
Primary Distal Hypospadias Repair: Tubularized incised-plate urethroplasty (Snodgrass) Versus The perimeatal-based flap (Mathieu)

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Abstract:

Background: A Prospective study of distal hypospadias repair by Snodgrass procedure.Comparing with the Mathieu's repair.

Materials & Methods: Between January 2006 to June 2008 ,fifty patients with distal hypospadias underwent primary repair in prospective controlled randomized trial.To determine whether the tubularized incised_plate repair or the perimeatal_based flap technique is more appropriate for the repair of distal hypospadias, a comparative study was conducted and the outcome was evaluated in the term of satisfactory functional and cosmetic results and occurrence of complications and the operating time .

Results: Twenty five patients were allocated for a Snodgrass procedure; their mean age was 2 years. Mathieu repair was carried out for the other 25 patients; their mean age was 2.5 years. The mean duration for surgery was shorter for the Snodgrass procedure than Mathieu repair(60 minutes versus 100 minutes). The cosmetic and functional results were better in the Snodgrass repair where the meatus was located at the tip of the glans and vertically oriented in most patients. With Mathieu procedure the meatus was round in shape and horizontally oriented. Four of patients(16%) who underwent Mathieu repair had urethrocuteaneus fistulae versus one(4%) in the Snodgrass group.

Conclusion: the tubularized incised_plate repair(Snodgrass) technique offers a safe and reliable modality for the primary repair of distal penile hypospadias. Compared to perimeatal_based flap technique(Mathieu procedure) .

Keywords: Distal hypospadias, Snodgrass procedure, Mathieu's procedure, Tubularized Incised-Plate urethroplasty(TIP-Urethroplasty)

introduction:

E ighty percent of patients with hypospadias have a meatus in a coronal or subcoronal position^[1].

A number of surgical procedures and technical modifications for distal hypospadias has been developed and refined through the years to allow for a simple single stage repair that has lessened patients discomfort and decreased complications and cost effectiveness without sacrificing cosmetic results^[2].

The perimeatal_based flap(Mathieu)urethroplasty is commonly used for the primary correction of distal hypospadias^[3,4]. The most frequent complication after hypospadias repair are urethrocuteaneus fistulae and meatal stenosis,which have been reported in up to 21% of patients^[5]. Furthermore;the meatal_based flap repair creates a horizontal and round meatus which is cosmetically less accepted than a normal slit like meatus^[6,7]. Tubularized incised plate(TIP) repair described by

Snodgrass in 1994 provides a technique with a possible low complications rate for correcting distal hypospadias,creating a neourethra of normal diameter irrespective to the plate,glans configuration and location of the meatus^[8].

Patients & Methods:

Two procedures for correcting distal hypospadias were assessed in a prospective randomized controlled trial conducted between January 2006 and June 2008 at Paediatric Central Teaching Hospital in Baghdad fifty consecutive patients were randomized into 2 equal groups. In group A:Snodgrass procedure was performed. In group B:Mathieu repair was done (Table 1). The selected techniques were vigorously applied by the same surgeon. Patients were then followed once a week for the first month, then every month the first year. to determine any complications and evaluate the cosmetic results.

Table 1: Sites of meatus in different groups

Site of meatus	Group A(Snodgrass procedure)	Group B(Mathieu's procedure)
Coronal	03	04
Subcoronal	10	13
Anterior penile	12	08
Total	25	25

Operative technique:

The penis is degloved with a U-shaped incision extending along the edges of the urethral plate to healthy skin 2 mm proximal to the meatus. Artificial erection test was induced to assess any deviation if there was significant chordee it was corrected by dorsal plication^[9].

The ventral glans is then infiltrated with 1:100000 epinephrine and the glans wings were created after making parallel longitudinal incisions to define the urethral plate.

In the Mathieu group, skin flap was outlined proximal to the meatus long enough to reach the tip of the glans. The flap was raised to the meatus and anastomosed to the distal urethral plate with 5/0 polyglactin subcuticular suture on each side.

In the Snodgrass group^[8], the urethral plate was widened by a mid line incision along its entire length from the meatus to the glans tip. The incisions carried deeply through the mucosal and submucosal tissue dividing all transverse webs and exposing the underlying corporal bodies. This maneuver opens the plate to a very good extent making it possible to tubularize it over an 8-IOF silicone catheter. Continuous subcuticular 5/0 polyglactin suture was used to fashion the tube. Dorsal subcuticular tissue dissected from the shaft skin was rotated ventrally to cover the neourethra in both groups^[8,10]. The glandular wings were symmetrically closed over the neourethra with 5/0 polyglactin sutures in two layers. Skin closure is achieved by a variant of Byar's flaps. Simple gauze-dressing is applied and the patients were kept on antibiotics for the duration of the indwelling stent. The dressing is removed on the

third day and the patient discharged from the hospital.

