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Bhat's modifications of Glassberg–Duckett repair to reduce complications in management severe hypospadias with curvature

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Inner preputial flap repair;
Tubularized incise plate urethroplasty

Abstract

Objective: Disadvantages of two-stage hypospadias repair are the necessity of 2 or 3 surgeries, loss of time/money, complications like splaying of the stream, dribbling of urine or ejaculate and milking of the ejaculate due to a poor-quality urethra. The current article details our modifications of flap repair allowing to manage such patients in one stage and reducing the complications.

Subjects and methods: Twenty one patients (aged 2–23 years, between January 2006 and June 2012 mean 11.5 years) of severe hypospadias were managed with flap tube urethroplasty combined with TIP since June 2006 and June 2012. Curvature was corrected by penile de-gloving, mobilization of urethral plate/urethra with corpus spongiosum and transecting urethral plate at corona. Buck's fascia was dissected between the corporeal bodies and superficial corporotomies were done as required. Mobilized urethral plate was tubularized to reconstruct proximal urethra up to peno-scrotal junction and distal tube was reconstructed with raised inner preputial flap after measuring adequacy of skin width. Both neo-urethrae were anastomosed in elliptical shape and covered with spongiosum. Distal anastomosis was done 5–8 mm proximal to tip of glans preventing protrusion of skin on glans. Tubularized urethral plate was covered by spongioplasty. Skin tube was covered by dartos pedicle and fixed to corpora. Scrotoplasty was done in layers, covering the anastomosis.

Results: Type of hypospadias was scrotal 10, perineo-scrotal 5, penoscrotal 4 and proximal penile in 2 cases. Chordee (severe 15 and moderate 6) correction was possible penile de-gloving with mobilization of urethral plate with spongiosum after dividing urethral plate at corona 8, next 5 cases required dissection of corporal bodies, superficial corporotomy 5 and 3 cases lateral dissection of Buck's fascia. Length of tubularized urethral plate varied from 3 to 5 cm and flap tube varied from 5.5 to 13 cm (average 7.5 cm).

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Complications were fistula 2, meatal stenosis 1, and dilated distal urethra1 with overall success rate of 81%. None of them had residual curvature, torsion, splaying or dribbling urine in follow up of 10–36 (average 18) months.

Conclusions: TIPU with spongioplasty of proximal urethra and dartos cover on skin tube reconstructs functional urethra. Distal end skin sutured to glans mucosa 5–8 mm proximal to the tip of glans reconstructs a cosmetically normal looking meatus. An exact measurement of the width and length of the stretched dartos, fixation of the skin tube to the corpora and covering the skin tube with dartos helps in prevention of diverticula. Elliptical anastomosis covered with spongiosum prevents fistula and stricture at anastomotic site.

Introduction

The management of severe or proximal hypospadias is still the 'Holy Grail' of hypospadiology. Numerous methods have been described for the treatment of this clinical entity with varying results. The accepted modern approach in any kind of hypospadias repair includes preservation of the urethral plate, if possible [1]. Conventionally, the urethral plate was resected to correct chordee in proximal hypospadias, and tube, flap or graft urethroplasty was done. Over the last few years, tubularized incised plate (TIP) urethroplasty has become the most commonly performed surgery for distal hypospadias [2], but its use is limited in proximal hypospadias cases due to severe ventral curvature [3]. Commonly, severe hypospadias is managed by applying two- or three-stage procedures. In many cases of perineal and perineo-scrotal hypospadias, the preputial flap falls short, forcing the surgeon to go for a two-stage repair. Disadvantages of two-stage procedures include the necessity for 2 or 3 surgeries, loss of patient's or parents' time and money, late complications like splaying of the stream, dribbling of urine or ejaculate and milking of the ejaculate due to a poor-quality urethra (devoid of support), diverticula formation, stricture and fistula at the anastomotic site, disfigurement due to a protruding skin tube, mobility of the skin tube and penile torsion. The advantages of one-stage repair on the other hand are a healthy unscarred skin in primary repair cases, cost effectiveness of the procedure, a decreased anesthesia risk, better psychological impact and decreased separation anxiety, all of which offer a greater convenience to the patient and parents, as well as to the surgeon [4,5].

In 1987, Glassberg suggested that in situations where the skin tube falls short an augmented Duckett repair might be useful where the inner preputial tube is anastomosed to a neo-urethra fashioned from a proximal midline skin tube [6]. However, the complication rates varied from 25% to 42% as reported in the literature [7,8]. In the present work, we propose certain modifications to the Glassberg–Duckett technique, which will help to bring down the complications, and, most importantly, to provide a functional urethra up to the penoscrotal junction, thus minimizing terminal dribble of urine and squeezing of ejaculate.

Patients and methods

We reviewed the case sheets, operative photographs and videos of 21 cases of severe hypospadias treated with the modified Glassberg–Duckett urethroplasty procedure between January 2006 and June 2012 after clearance from the institutional ethical committee. In total, 262 patients with hypospadias were operated during this period, 35 of them with proximal hypospadias. Among these, 14 had a wide urethral plate and a good spongiosum, thus enabling correction of the curvature with preservation of the urethral plate, so TIPU repair was done. Consequently, these patients were excluded from the study, thus leaving the remaining 21 cases with a narrow and/or poorly developed urethral plate and severe curvature which persisted after penile de-gloving and urethral mobilization as a patient cohort for this study. They were treated with a combined approach using proximal TIP urethroplasty and a distal Duckett tube constructed from the inner prepuce after transection of the urethral plate at the corona. The site of the meatus at the bifurcation of the spongiosum was considered for classification of the type of hypospadias. All procedures were performed by the same surgeon (ALB). The data evaluated included the patients' age, the location of the meatus, the degree of chordee and torsion, the size and quality of the urethral plate, associated anomalies, the duration of follow up and postoperative complications such as infection, hematoma, meatal stenosis, residual chordee or torsion, splaying of urine and retained ejaculate, stricture and fistula.

Surgical technique

After a circumferential circum-coronal incision, penile de-gloving was done keeping the plane of dissection at the level of tunica albuginea. The curvature was corrected by penile de-gloving, mobilization of the urethral plate and the urethra with the corpus spongiosum after transecting the urethral plate at the corona (Fig. 1A and B). The mobilized urethral plate and spongiosum were preserved for tubularization. Buck's fascia was dissected between the corporeal bodies. Superficial corporotomies were performed in patients with persisting curvature. In patients where TIP urethroplasty had been planned in the beginning and curvature correction had been attempted by mobilizing the urethra with the spongiosum, but had failed because of tethering of the urethral plate, the urethral plate was transected at the corona in order to correct the curvature (Fig. 2A and B) and flap urethroplasty was done. Correction of curvature was confirmed by Gitte's test (Fig. 1B) and residual curvature (if any) was corrected applying midline dissection and superficial corporotomies. Inner prepucial flap of adequate length and width was mobilized keeping the plane of dissection at superficial layer of dartos. Proximal dissection of the vascular pedicle was done up to the root of penis to prevent torque. After stretching the flap, its size