

Single Stage Repair of Anterior and Mid Penile Hypospadias

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ABSTRACT

Aim of study: The aim of study was to assess the usefulness of Snodgrass technique in proximal hypospadias and describe our experience in terms of success, complications, and failures.

Main outcome measures: To construct straight penis with vertical slit like urethral opening at the tip of penis without any difficulty in micturation.

Study design: It is a retrospective study.

Setting: Study was conducted in the Departments of Paediatric Surgery, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan and The Children Hospital and The Institute Of Child Health Lahore from March 2005 to December 2009.

Patients & methods: 60 patients of anterior penile and mid penile hypospadias were operated with Snodgrass technique during the study period. The medical records of these patients were reviewed regarding results of the surgery in terms of complication rate.

Results: Out of 60 patients, 05 patients (8.33%) developed urethrocutaneous fistula, 03 patients (5%) developed meatal stenosis and 01 patient (1.66%) developed meatal retraction.

Conclusion: Our experience indicates that Snodgrass repair is associated with low complication rate.

Keywords: Urethroplasty, hypospadias, urethrocutaneous fistula, Snodgrass, penile.

INTRODUCTION

Hypospadias is an anterior urethral developmental abnormality, in which the urethral opening is ectopically located on ventrum proximal to the tip of glans penis. A ventrally placed urethral meatus, a dorsally angulated, flattened spatulated glans; a ventrally deficient prepuce; a usually downward curvature of penis known as chordee are characteristically associated with hypospadias¹. The meatus may be located anywhere from the glans along the shaft of the penis up to the scrotum or even in the perineum. Chordee has an inconsistent association with hypospadias. Hypospadias usually occurs as an isolated defect, but can be part of a recognized syndrome or associated with other genital anomalies. The existence of functional problems related to urination, sexuality and reproduction, has often been reported in the literature. In addition there have been aesthetic repercussions regarding external aspect of a penis with hypospadias. Many techniques have evolved during the past 150 years to construct a neourethra. The objective of therapy is to reconstruct a straight penis with a meatus as close as possible to its normal site and size with the ultimate goal of allowing a forward directed stream and normal coitus at a later life. The multiplicity of

methods of repairing hypospadias suggests that no method is universally satisfactory.

Tubularization of an intact urethral plate (TIP) for the repair of distal hypospadias was introduced by King in 1970². In that technique, the meatus was placed at the corona and did not reach the tip of the glans. Sadlowski et al extended tubularization of the urethral plate to the proximal part of the glans³. Firlit described tubularization of the intact urethral plate up to the tip of the glans, either alone or with a Duplay urethroplasty⁴. Zaontz reported good results with the same technique when the urethral plate is grooved and wide⁵. Similarly, the megameatus intact-prepuce variant of hypospadias with a deeply grooved urethral plate is repaired via tubularization of the intact urethral plate⁶. Von Horn and Kass described the repair of coronal, anterior penile, mid-penile and penoscrotal hypospadias using in situ tubularization of the urethral plate⁷. When a urethral plate is shallow, tubularization may be technically difficult. Rich et al introduced the concept of midline incision of the distal part of the urethral plate in conjunction with meatal-based flap or onlay island flap procedures to reconstruct a vertically orientated and cosmetically normal neomeatus⁸. Snodgrass developed the above concept and described a distal penile hypospadias repair using tubularization of an entirely incised urethral plate from tip of glans to meatal opening, in the midline, to be widened and easily tabularized⁹. Current concept of hypospadiac pathophysiology with emphasis upon preserving the

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urethral plate, have brought hypospadias surgery over the last decade near its ultimate goal of a reconstructed penis that is functionally and cosmetically normal. First described in 1994, Snodgrass repair (tubularization of incised urethral plate- TIP) has become procedure of choice for distal and proximal hypospadias repair due to its low complication rate and superior cosmetic results. Snodgrass et al reported satisfactory functional and cosmetic results in a large series (148 patients)¹⁰. As encouraging results are being reported from many centers all around the world, it can be assumed that we are entering a new era of hypospadiology. But very scant research has been done locally to evaluate this technique. Moreover long-term data regarding TIP procedure is still lacking for final evaluation. An extensive and meticulous analysis of Snodgrass repair will be needed to determine whether this technique can stand test of time. So we want to see the usefulness of Snodgrass technique in terms of success, complications and failures.

