Journal of Paediatric Surgeons of Bangladesh (2012) Vol. 3 (1): 12-17
Official organ of the Association of Paediatric Surgeons of Bangladesh

Journal of Paediatric Surgeons of Bangladesh

Original Article

PREPUTIAL DARTOS REINFORCED SNODGRASS TUBULARIZED INCISED PLATE URETHROPLASTIES IN DISTAL HYPOSPADIAS TO PREVENT URETHROCUTANEOUS FISTULA

TALUKDER SA [1], TALUKDER DC[2], MAHMUD AA[3], ALI MS[4] , KHAN NZ[5], DAS SC[6],ISLAM S[7] BARI MS[8]

Abstract:

Urethro cutaneous fistula(U-C fistula) is the most common complication of hypospadias surgery. It frequently needs separate surgeries for closure, which bring a great deal of physical and mental agony and monetary involvement of the patient and his family. Many efforts have been invented to prevent the u-c fistula with various degree of success. We would like to see the outcome of "Preputial Dartos Reinforced Snodgrass Tubularized Incised Plate Urethroplasties in Distal Hypospadias to Prevent Urethrocutaneous Fistula". This interventional study was performed to see the outcome of preputial dartos reinforced Snodgrass tubularized incised plate urethroplasties in distal hypospadias specially urethrocutaneous fistula prevention. For this purpose 40 patients were selected having distal hypospadias age ranging from 6 months to 11 years admitted in the Department of Pediatric Surgery, Mymensingh Medical College & Hospital during the period of January 2010 to March 2011. Out of 40 patients, 20 were in group-A (preputial dartos flap) and another 20 were included in group - B (without flap). All this patients were followed by perioperative and postoperative care. Few patients developed postoperative pyrexia, wound infection, stent blockage which were treated accordingly leaving minimum morbidity. Both groups of patients were followed up for 3 months after surgery.

Present study is probably a better technique to prevent fistula-associated morbidities in distal Snodgrass TIP urethroplasties.

Key Words: Urethroplasty, Urethrocutaneous Fistula, Preputial Dartos Reinforced Snodgrass Tubularized Incised Plate.

*1. Talukder SA, Professor(cc) Dr Md. Shah Alam Talukder, Professor & Head Dept of paediatric surgery, MMCH, e-mail:doctorshahalam@gmail.com
2. Dr. Debesh Ch. Talukder, Asstt. Prof of ENT, DMCH,
3. Dr. Md. Abdullah Al Mahmud , Assistant Registrar, Dept of paediatric surgery, MMCH , e-mail:drrtan31@gmail.com
4. Dr. Mohammed. Showkot Ali, Lecturer, Anatomy, MMC
5. Dr. Nadiuzzaman Khan, Registrar, Dept of paeditric surgery, MMCH
6. Dr. Shankar Chandra Das, Medical Officer, Gazipur Sadar Hospital
7. Dr. Sangul Islam, MS (Paediatrics) Final part student, MMCH
8. Dr. Md. Shafiqul Bari, Registrar, Dept of paediatric surgery, MMCH

Correspondence to : Professor(cc) Dr Md. Shah Alam Talukder, Professor & Head Dept of paediatric surgery, MMCH, e-mail:doctorshahalam@gmail.com

Introduction:

Hypospadias is a developmental anomaly characterized by a urethral meatus that opens onto the ventral surface of the penis, proximal to the tip of the glans[1] Techniques used for anterior hypospadias are meatal advancement and glanuloplasty (MAGPI), extended MAGPI the Mathieu's procedure, Snodgrass technique, and Ducket onlay transverse preputial island flap. But significant post operative complications make the hypospadias repair challenging. The urethral fistula is probable most common complication of hypospadias surgery [2].

The Snodgrass technique is becoming more cosmetic than other established techniques [3]The Snodgrass urethroplasty provides satisfactory cosmetic and functional results and is versatile in repairing almost all types of hypospadias [4] .

