TRANSVERSE PREPUTIAL ISLAND FLAP FOR HYPOSPADIAS REPAIR

JEHANGIR AHMED

ABSTRACT

Objective — *To determine the outcome of transverse preputial island flap urethroplasty for hypospadias in children.*

Study design — *Descriptive study.*

Place & Duration of study — *Department of Pediatric Surgery Bolan Medical Complex Hospital Quetta, from March 2005 to July 2010.*

Methodology — *Patients up to 13 years of age who were operated for hypospadias by transverse preputial island flap method were included. Hypospadias was categorized as distal penile, mid penile and penoscrotal types. Post-operative results were noted on proforma.*

Results — *Total number of patients was 94. Early postoperative complications noted were: urethro-cutaneous fistula in 19 patients (20%), meatal stenosis in 9 (9.5%), glandular dehiscence in 2 (2%), and complete disruption of urethral tube in 3 patients (3%). Urethral stricture at follow up noted in 4 patients (4.2%). Complications were more in more proximal type of hypospadias particularly in those with severe chordee. All cases of urethral stricture and meatal stenosis responded well to regular urethral dilatation.*

Conclusions — *Transverse preputial island flap urethroplasty is technically challenging and associated with significant number of complications.*

Key words — Hypospadias, Preputial island flap, Urethroplasty.

INTRODUCTION:

Hypospadias is one of the most common congenital anomalies occurring in 0.4 to 8.2 per 1000 live male birth.[1] Recently it has been shown that the prevalence of hypospadias has nearly doubled in western world.[2] Hypospadias therefore continues to be a challenging problem for pediatric surgeons, urologists and plastic surgeons alike. Transverse preputial island flap (TPF) urethroplasty for hypospadias is based on superficial dorsal vessels of the penis and has stood test of time.[3,4] It can be applied to anterior, middle and posterior types of hypospadias associated with or without chordee[5].

Correspondence:
Dr. Jehangir Ahmed
Department of Pediatric Surgery
Bolan Medical Complex Hospital Quetta
Email: jehangir_baluch@hotmail.com

The technique was originally introduced by Asopa et al with the tubularized flap attached to the dorsal layer of prepuce. This technique was further developed and popularized by Duckett. He separated the inner layer of prepuce with axial vascular pedicle from the outer layer of prepuce.[7] This study was conducted to describe the results of (TPF) urethroplasty at our department [6].

METHODOLOGY:

This retrospective descriptive study was conducted at the Department of Pediatric Surgery Bolan Medical Complex Hospital Quetta. It included patients operated for hypospadias from March 2005 to July 2010. The medical records of patients with different types of hypospadias who underwent transverse island flap urethroplasty were reviewed.

All patients under 13 years of age were included. During the procedure an artificial erection test was

was performed and chordee was corrected. A transverse island flap from the inner layer of prepuce with the length equal to the distance between the hypospadias orifice and glans tip, usually 12-18 mm wide was dissected with its axial vascular pedicle. After adequate mobilization this flap was tubularized around a suitable sized stent using 5/0 polydioxanone (PDS) or polyglactin 910 (Vicryl) sutures. The newly formed urethra was transposed ventrally and anastomosed to the native urethra proximally and at the proposed glans site distally. Urethral tube was used for drainage as a catheter and secured distally to the glans with the traction suture. The dorsal layer of prepuce transposed ventrally and the repair covered with the skin.

Dressing was changed at 48 hours after surgery to assess the viability of the repair and to detect the acute postoperative complications (bleeding, hematoma and edema), and thereafter daily. The catheter was left in situ for 7-10 days according to the length of neo-urethra. All the patients were kept on regular follow-up in outpatient department one week after discharge and at first, third and six months. Urethral calibration was done in selected patients having meatal stenosis and urethral stricture. Patients having persistent urethrocutanuous fistula were repaired after six months of primary surgery for hypospadias.

RESULTS:
Ninety four patients were operated by transverse preputial island flap urethroplasy method during the study period. Varying degree of chordee was present in the study population. The age ranged from 9 months to 13 years (mean 6.7 years). Most of the patients were younger than 5 years (n 57, 61%). The age distribution is given in table I. The external urinary meatus was sub-coronal or distal penile in 49 cases (52%), mid-penile in 36 cases (38%), and penoscrotal in 9 cases (10%).

The repair was successful in 70 % (n 66) patients. These patients had normal urinary stream without any complication. Overall complication rate was 37.7% (Table II). Mild infection was noted in three patients, while five patients developed edema. These complications settled with antibiotics and antiseptic dressings. Glandular disruption was observed in two patients. Secondary surgery for glans closure was successful in both of them.

Necrosis and sloughing of neourethra with subsequent disruption of the repair occurred in three patients. These were treated initially with debridement and daily dressing. Nineteen (20%) patients developed urethrocutaneous fistula. It was single in 15 patients while in four patients there was more than one fistula. Fistula healed in seven patients within first six months. Nine patients underwent surgery for fistula closure after an interval of 7 to 9 months which was successful in five patients. Three patients did not report for fistula closure.