PATIENTS & METHODS:

From March 2005 to December 2009, 68 patients of anterior and mid penile hypospadias were operated in the Department of Paediatric Surgery, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan and The Children Hospital and The Institute of Child Health Lahore with Snodgrass technique. Eight cases were excluded due to previous surgery. Hypospadias were coronal in 15, distal penile in 20 and mid penile in 25 patients. Chordee was absent or either mild in these patients. In all 60 patients, Snodgrass procedure was done. The technique is described as below:

A holding suture was placed in the glans penis to aid in the traction of phallus, the urethral meatus was dilated to provide an adequate meatal caliber. Feeding tube according to the size of phallus was put into the bladder as a stent and diversion. Two parallel incisions were made on either side of urethral plate creating about 08 to 10mm wide urethral plate. An incision was made in the middle of urethral plate to divide it into two equal halves to increase its width. Tube was constructed with 6/0 PDS suture continuously. Dorsal prepuceal subcutaneous tissue flap is harvested and repositioned over the neourethra as a second layer of coverage. Redundant skin is excised. Skin coverage is given and urethral stent is secured.. Broad spectrum antibiotics are given. The stent is removed on tenth day and the patient allowed passing urine. After discharge the patients are followed up first monthly for 3 months, 3 monthly for 2 years and afterward yearly.

RESULTS

From March 2005 to December 2009, 60 cases of anterior hypospadias were operated. The age range at the time of surgery was 1 to 18 years. Twenty seven patients were less than 05 years, 22 patients were between 5-10 years, 11 patients were above 10 years at the time of surgery. Early and late complications were shown in table-1. One patient developed hemorrhage post operatively that was stopped by pressure dressing. The first dressing was changed on 4th post operative day. Stent blocked in 05 patients. Flushing of catheter was done but in 03 patients repeatedly blocking of catheter occurred. So stent was removed at 5th day of surgery in these patients. Five patients developed urethrocutaneous fistula. One patient developed meatal retraction and 03 developed meatal stenosis. Two patients with fistula formation also had meatal stenosis. These patients with urethrocutaneous fistula were successfully repaired subsequently. Two patients of meatal stenosis responded to dilatation and one needed meatoplasty. Complete straightening of phallus and meatus at the tip of glans were achieved along with conical glans in all patients, implicating good cosmetic result.

Table-1 Early complications:

Complications	=n	%age
Hemorrhage	01	1.66
Infection	03	5
Blockage of stent	05	8.33
Removal of stent	03	5

Table-II Late complications:

Complications	=n	%age
Stenosis	03	5
Fistula	05	8.33
Meatal retraction	01	1.66

DISCUSSION

Traditionally the goals of operative surgery in hypospadias have been to construct a straight penis and the provision of a glanular vertical slit like meatus, to allow normal voiding and satisfactory sexual function during coitus. However greater appreciation of the long-term psychological consequences of a cosmetically unsatisfactory repair, warrant a need for an optimal repair that can provide both functional and cosmetically normal outcome.

Various one stage surgical procedures have been devised for anterior and mid penile hypospadias including meatal advancement Glanoplasty Incorporated (MAGPI), Snodgrass (Tubularized incised plate urethroplasty), Mathieu, Modified Mathieu, Mustardee repair. Snodgrass repair is the

most acceptable procedure now a day throughout the world due to its cosmetic and functional results. Our experience with this technique demonstrates the versatility of tubularized incised plate urethroplasty as midline longitudinal incision resulting in widening of the urethral plate and thus tubularization is possible without using skin flaps. Moreover low complication rate is also achieved due to tension free closure of neourethra using a dorsal vascular flap to cover the repair before skin closure. The advantages of this technique include its simplicity, low complication rate, very good appearance of glans penis and normal meatus.