A tubularized incised plate urethroplasty described by Snodgrass presents the method of choice in the treatment of distal/midshaft hypospadias with minimal complication rate . Urethrocutaneous fistula is the most common complication, and interposition of well-vascularized tissue between the penile skin and the neourethra is essential for its prevention. Different tissues and techniques have been described to solve this problem. Retik and Borer described covering the neourethra with an asymmetrical, rotational, subcutaneous dartos tissue flap harvested from the

dorsal preputial and shaft skin[2] . Flaps, harvested from dorsal skin, are abundant, well vascularized and follow the axial course of blood vessels in the best possible way. The crucial point in the technique involves harvesting of the dorsal dartos flap. A transposed flap completely covers the neourethra, giving additional support in fistula prevention. The flap's redundancy, vascularization and always sufficient length makes it very useful for distal, midshaft hypospadias repairs with a well developed urethral plate. Use of this flap achieved very good outcomes compared with other studies [2,5-8] .

In Snodgrass technique for distal hypospadias, use of other flap like tunica vaginalis, buccal mucosal flap rate of urethrocutaneous fistula is high and might add additional trauma than Preputial dartos reinforced Snodgrass tubularized incised plate in distal urethroplasties [9].

In this study we would like to show the outcome of Preputial dartos reinforced Snodgrass tubularized incised plate urethroplasties in distal hypospadias to prevent urethrocutaneous fistula.

Materials and Methods:

This Interventional study was carried out in the Department of Paediatric Surgery, Mymensingh Medical College and Hospital (MMCH), Mymensingh from January 2010 to March 2011, for a period of 15 months. A total 40 patients were included in this study. Among them 20 were considered as study group and 20 as control group after fulfillment of selection criteria. Inclusion criteria-the patient presenting with distal hypospadias with mild skin chordee or without chordee.

Exclusion criteria-Mid penile and proximal hypospadias with moderate to severe Chordee, Circumcised penis, Underwent urethroplasty earlier and skin disease in genitalia.

Study was performed by doing selecting the patients as odd number in group-A and even number in group-B.

The treatment procedure, merits and demerits, expected results and possible complications were explained to the patients' legal guardian. In each case, information about the patients were recorded in predesigned questionnaire after obtaining written consent of the parents/guardians in the consent form. By taking history, physical examination and laboratory investigations all the patients were operated under general anaesthesia with caudal block by 0.05% bupivacaine hydrochloride. Urethroplasty was done in group-A patients by Snodgrass procedure with the application of preputial dartos soft tissue flaps, in group-B patients by Snodgrass procedure without the application of soft tissue flaps.

Results and Observation:

This interventional study was performed to see the outcome of preputial dartos reinforced Snodgrass tabularized incised plate urethroplasties in distal hypospadias specially urethrocutaneous fistula prevention. For this purpose 40 patients were selected having distal hypospadias age ranging from 6 months to 11 years admitted in the Department of Pediatric Surgery, Mymensingh Medical College & Hospital during the period of January 2010 to March 2011. Out of 40 patients, 20 were in group-A (preputial dartos flap) and another 20 were included in group - B (without flap). All this patients were followed by perioperative care. Few patients developed postoperative pyrexia, wound infection, stent blockage which were treated accordingly leaving minimum morbidity. Both groups of patients were followed up for 3 months after surgery.

Table-I

Types of hypospadias

No of patient (Group-A, n =20) and (Group-B, n = 20)

Groups	Types of Hypospadias	
	Coronal	Distal penile
Group A	7 (35%)	13 (65%)
Group B	8 (40%)	12(60%)

Table-I shows maximum number of hypospadias was distal penile hypospadias in both groups. In group-A, 13 patients (65%) and in group-B 12 patients (60%) presented with distal penile hypospadias.

