Tubularized incised plate urethroplasty with de-epithelialized flap

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ABSTRACT

Aim: To improve the results of tubularized plate urethroplasty by adding de-epithelized flap. **Patients and Methods:** Twenty-five cases of hypospadias who underwent Snodgrass urethroplasty using de-epithelialized flap were studied. The minimum period of follow-up in this series was 1 year. **Results:** The resultant neo-meatus was vertically oriented and slit like. Glans was conical which is cosmetically well accepted. Penile raphe was in the midline. None of the patient had residual chordee, penile torsion, or glans dehiscence. Excellent cosmetic results were observed in all cases. The complication rate in our series was 8% (two cases). Two patients developed fistula. **Conclusion:** De-epithelialized flap is a simple method to provide additional covering to the constructed neourethra after Snodgrass urethroplasty. It achieves our goal of noncrossing suture lines and providing maximum vascularity.

Key words: De-epithelialized flap, hypospadias, snodgrass repair

INTRODUCTION

There are around 200 original methods of reconstruction reported till now. Modifications of modification continue even now. Although tubularized incised plate urethroplasty is a good procedure addition of de-epithelialized flap further improves the result.

Durham Smith[1] in 1973 described a new technique using de-epithelialized flap. The repair depends on tissue adhesion over a wide area rather than edge-to-edge healing. None of the suture lines were superimposed.

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Snodgrass[2] described distal penile hypospadias repair using tubularization of an entirely incised urethral plate. He covered the reconstructed neourethra with vascularized subcutaneous tissue dissected from the dorsal prepucial and shaft skin. We have used de-epithelialized flap to accomplish our goal of functional success particularly minimizing or eliminating fistulae.

PATIENTS AND METHODS

Twenty-five patients were operated by this technique over a period of 2 years. Mean age was 27.6 ± 11.3 months. Meatal position was subcoronal in 12 patients and distal penile in 13 patients. Patients with good prepucial hood, mild chordee (<30°), and adequate urethral plate (width of urethral plate >6 mm labeled as well formed, 4-6 mm as narrow, and <4 mm as inadequate) were included in our study. In our study, mild chordee was present in 17 patients and 10 patients had minimal torsion of penis. In 20 patients urethral plate was well formed, whereas 5 patients had narrow urethral plate.

The patients with inadequate length of urethral plate, moderate-to-severe chordee, severe hypospadias requiring complex repair, and intersex cases were not included in our study.

All the patients were primary cases and operated under general anesthesia with supplementation of caudal block. Firlit collar incision was given; chordee was completely released by degloving of the penis. Parallel longitudinal incisions were made on either side of the urethral plate up to the level where edges of glans groove starts converging. Urinary meatus was included in the incision. Glanular wings were raised. The plate was then incised in the midline from meatus to the glans. Incision was not extended to the tip of the glans, to prevent subsequent meatal stenosis. Deep incision was taken to divide all transverse webs and expose the corporal bodies. Mobility of the epithelial strips created by longitudinal incision of the plate was confirmed. This helped in relieving meatal stenosis.

The urethral plate was tubularized over infant feeding tube no. 7 with vicryl 6-0 continuous subcuticular vicryl sutures. Splayed out corpus spongiosum on either side of the urethral plate was mobilized and sutured over the tubularized urethra. Spongioplasty done in this way gave additional cover to the neourethra. A vertical midline incision was given in the dorsal prepucial skin extending up to the corona. Length of the skin required to cover the ventral skin defect was assessed. The excess skin which otherwise would have been discarded was de-epithelialized using blade no. 15. Incision was given over the inner aspect of prepuse and subcutaneous tissue was separated from the skin using sharp dissection. The de-epithelialized flap derived from the dorsal prepucial skin was sutured over the neourethra with vicryl 6-0 [Figure 1]. Glans wings were sutured in two layers with interrupted vicryl 5-0 suture. Rotated skin flaps were sutured in the midline. This helped in avoiding crossing over of suture lines. The neourethral suture line was in the midline, while the de-epithelialized flap suture line was laterally. Excess skin was trimmed and then approximated in midline using vicryl 5-0 interrupted sutures.

