperatively, all patients underwent a similar approach, which preserved the urethral plate for tubularized incised plate (TIP) or onlay preputial flap repair, unless urethral plate transection was performed to correct ventral penile curvature. The anatomical distribution of the hypospadiac meatus before degloving was progressively more severe in this patient cohort (Table 1).

Surgical procedure

The first stage of the procedure begins with release of the preputial skin, which helps to correct some of the chordee. A U-shaped incision is made, extending along the edges of the urethral plate to healthy skin 2 mm proximal to the meatus, and then extended circumferentially around the coronal sulcus; the penile shaft is then completely degloved. If penile curvature remains, the urethral plate is transected and divided ventrally below the glans, midway between the tip of the glans and the urethral meatus. This then allows for thorough dissection of the distal spongiosum, which exposes the corpora on the ventral aspect of the penis. Further or persistent chordee is corrected by multiple transverse corporotomies (fairy cuts). Multiple transverse corporotomies include an incision at the point of the greatest curvature with another parallel incision. These incisions extend through the tunica albuginea without intentionally exposing the erectile tissue. Continuous bleeding may be encountered; electric cautery coagulation or interrupted suture can be used to stop bleeding. Once the penile curvature is completely corrected, the glans is prepared. The glans is divided deeply in the midline to the tip; following this midline split the glans is dissected laterally off the dome of the corpora cavernosum so that it is open like a book. The dorsal foreskin is unfolded and divided in the midline. The most-distal portion of the inner prepuce is rotated into the glanular cleft and sutured to the mucosa of the glans by interrupted stitches with 6-0 absorbable suture (Monosyn, Braun, Germany). A midline closure is then performed; the midline closures catch a small portion of the underlying tissue. This eliminates dead space and helps to create a groove in the preparation for the second stage. The preputial skin should be preserved as much as possible at this stage. The bladder is drained with a 6Fr/8Fr Foley catheter. Vaseline gauze dressing is placed around the penile shaft and the penis is wrapped with multiple layers of gauze to achieve uniform compression along the shaft.

The second stage of the procedure is usually carried out six months later when complete healing has occurred (Fig. 1). A 6-0 absorbable suture (Monosyn) is placed through the tip of the glans as a traction suture. Incision lines are marked, designing a 12 to 15 mm-wide strip that extends from the ectopic meatus up to the six o'clock points of the proposed new meatus. The two wings of the glans are dissected laterally off the dome of the corpora cavernosum; extended dissection may be needed to achieve a tension-free approximation. In some cases, a midline incision of the grafted urethral plate may be needed to increase the diameter. A 6Fr/8Fr Foley catheter is inserted. An additional 6Fr feeding tube, prepared with several small lateral incisions, is inserted just into the native urethra to act as a drainage tube for the neourethra; its distal end is tied to the urinary catheter (Fig. 2). The strip is tubularized with 6-0 absorbable suture (Monosyn), by using an extraluminal inverting continuous method, reinforced with a few interrupted sutures. The penis is then degloved at the level of Buck's fascia. A protective dartos fascia flap is placed over the entire suture line as a waterproofing layer. The dartos flap is taken from the adjacent penile skin or the scrotum. The glans spongiosum is reconstructed with 6-0 absorbable sutures (Monosyn), thereby completing closure of the glans wings below the meatus. Glansplasty is performed in two layers, the first is subepithelial and the second approximates the epithelium. Two or three stitches from the neomeatus to the corona are usually needed for glansplasty, depending on the size of the glans (Fig. 3). Glans epithelium and penile skin are sutured using simple interrupted 6-0 absorbable sutures. In rare cases of shortage of penile skin, part of the scrotal skin can be mobilized and advanced to cover the penile shaft. Pressure dressing is applied in a similar fashion to the first stage. The feeding tube remains in situ for three days to facilitate the

Table 1 Anatomical location of the hypospadiac meatus before chordee correction.

Location	Number of patients (%)
Glanular	—
Coronal	5 (3.9%)
Penile shaft	8 (6.3%)
Penoscrotal	97 (75.8%)
Perineal	18 (14.0%)

Figure 1 Appearance after stage I.