We compared our results with other studies on the tubularized incised plate urethroplasty to assess the effectiveness of this technique in our setup. The reported complication in different series varies from 1% to 10%^{11,12,13,14,15,16,17,18}. Urethrocutaneous fistula is the most common complications of hypospadias surgery. The incidence of this complication has been used to evaluate the effectiveness of a particular surgical procedure. In our study, 05 patients (8.33%) developed fistula. This is comparable to the literature. The development of fistula is clearly a multifactorial phenomenon. Different factors like edema, attenuated vascular supply, infection, and haematoma may contribute to impair healing of the neourethra. Distal urethral obstruction from meatal crusting or stenosis results in higher urethral pressures during voiding and may result in disruption of a proximal suture line. Finally the technical factors such as overlapping of suture lines, improper tissue handling, and inadequate inversion of the epithelium or use of poorly absorbable suture material have been implicated in the development of this complication. In our study there was development of fistulae in two patients with meatal stenosis. This is comparable with one study in which the fistula formation was strongly associated with development of urethral meatal stenosis¹³. This highlight the fact that prevention of meatal stenosis may help in further bringing down the occurrence of this most fearful complication associated with hypospadias repair, thus further enhancing the effectiveness of Snodgrass repair. We did successful multilayered closure of fistula. Meatal stenosis in these patients was managed conservatively with routine meatal dilatation and subjective complaints were cured in two patients but one patient required meatoplasty. Meatal retrusion was managed by meatoplasty and meatal advancement. In our study 3 (5%) patients developed meatal stenosis. This is comparable with other studies that reports meatal stenosis in the range 2 to 20%^{11, 12, 13, 14, 15, 16, 17, 18}. However it was noted that those patients that were operated earlier in our study had developed meatal stenosis. Sewing the

plate too far distally during the process of tubularization was thought to be the reason for development of this complication. In subsequent cases this was avoided and the meatus was slightly kept under mature resulting in prevention of this complication.

In a study performed by Angelo, Baccala Jr and Jonathan Ross in 2005 101 patients underwent one stage repair using a modified TIP repair with a local De-Epithelialized skin flap to cover the urethroplasty¹⁹. With at least six months of follow up, all patients have achieved excellent functional and cosmetic results with meatus at the tip of penis. On follow up, three repairs for meatal stenosis and two for fistula were reoperated.

Neourethral stricture was not encountered in our study. Although this seems to be a potential complication, is not encountered in many studies carried out by different surgeons^{15, 20}. This seems to be logical because circumferential anastomosis is not needed in this technique rendering less chance of development of anastomotic strictures. Snodgrass himself followed patients who underwent this technique postoperatively for one year and assessed the neourethra with urethroscopy and uroflowmetry and concluded that incision of urethral plate did not result in neourethral strictures²¹. However there is reported incidence of stricture formation of 8% in one study but in that study Snodgrass procedure was used for the treatment of previously failed hypospadias repair²². In this study the stricture was formed at the anastomotic site between the normal urethra and neourethra. A similar study performed in India (Delhi) showing complications in 02 cases out of 16 (12%) one developing urethrocutaneous fistula and other meatal stenosis²³. Cosmetic and functional results were excellent in 14 cases. TIP repair is the optimal technique for virgin cases of mid and distal penile hypospadias. A similar study was performed at Istanbul²⁴. Of 26 patients, distal penile hypospadias was present in 21 patients. All were repaired successfully with Snodgrass technique. No one developed fistula. One patient developed meatal stenosis. In our opinion the reported excellent results from Snodgrass repair in terms of low complication and better cosmeses are due to multiple factors namely; vascularity of neourethra, preservation of urethral plate, technical simplicity resulting in minimal tissue handling, single suture line in the urethroplasty, no need for pedicle graft, and consistent availability of tissue after dorsal midline relaxing incision. Numerous studies have shown superiority of Snodgrass repair over other surgical techniques for repair of hypospadias^{25, 26, 27}. These studies showed that fistula formation rate and flap necrosis rates were significantly lower with

Snodgrass technique as compared to Mathieu repair. Majority of surgeon also found that Snodgrass urethroplasty is more convenient and less challenging than Mathieu repair²⁷. At present majority of pediatric urologist prefers Snodgrass technique for repair of distal and mid shaft hypospadiac defect²⁸.

CONCLUSION

Snodgrass repair offers optimal repair for anterior and mid penile hypospadias with low complication rate and superior cosmetic results. Further studies can be conducted to access the usefulness of this technique in terms of not only complication rate but also functional & cosmetic results using parameters like glanular configuration, urinary stream, maximum and mean urinary flow rate, caliber of neourethra, and straightness on erection. Final outcome of Snodgrass technique can be assessed only once that patient has achieved sexual maturity.

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