"Snodgraft" Technique for the Treatment of Primary Distal Hypospadias: Pushing the Envelope

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Abbreviations and Acronyms

DIGU = dorsal inlay graft urethroplasty

M/N-S = meatal and/or neourethral stenosis

TIPU = tubularized incised plate urethroplasty

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Study received Sisli Etfal Training and Research Hospital ethics committee approval and complies with the Helsinki Declaration.

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Purpose: "Snodgraft" modification has been proposed to reduce the risk of meatal/neourethral stenosis in distal hypospadias. We applied the Snodgraft technique by using inner preputial graft in primary distal hypospadias repair.

Materials and Methods: A total of 102 consecutive patients undergoing the Snodgraft procedure were prospectively studied between 2006 and 2011. Mean patient age was 7.2 years. Localization of the meatus was glanular in 5 patients, coronal in 49, subcoronal in 45 and mid penile in 3. In all patients the posterior urethral plate was incised, and the graft harvested from the inner prepuce was sutured from the old meatus to the tip of the glans. A neourethra was created over a urethral catheter using 6-zero polyglactin suture. An interpositional flap was laid over the urethra as a second barrier. All patients were followed at 3 to 6-month intervals for cosmetic and functional results.

Results: At a mean of 2.4 years of followup no patient had meatal stenosis or diverticulum at the inlay graft site. However, urethrocutaneous fistula was observed in 10 patients (9.8%). A slit-like appearance of neomeatus was achieved in all patients. During followup no obstructive urinary flow pattern was detected, and early and long-term maximum urine flow rates were comparable.

Conclusions: No meatal/neourethral stenosis was observed in any patient undergoing a Snodgraft procedure. A randomized trial will be needed to prove that the incidence of meatal/neourethral stenosis is lower after Snodgraft repair compared to routine tubularized incised plate repair.

Key Words: hypospadias, transplants, ureter, urologic surgical procedures

TUBULARIZED incised plate urethroplasty has become the most popular technique for repairing distal hypospadias at many institutions during the last 2 decades. Although this technique is easily applicable with good cosmetic results, several complications, including meatal and/or neourethral stenosis, have been reported.[1] Dorsal inlay graft urethroplasty ("Snodgraft") using an inner preputial free graft has been described as an effective method for hypospadias repair with the main advantage of reducing the risk of meatal/neourethral stenosis.[2] Since this modification was first reported in 2000, only a few studies of the modification have been conducted to date.[2–6] Therefore, there is still a lack of evidence to prove the efficacy and safety of this technique.

In the majority of the published series on DIGU the major indications for grafting were the presence of a narrow or shallow glans, or insufficient urethral plate width. At our institution

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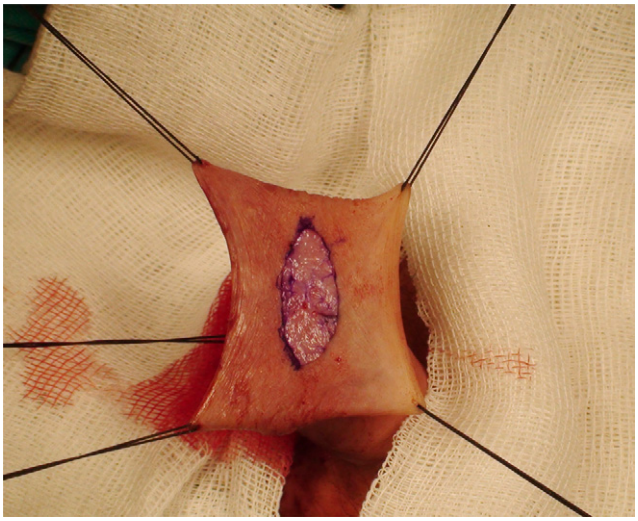

Figure 1. Harvesting of inner prepuce in preparation for DIGU

regardless of the urethral plate characteristics, DIGU has been used since 2006 in every case of distal hypospadias. We report a large series of Snodgraft procedures in the treatment of primary distal hypospadias repair.