Meatal stenosis occurred in 8 (8.5%) patients. Urethral stricture was found in four (4.2%) patients. All cases of meatal stenosis and urethral stricture responded well to regular dilation. Complications are summarized in table III.

Table - I: Age of the Patients at Presentation

Age in Years	No. of patients	%
1-5	57	61%
5-9	23	24%
9-13	14	15%
Total	94	100%

Table - II: Overall Results of Repair

Type of Hypospadias	Results		Total
	With Complications	Without Complications	
Distal Penile	10	39	49
Proximal Penile	12	23	35
Peno-scrotal	6	4	10
Total	28	66	94

Table - III: Complications of Transverse Preputial Island Flap Urethroplasty

Complications	No of Patients	%
Fistula	19	20
*Single	15	
*Multiple	4	
Glandular Disruption	2	2
Total Disruption	3	3
Meatal Stenosis	8	8.5
Stricture	4	4.2
Total	28	37.7

DISCUSSION:
Hypospadias repair is one of the most challenging problems for operating surgeons due to its high complication rate. The reported incidence of

complications range from 6% to 30% depending upon severity of hypospadias.[5, 8] The technique of repair for hypospadias kept evolving as none of the current methods is without complications even in the best of hands. The type of repair used is mostly preference of individual surgeon. Due to technical challenges and often poor outcome the condition has attracted attention of operating surgeons. During the past years many techniques have developed to overcome these problems. Mostly one stage repair for hypospadias is preferred nowadays. The advantage of correcting chordee and reconstruction of neourethra in single operative sitting and the associated low morbidity are the reason for popularity of single stage repair.

The inner preputial flap is one of the most suitable epithelial structures for creating neourethra up to 6-7cm long. Its vascular pedicle can be dissected proximally to be adopted to different types of hypospadias.[3,6,7] Complications after any surgical procedure are possible, but these complications are higher in hypospadias surgery when compared to any other reconstructive surgery. The frequency of complications in this study was also high. The single stage operation was functionally and cosmetically successful in 66 patients. Twenty eight patients needed further surgery for complications.

Urethrocutaneous fistula after hypospadias repair is the most common complication and it varies in various studies.[8-11.] Despite improvements in surgical techniques, fine surgical instruments and monofilament absorbable suture material urethrocutaneous fistula still occurs in 5% to 20% of all hypospadias repairs.[12,13] In this study 20% of the patients developed urethrocutaneous fistula. The fistula formation was mostly at the junction of neourethra with the native urethra, and the frequency was high in cases of proximal hypospadias. This compares well with the similar results in studies by other investigators.[5,9,14] Dewan et al reported 34% fistula rate in their hypospadias patients managed by transverse preputial island flap technique.[11] Many factors seem to be involved in this wide range of fistula rate among different series. Technical differences, the severity of hypospadias, opposing suture lines, suture material, length of neourethra, tissue ischemia and distal narrowing are important factors in formation of fistula.[5,15-17]

Various techniques have been described to prevent fistula formation after transverse preputial island flap urethroplasty. Chuang and Shieh in their study found that two layered closure of neourethra decreased complication rate of urethrocutanuous fistula from 34% to13%. They were of the opinion that two layered closure resulted in improved healing of the neourethra and decreased chances of ischemic necrosis.[18] Hayashi et al noted urethrocutanuous fistula in one patient out of thirteen with two layer closure of the neourethra, additionally the portion of anastomosis between native urethra and the neourethra was wrapped with the tissue of corpus spongiosum. [19]

In this study there were eight cases of meatal stenosis. Technical problems such as creating a narrow lumen meatus or too tight glanuloplasty may be the cause of meatal stenosis. These disadvantages were focused and there were no meatal complications in our last nineteen patients. Early calibration and dilation of the neourethra is a useful method for treatment of meatal stenosis after hypospadias repair.[20] The incidence of meatal stenosis was high but response with dilatation was good. Regular dilatation at frequent intervals for three months was the protocol in patients who developed meatal stenosis. None of them required surgery for this complication.

Stricture of neourethra is another complication after transverse preputial island flap urethroplasty for hypospadias. The reported incidence of this complication according to different series is 6% - 22%.[16,21,22] Stricture was found in four patients in this series who had poor urinary stream. Stricture were single and at the anastomosis of proximal urethra with neourethra. These cases responded well to regular dilations. The exact number of our patients having urethral stricture may be high as long term follow-up is required to asses the incidence of this complication.

One of the most unanswered questions in hypospadias surgery is why some urethroplasties fail while others are successful. Surgeon's experience, operative techniques and patient factors may be involved. However no one has clear answer to this important question. The percentage of complications was high in our series; however there was significant improvement in our results in last twenty patients. There is a significant learning curve in hypospadias surgery and results improve with experience of surgeon.[23] We also noticed this pattern of learning in our study.

CONCLUSIONS:

Duckett's method of transverse preputial island urethroplasty is technically challenging. Fistula is the commonest complication with this repair; however healing is spontaneous in about one third of cases provided there is no distal obstruction. Experience of the surgeon, proper selection of

patient and meticulous surgical technique play important role in minimizing postoperative complications.

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