Table-II

Postoperative wound infection following urethroplasties

No of patient (Group-A, n =20) and (Group-B, n = 20)

Type	Groups	Period (POD)									
		1st		2nd		3rd		4th	5th	6th	7th
		No	%	No	%	No	%	No	No	No	No
Haematoma	A	-	-	-	-	2	10	-	-	-	-
	B	-	-	-	-	1	5	-	-	-	-
Condition of glans andskin	A	Well		Well		Well		Well	Well	Well	Well
	B	Well		Well		Well		Well	Well	Well	Well

Table-II shows 2 patients (10%) in group-A and 1 patient (5%) in group-B developed hematoma on 3rd POD which were treated accordingly and resolved. Condition of glans & skin of all patients were well.

Table-III

Stent blockage from 1st to 8th postoperative day following urthroplasties

No of patient (Group-A, n =20) and Group-B, n = 20)

Groups	No of patient (%)	Stent blockage
Group – A	2 (10%)	1 – 2nd POD and 1 – 3rd POD
Group – B	2 (10%)	1 – 3rd POD and 1 – 4th POD

Table III shows 2 patients (10%) in group-A blockage of stent occurred on 2nd & 3rd POD and 2 patients (10%) in group-B blockage of stent occurred on 3rd and 4th POD. They were managed by conservatively with normal saline irrigation.

Table-IV

Urethro-cutaneous fistula developed in Group-A and Group-B

No of patient (Group-A, n =20) and (Group-B, n = 20)

Groups	U-C fistula		P value
	Yes (%)	No (%)	
Group A	1 (5%)	19 (95%)	0.037*
Group B	6 (30%)	14 (70%)	

* P<0.05 , Chi-square test

Table 4 shows the rate of urethro-cutaneous fistula in group-A, 5% (1 patient) and in group-B, 30% (6 patients). This difference was statistically significant.

Fig.-1: *Coronal variety of hypospadias with stenting*

Fig.-2: *Preputial dartos flap before operation*

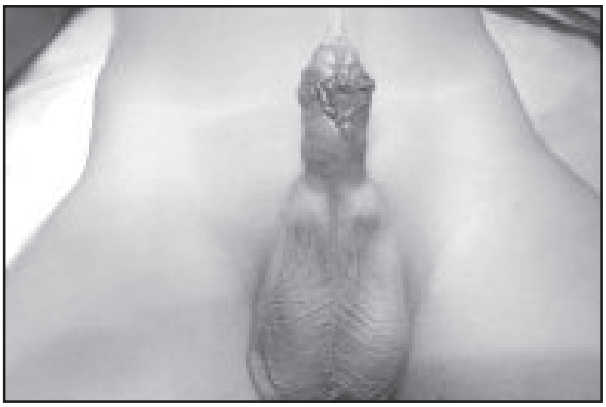

Fig.-3: *After completion of urethroplasty with preputial dartos flap*

Discussion:

Urethro-cutaneous fistula (UCF) formation is the most common complication of hypospadiac urethroplasties. Fistula formation depends on a fine balance between (i) healthy native versus ischemic neo-urethral tube, (ii) thick and vascular versus thin and attenuated STRIF, (iii) uniform, patent and adequate neo-urethra versus its irregularity, stenosis or stricture, (iv) long and oblique versus short and superimposed fistulous tract, (v) experienced versus infrequently operating surgeon, (vi) with or without proper pre, per and postoperative precautions, and (vii) many other unknown unidentifiable factors. Different soft tissue reinforcement interposition flaps (STRIFs) have been described in the literature to provide biological and mechanical support to neo-urethral tubes against fistulisations [10-12]. These reinforcement flaps, irrespective of the tissues (preputial skin, penile skin, buck's fascia, scrotum and testes) used for their harvesting, their location (local or distant) and their pattern of vascularity (random or axial), have been collectively named by the authors as STRIFs [13].

This interventional study has been carried out in Department of Paediatric Surgery, Mymensingh Medical College and Hospital, Mymensingh, during the period of January 2010 to March 2011, a period of 15 months.