Transurethral feeding tube was kept per urethrally to drain urine. Sponge dressing was applied over the penis. Dressing was changed on seventh postoperative day. Per-urethral catheter was removed on the tenth postoperative day.

RESULTS

Our study was spanned over a period of 3 years. Mean follow-up was 19 ± 5.9 months. Excellent cosmetic results were observed in all cases. Resultant neomeatus was vertically oriented and slit like. Glans was conical in shape, which was cosmetically acceptable [Figure 2]. The penile raphe was in the midline. No patient had torsion or glans dehiscence. Two patients (9%) developed fistula.

In one patient with distal penile hypospadias, small coronal fistula with meatal stenosis was noticed on first follow-up. With regular dilatation of the meatus for a period of 3 months, the fistula closed spontaneously. Another patient developed fistula, which required formal closure after 6 months. Two (8%) patients were lost to follow up.

Comparing our study with Snodgrass multicentric experience where the complication was 7%. We had a complication rate of 9% (2/23).

DISCUSSION

Surgical techniques for repair of hypospadias are being developed continuously, implying that no single technique is considered perfect for hypospadias.[1-4]

Durham Smith[5] described de-epithelialized overlap flap in 1973. He used this technique as a two-stage procedure and reported only one fistula in 51 patients (2%). Other features of his repair included a urethral tube of uniform lumen, an orifice on tip of the glans and a cosmetic appearance of a normal circumcised male. The only limitation of Smith's procedure was that it was applied exclusively to a two-stage procedure. With experience, it became apparent that de-epithelialized flap is also helpful in the successful closure of urethrocutaneous fistula.

Snodgrass' technique[6] of tubularized incised plate urethroplasty makes a narrow urethral plate wide enough for easy tubularization and provides vertically oriented and a cosmetically normal neomeatus. The key step in the procedure is to divide the urethral plate



Figure 1: Photograph showing the de-epithelized flap made to cover the neourethra



Figure 2: Photograph showing vertically oriented slit-like neomeatus

by deep sagital incision in the midline, dividing all transverse webs, and exposing the underlying corporal bodies. This allows for its subsequent tubularization. Initially Snodgrass reported tubularized incised plate urethroplasty for distal hypospadias where no fistula was reported. Later on, he reported multicentric experience of tubularized incised urethroplasty (148 patients).[7] Complication was reported in 10 patients (7%).

Snodgrass described additional coverage of neourethra by vascularized subcutaneous tissue dissected from dorsal prepucial and shaft skin. This dissection requires skill and there are chances that vascularity of the skin cover may get compromised resulting in subsequent dermal necrosis. Compared to this creation of de-epithelialized flap is a simpler alternative as experienced by us. Using de-epithelialized flap as an additional layer our goals of noncrossing suture lines and maximum vascularity is achieved. This flap can be positioned to cover the entire neourethra and its suture line in almost all cases. With excision of cutis neither skin nor its appendages are present.

Berry Belman[8] concluded that addition of de-epthelialized flap to create a layer completely covering the neourethra appeared to reduce the incidence of fistula significantly.

Ross and Kay[9] used de-epithelialized local skin flap with Snodgrass repair in 18 patients and concluded that distal hypospadias utilizing a local de-epithelialized local skin flap to cover a tubularized incised urethral plate gives an excellent cosmetic and functional result. Optimal blood supply to the skin cover is preserved and penile torsion is avoided.

Snow *et al*.[10] in 1995 reported first time the use of tunica vaginalis to interpose between reconstructed urethra and dartos and skin. The fistula rate reported was 9%. Similar results has also been reported by Shanker *et al*.[11] and Handoo.[12] It has a dependable blood supply from the cremasteric vessels and its pedicle length can safely be increased up to the external inguinal ring.

One of the causes of urethral fistula after hypospadias repair is known to be devascularization of the distal urethra. Reduction in the incidence of urethral fistula can be achieved by de-epithelized flap as it creates a layer between two suture lines and by probably increasing vascularity to the neomeatus.[8,13]

In conclusion, de-epitheliased flap is a simple method to provide additional cover to the constructed neourethra after Snodgrass urethroplasty. It achieves the goal of noncrossing suture lines, maximizing vascularity and minimizing fistula rate.

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Source of Support: Nil, **Conflict of Interest:** None declared.