MATERIALS AND METHODS

A total of 102 children diagnosed with primary distal hypospadias were prospectively enrolled. Patients with proximal hypospadias, severe chordee, micropenis and circumcised penis were excluded. Distal hypospadias was defined as meatal location distal to the mid penile shaft. The presence of chordee was checked with an artificial erection intraoperatively after degloving the penis when necessary. Micropenis was defined as stretched penile length less than 2.5 SD below mean normal for age. Patients who were previously circumcised for traditional or religious reasons had undergone TIPU alone without grafting and were excluded from the study. The remaining patients with primary distal hypospadias underwent the Snodgraft procedure between October 2006 and February 2011. No patient was lost to followup.

All operations were performed by 2 consultant pediatric urologists (MSS, KH). The surgical procedure was performed according to the description of Kolon and Gonzales.[2] Optical magnification was used for all procedures. After circumferential incision and degloving of the penis, diluted adrenaline solution was injected into the glans to prevent bleeding. A bilateral incision was made along the urethral plate to prepare the wings of the glans. The urethral plate was incised longitudinally in the midline as described by Snodgrass and Nguyen.[1] A small free graft was harvested from the inner preputial skin from the dorsal headpiece, and excess fatty tissue was removed (fig. 1).

The technical principle in harvesting a graft was to prepare adequate tissue to cover the entire incised area of the urethra. Therefore, the length and the width of the graft were subject to change in every case according to the meatal location, urethral plate characteristics and depth of the midline incision. Subsequently the graft was sutured overlying the incision line with 6-zero polyglactin (fig. 2).

The neourethra was rolled around a 6Fr, 8Fr, 10Fr or 12Fr feeding tube or silicon catheter according to patient age and penile size. A double layer running subepithelial 6-zero polyglactin suture was used for urethral closure. An interpositional flap prepared from the dorsal dartos fascia was always laid over the midline as a second barrier for waterproofing. A dartos flap was considered to be a formal vascularized flap mobilized from the dorsum and laid over the neourethra either with the buttonhole maneuver or from the lateral aspect of the penis. The glans wings were then reapproximated with no tension. A 5-zero polyglactin suture was used with the 1-layer mattress suturing technique, and the skin was closed with 4-zero rapid polyglactin after circumcision. Finally, the patient was left with an indwelling catheter and a compressed hypospadias dressing.

Third-generation cephalosporins were applied prophylactically on the day of surgery. The urethral catheters were removed at 24 to 48 hours postoperatively in all cases. All patients were routinely evaluated postoperatively every 3 to 6 months for up to 4 years for cosmetic and functional results. Urethrocutaneous fistula was defined as fistula of the neourethra requiring surgical intervention. M/N-S was defined as symptomatic stenosis re-

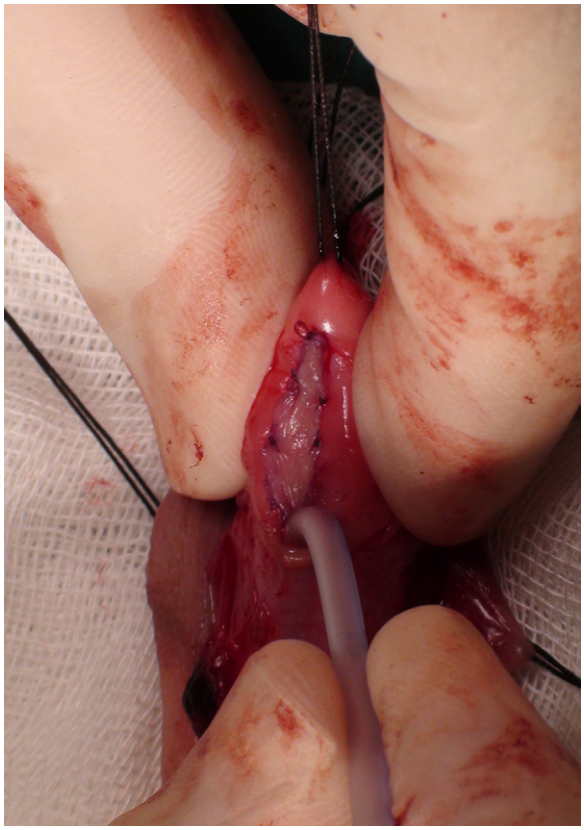

Figure 2. Midline incision of urethral plate is covered with DIGU