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Original Article

TO EVALUATE THE ROLE OF VASCULARISED DORSAL DARTOS FLAP IN SNODGRASS URETHROPLASTY

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Abstract

Background: Hypospadias is a common congenital anomaly of male urethra. Surgical repair is the only treatment of this defect, but there is no single, universally acceptable technique for its repair . Snodgrass technique is now popular for its low complication rate, shorter operative time, vertically oriented slit like meatus and better cosmetic outcome.

Objective: To evaluate the role of vascularized dorsal dartos pedicle flap over the neourethra in terms of postoperative urethrocutaneous fistula formation between two groups of patients of distal penile hypospadias.

Methodology: Thirty two patients were included in this study. They were divided in group A and group B on the basis of serial number of patients. Snodgrass urethroplasty was done in group A considered as control and in group B, Snodgrass urethroplasty was done with additional dorsal dartos flap by buttonhole technique considered as interventional group. The outcome of both groups in terms of post operative urethrocutaneous fistula were evaluated.

Results: In this study in group A, urethrocutaneous fistula developed in 6 patients out of 16 patients. Among the fistulas, 5 were situated at the coronal level and 1 at the hypospadiac meatus level. In group B, urethrocutaneous fistula developed in 1 patient out of 16 patients and the fistula occurred at the coronal level. In either group, all the fistulas are developed after removal of the catheter. In terms of post operative urethrocutaneous fistula formation in between the two groups, the results were statistically significant.

Conclusion: Snodgrass urethroplasty with additional dorsal dartos flap by buttonhole technique have better outcome than without additional dorsal dartos flap in terms of postoperative fistula formation.

Keywords: Urethrocutaneous Fistula, Dorsal Dartos Flap, Button Hole.

Introduction

Hypospadias is a developmental anomaly occuring 1 in 300 live-births[3]. Surgical reconstruction is the only option to correct this congenital defect. But the complications are much higher after hypospadias surgery than any other reconstructive procedure[5]. Among the complications, urethrocutaneous fistula is the most frustrating & difficult to manage. To overcome these postoperative complications, more than 300 different surgical techniques have developed but the hypospadiologists are still in search of an ideal technique[3].

Among the recently developed sophisticated procedures of hypospadias surgery the tubularized incised plate urethroplasty (Snodgrass technique) is the most established and reliable method[4]**.** It is easy to do and has a good cosmetic outcome with a ventrally oriented meatus as in a normal circumcised penis. Though this procedure is a worldwide accepted urethroplasty technique but is not free of postoperative fistula formation . The fistula occurs in 2- 30% cases[13].

Several factors are responsible for fistula formation. The most important factor is the ventral penile skin, distal to the hypospadiac meatus. In Hypospadiac penis, the important local healing factors i.e. vasculo-collagenous tissues are insufficient on the ventral skin

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as compared with the dorsal skin. This may be responsible for the higher incidence of complications like frustrating urethrocutaneous fistula after operation[1].

Efforts continued to reduce the postoperative fistula after urethroplasty through different surgical modifications. All the modifications are based on the vascularized supporting subcutaneous tissue covering over the neourethra. This vascularized peno-preputial dorsal flap may be an ideal loco-regional support over the neourethra. In hypospadias, the dorsal skin is abundant and loose. The subcutaneous dartos fascia can be easily isolated from the overlying skin up to the root of the penis keeping the intact longitudinal vessels with it. Several hypospadiologist used vascular pedicle flap in different ways to reduce the fistula formation. So the use of vascular flap is an integral part of the surgery. But the question is that from where we get a vascular flap and how we transfer this flap over the neourethra without rotation of the penis? If we transfer the flap ventrally by buttonhole technique and spread it over the urethra from the root of the penis upto the neomeatus, it provides complete and symmetrical covering of the whole length of the urethra. Moreover it maintains the axial course of blood vessels without any rotational deformity and also maintains the normal appearance of the shaft and good looking glans. All of the available study found that they cover the neourethra only. Moreover unequal placement of the flap gives abnormal shaped penis as well as vascular impairment of the flap. In our country, several studies were carried in different institutions regarding hypospadias repair only to evaluate the postoperative outcome of different surgical techniques in terms of fistula formation[9,10,6]. So this study was design to see the role of vascularized dorsal dartos flap in terms of postoperative fistula. by buttonhole technique over the whole length of the urethra from root of penis up to the glans in Snodgrass urethroplasty.