A total of 40 patients were included in this study. These patients were divided into two groups. Group-A included 20 patients who underwent urethroplasty by Snodgrass procedure followed by application of preputial dartos flap and group-B included 20 patients who underwent urethroplasty by Snodgrass procedure without application Flap. In this study, surgical outcomes and complications between the two groups were compared.

Age ranges were 6 months to 11 years with mean age of 6.93±2.03 in group-A and 5.45±2.52 in group-B. Age groups of this study are consistent with other studies[14-18].

In this study, hypospadias without chordee were 6 in group-A and 5 in group-B and mild skin chordee were 14 in group-A and 15 in group-B which were not significant among the both groups. In other series having mild to moderate chordee with the consistency of the study[19].

In this study, both groups of hypospadias patients had urethroplasty by Snodgrass procedure. Preputial dartos flap was applied in group-A and no flap was applied in group-B. In this series, mean operating time in group-A was 66.50±5.64 minutes and in group-B were 59.00±3.84 minutes. There was significant difference in mean operating time. The difference between the groups showed statistically significant[12]. However, the mean time of urethroplasty without flap seems to be shorter, but applying a flap may prevent a second surgery to close urethro-cutaneous fistula.

In this study, 2 patients (10%) in group-A blockage of stent occurred on 2nd & 3rd POD and 2 patients (10%) in group-B blockage of stent occurred on 3rd & 4th POD. They were managed by conservatively with normal saline irrigation.

Wound infection in this study is negligible. In group-A, haematoma occurred in 2 patients whereas in group-B 1 patient which were treated accordingly and resolved. Devitalized wound occurred 1 patient in group-A and 2 patients in group-B. Partial wound disruption occurred in 4 patients in group-B and none in group-A. Among them U-C fistula formation 1 patient in group-A and 6 patients in group-B. It is due to the application vascularized preputial dartos flap as a second layer over the neourethra prevent wound infection[13].

In this study, it was found that postoperative meatal stenosis in 1 patient in group-A and 2 patients in group-B on 2nd post operative follow up. They were advised for regular meatal dilatation with the lubricated nozzle of neomycin eye ointment gave good outcome with the consistency of other study[13].

In this study, uretrho-cutaneous fistula developed in 1 patient (5%) in group-A and 6 patients (30%) in

group –B. It is consistent with the internationally accepted rate of fistula formation[20]. However, in this study, the better result in group-A, was due to the application vascularized preputial dartos flap as a second layer over the neourethra.

On the other hand, in this study, the rate of urethra-cutaneous fistula is much less, specially in group-A (5%). By comparing the surgical outcome of urethroplasty by applying preputial dartos flap as a second layer over the neourethra the U-C fistula rate in group-A is much less (5%) than group-B (30%) where any type of flap was not applied. This difference was statistically significant ($p < 0.05$).

This study demonstrates that use of preputial flap as a second layer over the neourethra is more effective in preventing urethrocutaneous fistula than without applying any type of flap. Sample size and single centered study limitalization of the study.

Conclusion:

The technique of applying preputial dartos wrap over the neourethra in urethroplasty for distal hypospadias repair is relatively new. Though it may take 10 to 15 minutes more time to apply the wrap, but it can save the burden of another surgery to manage the urethro-cutaneous fistula as a complication. However, the duration of operating time will be decreasing with the experience of surgeons. As a result, preputial dartos flap wrapping is better in comparison to without flap wrapping. The present study is probably a better technique to prevent fistula-associated morbidities in distal Snodgrass TIP urethroplasties and further stdy is needed to support this study. The use of such STRIFs may be recommended for all hypospadiac urethroplasties

References:

1. Murphy, J.P. 2000. Hypospadias in Paediatric Surgery, (eds.) Ashcraft, K.W. Murphy, J.P., Sharp, R.J., 3rd ed., W.B. Saunders Company, Philadelphia. 763-782.
2. Retik, A.B., Michael, M.D., Keating, Z. and Mandell, J. 1988. Complication of hypospadias repair. Urol. Cli. North Amer. 15: 223-226.
3. Moschos, V., Alan, P., Dickson, D. and Gough, C.S. 2005. An objective assessment of the results of hypospadias surgery. BJU International, 96(1), 135-139.
4. Yun Z., Lu, J. and Takahashi, N. 2002. Snodgrass procedure for primary hypospadias repair. I. J. U. 9: 215-218.
5. Yerkes, E.B., Adams, M.C., Miller, D.A., Pope, J.C., Rink, R.C. and Brock, J.W. 2000. Y-to-I wrap: use of distal spongiosum for hypospadias repair. J. Urol. 163: 1536-1539.
6. Shanberg, A.M., Sanderson, K. and Duel, B. 2000. Re-operative hypospadias repair using Snodgrass incised plate urethroplasty. BJU Int. 87: 544-547.
7. Soygur, T., Arikan, N., Zumrutbas, A.E. and Gulpinar, O. 2005. Snodgrass hypospadias repair with ventral based dartos flap in combination with mucosal collars. Eur. Urol. 47: 879-884.
8. Sozibur, S. and Snodgrass, W. 2003. A new algorithm for primary hypospadias repair based on TIP urethroplasty. J. Pediatr Surg. 38: 1157-1161.
9. Snodgrass W. 2002. Tubularized incised plate (TIP) hypospadias repair. Urol. Clin. N. Am. 29: 285.
10. Smith, D. 1973. A de-epithelialised overlap flap technique in the repair of hypospadias. Br. J. Plast. Surg. 26: 106-114.
11. Snow, B.W. 1986. Use of tunica vaginalis to prevent fistulas in hypospadias surgery. J. Urol. 136: 861-863.
12. Singh, R.B. and Pavithran, N.M. 2004. Tunica vaginalis interposition flap in the closure of massive disruption of the neo-urethral tube (macrourethrocutaneous fistulae). Pediatr Surg. Int. 20: 464-466.
13. Singh, R.B., Dalal, S., Pavithran, N.M. and Sharma, B.D. 2007. Soft tissue reinforcement interposition flaps in hypospadias repair. Indian J. Plast. Surg. 40(2): 70-77.
14. Masud, A.K.M. 1999. Hypospadias surgery a short outcome. MS thesis, BSMMU, Dhaka.
15. Alam, M.S. 2000. Comparison of single stsge correction of distal and mid penile hypospadias by V. T. Joseph's technique and onlay island flap technique' MS thesis, BSMMU, Dhaka.

16. Khan, H.K. 2003. Comparison between based Flap Mathew and Tubularized Plate urethroplasty (Snodgrass) in distal hypospadias. MS thesis, BSMMU, Dhaka.

17. Sajid, M.M. 2005. Comparison between Tunica vaginalis blantket wrap and non blanket wrap–procedures in urethroplasties. MS thesis, University of Dhaka, Dhaka.

18. Amin, M.R. 2006. A comparative study between Snodgrass and Modified Snodgrass urethroplasty, MS thesis, BSMMU, Dhaka.

19. Ahmed, M., Aboul, W.M.D., Sherine, M., Aboul, F.M.D., Khaled, M., El-Sherbeni, M.D. and Modified, M. 2006. Tubularized Incised Plate (TIP) Hypospadias Repair Using Dartos Fascia Flap. Egypt, J. Plast. Reconstr. Surg. 30(2): 139-142.

20. Duckett, J.W. and Baskin, L.S. 1998. Hypospadias in Pediatric Surgery, (ed)O'Neill, JA, Jr.Rowe, MI. Grosfield, Jl, 6th ed, vol 2 Mosby-year Book, Inc. St. Louis, Missouri. 1761-1781.