The stent is left in place for 7 days. The patient is instructed for follow up once every week in the first month, then every month in the first year, then every 3 months in the second year. Meatal calibration is carried out once weekly for 2 months.

Results:

Fifty patients with distal hypospadias underwent primary repair. Twenty-five were allocated for a Snodgrass procedure: their mean age was 2 years (range between 12 months to 4 years). Mathieu repair was carried out for 25 patients: their mean age was 2.5 years (range between 8 months to 4 years). The mean follow-up period in both groups was 12 months (range between 8 months to 24 months).

The mean operative duration (defined to be from placing the traction suture to applying the surgical dressing) was significantly *less for* the Snodgrass technique than for the Mathieu repair: 60 and 100 min respectively.

There were six complications(24%) after the Mathieu procedure; four(16%) developed a coronal urethrocuteaneous fistulae. one (4%) meatal stenosis and one(4%) glandular dehiscence one week after surgery caused by skin break down table 2.

The resultant meatus was centrally located vertical and slit-like most patients after the Snodgrass repair, whereas most patients in the Mathieu group had a meatus that was distorted, round and horizontal.

Table (2): The reported overall complication rates for the Mathieu and Snodgrass repairs for distal hypospadias

	Group A	Group B
Operative technique	One suture line	Two suture lines
Operative duration	Coronal 50 min. Subcoronal 60 min. Ant. Penile 70 min. Mean 60 min.	Coronal 90 min. Subcoronal 100 min. Ant. Penile 110 min. Mean 100 min.
complications	Fistula 1 case(4%) Meatal stenosis 2 cases(8%) Penile torsion 1 case(4%) Glandular dehiscence 0	Fistula 4 case(16%) Meatal stenosis 1 case(4%) Penile torsion 0 Glandular dehiscence 1 case(4%)
Meatus site	Vertically located	Distorted
Meatus shape	Vertical slit like	Horizontal rounded

Discussion:

The majority of boys with hypospadias have a distal meatus with minimal chordee^[11]. There are various surgical procedures to correct such defects. The meatal-based flap urethroplasty is commonly used for the primary correction of distal hypospadias. It is used for a noncompliant meatus associated with a flat glans^[11]. The choice of operation for repair of distal hypospadias is determined by a number of factors including the configuration of the glans and meatus and associated degree of penile curvature^[12]. Another important consideration in hypospadias surgery is the final cosmetic result. The ultimate goal is a penis that is not only functionally normal but cosmetically as well.

Complications are common after hypospadias repair, ranging from fistula to complete loss of the neourethra requiring total reconstruction^[13]. The incidence of complications (defined as those requiring re-operation) after primary meatal-based flap urethroplasty is reported to range between 5 and 21% for distal hypospadias repair (Table 3). The two-suture lines necessary for the flap increase the risk of developing a coronal urethrocuteaneous fistula. There is also an increased risk of meatal stenosis because the blood flow in the distal part of the flap is reduced^[14]. The meatal-based flap extending near the scrotal junction could result in hair growth at the meatus during puberty finally the resultant meatus is horizontally oriented and rounded- although functionally accepted, but it is less cosmetically desirable than the normal vertically oriented, slit-like meatus. Because hypospadias surgery is complex, it is difficult to compare complication rates; especially in distal hypospadias where complication rates are relatively low in recent operative techniques. The surgeon needs to stabilize the many variables present e.g. anatomical variation, tissue handling, suture material, stenting and the surgeon. Hinging the urethral plate was developed as a modification of hypospadias reconstruction to improve the cosmetic appearance of the neomeatus for repairs that preserve the plate^[15]. Decision making is simplified by T.I.P. urethroplasty.

The designation of the meatus as compliant or so called variant does not affect the surgical technique. To address the concern of inadequate urethral plate width, Snodgrass introduced the concept of longitudinal incision of the urethral plate which enables tubularization creating a neo-urethra of normal diameter irrespective of the plate, the glans configuration (grooved or flat) or the location of the meatus^[10]. Hinging the urethral plate facilitates glans folding during glanuplasty extends the meatus to the lip of the penis, provides generous mobilization of the urethral plate. For tubularization with or without additional skin flaps and helps to create a cosmetically normal centrally located,

vertically oriented urethral meatus^[8] viability and the dorsal surface re-epithelialized rapidly during the brief period of urinary diversion.