Details of the method

We selected our patients. from the out patient department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University and from other private hospitals (Module General Hospital, Islami Bank Hospital) of Dhaka city with distal penile hypospadias.

Fig.-1: *A case of distal penile Hypospadias.*

A detailed history was taken after admission into the hospital. Urethral plate width was measured in mm using a compass with the help of ruller.

Then investigations were done to prepare the patient for Snodgrass urethroplasty under general anaesthesia. Patients were distributed in two groups on the basis of serial number-A for even and B for odd. After completion of all surgical ritual, general anaesthesia with endotracheal intubation was done in all patients. After proper exposure, painting with 10% povidone iodine and draping, a stay suture was given on glans penis by 5-0, round body Prolene for traction. Snodgrass urethroplasty was done for group-A. Local tourniquet was applied over root of the penis to minimize the bleeding during surgery. A U-shaped incision was made around the urethral plate border and hypospadiac meatus. A circumferential incision 5 to 7 mm proximal to the coronal margin was extended from each longitudinal incision, followed by degloving of the penile shaft skin in between dartos and buck's fascia upto to the root of the penis. Then a midline incision of the urethral plate was carried out starting from the hypospadiac meatus to end just behind the glans tip. A suitable sized stent according to the age

of the patient was inserted into the bladder against which a neourethra was constructed by using subcuticular (6-0) vicryl sutures. After completion of the stitches the stent was removed and a smaller than the size of the previous one was reintroduced through the neourethra to prevent ischemia due to post operative edema. Glans wings were sutured in two layers with interrupted vicryl 5-0 suture. Urethral tube was made as same as group-A for group-B.

But in group-B, after degloving the penile skin, the distributions of the blood vessels of the dorsal peno-preputial skins, their direction, number of longitudinal blood vessels and anastomotic arcades were observed against the light and were noted. Stay sutures were given at the margin of dorsal preputial skin and subcutaneous dartos.

The vascularized dartos flap was separated from the skin by using sharp and blunt dissection upto the penile root proximal to the 1st vascular arcades . After the preparation of the vascularized dorsal dartos flap from the dorsal peno-preputial skin, the blood supply of the flap as well as skin were assessed.

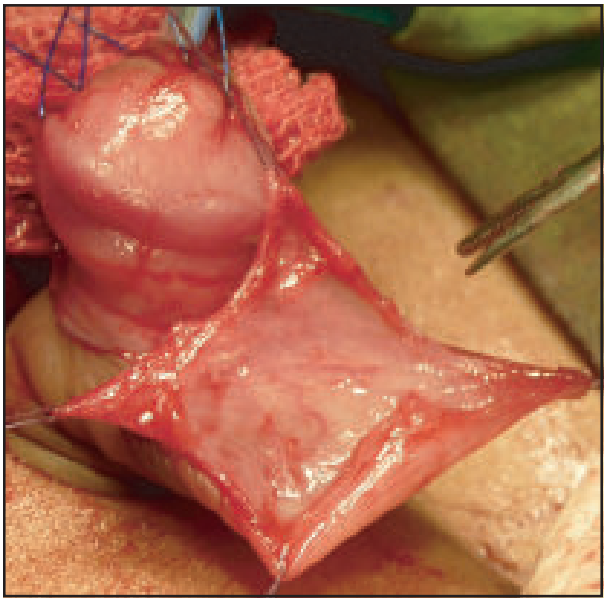

Fig.-2: *Vascularized dorsal dartos flap with vascular pattern*

The vascularity of the flap was assessed by colour and the number of longitudinal blood vessels was observed against light. The penile skin vascularity was also assessed by colour and number of longitudinal blood vessels before and after separation of dartos flap. Then a hole was made into the flap near the root

Fig.-3: *Vascularized dorsal dartos flap over the neourethra.*

in front of the 1st arterial arcades in between two longitudinal blood vessels. The flap was transferred to the ventral surface of the penis by the buttonhole technique .

The flap was then spread uniformly over the whole ventral aspect covering the neourethra from the root up to the neomeatus and anchored laterally with the buck's fascia, distally with the neomeatus and proximally with the root of the penis.

Vascularity of the flap was rechecked by same parameter. The glans wings were approximated in two layers without tension by several interrupted sutures (5-0vicryl) over the neourethra. Then a vertical midline incision was made in the dorsal prepucial skin extending up to the corona. Length of the skin required to cover the ventral defect was assessed. The excess skin had been discarded. Rotated skin flaps were sutured in the midline without any tension.

Transurethral stent was kept to drain urine and transfixed with the glans penis. Penile stent was removed on 8th post operative day and observed for urethrocutaneous fistula formation. All patients were followed post operatively up to four (4) weeks.

Calibration was started after 2 weeks of operation. In this study we used metallic urethral calibrator (dilator) no. 2 & 4 for patients of 1 to 4 years, no. 5 & 6 for patients of 5-12 years age group.

All data were recorded systematically in a data sheet form and the numerical data were expressed as mean. Statistical analysis was performed by using SPSS for window version13.0. Fishers exact test was used to see the level of significance. 95% confidence limit ($P<0.05$) was taken as a level of significance.

Results

During the period of April 2009 to September 2010, 32 patients were selected for the study. On the basis of serial number, the patients were divided into two groups, group A, and group B. The mean+SD of age in group A was 6.14+3.57 and in group B was 4.97+3.18. Vascularity of the dorsal dartos flap before and after placement over the neourethra and post operative urethrocutaneous fistula were observed and documented.

Vascularity of the dorsal dartos flap:

a. Colour of the dorsal dartos flap:

The colors of the dorsal dartos flap before and after placement over the urethra are shown in table-I. In group-B, all the 16(100.0%) patients had pinkish red colour and no patient had developed bluish colouration of the flap before and after placement over the urethra.

Table-I

Colour of the dorsal dartos flap.

Flap colour	Before placement (n=16) (%)	After placement (n=16) (%)
Pinkish red	16(100.0)	16(100.0)
Bluish	0(0)	0(0)

Post operative urethrocutaneous fistula

The number of urethrocutaneous fistula:

The number of urethrocutaneous fistula after urethroplasty are shown in table-II. In group-A, 6 (37.5%) patients had developed urethrocutaneous fistula and in group- B, 1(5.3%) patient had developed urethrocutaneous fistula. Fisher's exact test shows significant difference between the occurrences of U-C fistula in two groups (P<0.041).

Table-II

Number of urethrocutaneous fistula.

Complications	Group A (n=16) (%)	Group B (n=16) (%)	P value
Urethrocutaneous fistula			
Yes	6 (37.5)	1 (5.3)	0.041[s]
No	10 (62.5)	15 (93.8)	

Fisher's exact test. S= significant.

P value is 0.041, which is statistically significant.

Discussion

Hypospadias is one of the most common congenital anomaly. Despite obvious surgical advances in hypospadias repair, no single technique has been without complication. The most common complication of hypospadias surgery is fistula formation .

The present study was designed to evaluate the role of vascularized dorsal dartos flap in hypospadias surgery. We applied the vascularized dorsal dartos flap over the whole ventral aspect of penis covering the neourethra by buttonhole technique after Snodgrass urethroplasty. Vascularity of the dorsal dartos flap before and after placement over the neourethra and post operative U-C fistula were evaluated.

Thirty two (32) patients were included in this study. After preoperative evaluation, Snodgrass urethroplasty was done in 16 patients (Group-A) as control group and additional dorsal dartos flap was placed over the whole length of the ventral urethra in another 16 patients (Group-B) after reconstruction of the neourethra by Snodgrass procedure before skin and glans closure.