With this technique only one suture line is necessary, saving operating time and decreasing the possible risk of a urethrocuteaneous fistulae.

Also to minimize the risk of fistula formation, the urethroplasty should then be covered with vascularized deepithelialized transverse island flap of subcutaneous tissue.

Post operative follow up of patients revealed urethral stenosis in 4 patients that improved over a period of 2-3 months using periodic neourethral dilatation. Snodgrass^[16] evaluated 72 patients operated upon using T.I.P and reported that the dorsal relaxing incision of the tubularized incised urethral plate did not result in neourethral strictures procedure causes fewer complications than the Mathieu repair (Table 3). Our early reported experience of fistulae formations compares favourably with that of other studies (25% in Snodgrass repair and 75% in Mathieu repair).

The Snodgrass repair was significantly faster than the Mathieu procedure and the cosmetic appearance of the neomeatus is more natural. Prior circumcision or a failed hypospadias repair usually leaves insufficient skin to construct flaps. TIP urethroplasty may be indicated in these situations because it does not require skin flaps and the urethral plate often remains healthy despite prior surgery. Thus the TIP urethroplasty is a versatile procedure offering excellent cosmetic results and a low complication rate. It is recommended that the tubularized incised plate technique is to be used as the primary repair for children with distal hypospadias in properly selected patients.

Conclusion:

The Snodgrass technique offers a safe and reliable modality for the primary repair of distal hypospadias compared to perimeatal-based flap technique (Mathieu). Comparable functional and superior cosmetic results were observed. In addition the operative time was shorter and the incidence of complications in terms of urethrocuteaneous fistula is far less than in Mathieu's procedure.

References:

- 1-Devine C.J.Jr., Allen T.D., Duckett J.W. and Horton C.E.: Hypospadias, Dial. Urol., 1987; 1:2-4.
- 2-Mitchell M.E. and Klub T.B.: Hypospadias repair without drainage catheter. J. Urol., 1986; 135:321.
- 3-Dewan P.A., Dinneen M.D. and Ransley P.G.: Hypospadias: Duckett pedicle tube urethroplasty. Eur. Urol., 1991; 20:39-42.
- 4-Gonzales E.T.Jr. and Delune J.: the management of distal hypospadias with meatal-based vascularised flaps. J. Urol., 1986; 129:119-2.
- 5- Uygur M.C. and Erol D.: Lesson from 197 Mathieu hypospadias repairs performed at single

- institution. *Ped. Surg. Int.*, 1998, 14:192-4.
- 6-Rabinowitz R.:outpatient catheterless modified Mathieu hypospadias repair. *J.Urol.*, 1987, 138:1074-6.
 - 7-Roland R. William C. and Hulgurt J.R.:Meatal based flap, Reconstructive and plastic surgery of external genitalia, 1999.
 - 8-Snodgrass W.:Tubularised incised plate urethroplasty for distal hypospadias *J.Urol.*, 1994, 151:464-5.
 - 9-Baskin L.S. and Duckett J.W.:Dorsal tunica albuginea placcation for hypospadias curvature. *J.Urol.*, 1994, 151:464-5.
 - 10-Retik A.B. and Borer J.G.:Primary and reoperative hypospadias repair with the Snodgrass technique world *J.Urol.*, 1998, 16(3):186-91.
 - 11-Elder J.S., Duckett J.W. and Snyder H.M.:Only island flap in the repair of mid and distal penile hypospadias without chordee. *J.Urol.*, 1987, 138:376.
 - 12-Devine C.J. and Horton C.E.:A one stage hypospadias repair *J.Urol.*, 1991, 85:166.
 - 13- Rickwood A.M. and Anderson P.A.:One stage hypospadias repair, experience of 367 cases. *Br.J.Urol.*, 1991, 424-8.
 - 14-Nonomura K. and Asano Y.:Measurement of blood flow in parametral foreskin flap for urethroplasty in hypospadias repair. *Eur.Urol.*, 1992, 21:155-9.
 - 15-Rich M.A., Keating M.A. and Duckett J.W.:Hinging the urethral plate in hypospadias meatoplasty. *J.Urol.*, 1989, 142:1551-3.
 - 16-Snodgrass W.:Does tabularized incised plate hypospadias repair create neourthral stricture? *J.Urol.*, 1999, 162:1159-61.
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