In this study, 6 patients (37.5%) in group A and 1 patient (5.3%) in group B developed urethrocutaneous fistula. The rate of fistula reported in literature is ranged from 7-26%[12,7,8,11]. In this study, the rate of fistula in Snodgrass urethroplasty without additional dorsal dartos flap group was 37.5% which corresponded with other study but Snodgrass urethroplasty with additional dorsal dartos flap group was significantly less i.e 5.3%, (37.5% vs 5.3%). In this study, fistulae revealed immediately after removal of stent. Wood et al reported 61% fistulae occur in immediate postoperative period[14].

This study demonstrated that urethroplasty with additional well vascularized dorsal dartos flap gave better outcome than without additional dorsal dartos flap in terms of fistula formation.

Conclusion:

Post operative urethrocutaneous fistula is the most common complication of hypospadias surgery. This study revealed that the occurrence of urethrocutaneous fistula was reduced with additional vascularized dorsal dartos flap. So we concluded that a vascularized dorsal dartos flap over the whole length of the ventral aspect of the urethra by buttonhole technique may be an effective alternative method of reducing urethrocutaneous fistula in distal penile hypospadias.

References

1. Akan AB. 'The vasculo-collagenous tissue of the ventral skin of a hypospadiac penis distal to the hypospadiac meatus differ histologically from that of the corresponding dorsal skin', MS, Thesis, Bangabandhu Sheikh Mujib Medical University, 2010.
2. Azmy AF. 'General principles', in Hadidi, AT & Azmy, AF (eds), Hypospadias Surgery, Springer, Heidelberg , 2004. pp. 87-92.
3. Baskin LS. 'Hypospadias', in Grosfeld, JL, O' Neill, Jr, JA, Coran, AG & Fonkalsrud , EW (eds), Pediatric Surgery, 6th ed, Mosby, Philadelphia, 2006. pp1870-98.
4. Bhat & Mandal. 'Acute post operative complications of hypospadias repair', *Indian Journal of Urology*, 2008; 24: pp. 241-48.
5. Hasan K . ' A comparative study between the outcome of tunica vaginalis pedicle wrap & dartos flap pedicle wrap in primary hypospadias repair', *Bangladesh journal of medical science,* 2003; 16: pp. 46-50.
6. Holland, AJA, Smith, GHH, Cass, D. 'Clinical review of the `Snodgrass' hypospadias repair.' Aust. N.Z.J. Surg. 2000; 70: 597-600.
7. Humby G. 'A one stage operation for hypospadias', Br J Surg. 1941; 29: 84-92.
8. Jan, IA et al. 'Factors influencing the results of surgery for hypospadias', J Pak Med Assoc 2004; 54(11): 577-90.
9. Khan, HK. 'Comparison between perimeatal based flap (Mathieu) and tabularized incised plate urothroplasty (Snodgrass) in distal hypospadias', MS, Thesis, Dhaka University. 2003.
10. Sajid M. 'Comparison between the outcome of tunica vaginalis wrap & non wrap procedure in urethroplasty', MS, Thesis, Dhaka university. 2005.
11. Sarhan, OM, El-Hefnaway, AS, Hafez, AT, et al. 'Factors affecting outcome of tabularized incised plate (TIP) urethroplasty: Single-center experience with 500 cases', *Journal of Pediatric Urology,* 2009; 5: 378-82.
12. Snodgrass W, Koyle M, Manzoni G, Hurwitz R, Caldamone A, Ehrlich R. 'Tubularized incised plate hypospadias repair: Results of a multicentre experience', *The Journal of Urology*, 1996; 156: 839-41.
13. Snodgrass, W, Koyle, M, Manzoni, G, Hurwitz, R, Caldamone, A. and Ehrlich, R 1998, 'Tubularized incised plate hypospadiasrepair for proximal hypospadias', *The Journal of Urology*, 1998; 159(6): pp. 2129–31.
14. Wood, HM, Kay, R, Angermeier, KW, et al. 'Timing of the presentation of urethrocutaneous fistulas after hypospadias repair in pediatric patients', The journal of Urology. 2008; 180: 1753-56.