A STUDY OF TUNICA VAGINALIS FLAP IN ADULT REOPERATIVE HYPOSPADIAS

Periasamy Ponnusamy¹, Thiruvarul Palanisamy Venkatachalam², Pitchai Balashanmugham Karrupaiah³, Govindarajan Periasamy⁴, Selvakumar Soman⁵, Kulthe Ramesh Seetharam Bhat⁶

¹Senior Assistant Professor, Department of Urology, Government Stanley Medical College, Chennai.

²Senior Assistant Professor, Department of Urology, Government Stanley Medical College, Chennai.

³Professor, Department of Urology, Government Stanley Medical College, Chennai.

⁴Professor & HOD, Department of Urology, Government Stanley Medical College, Chennai.

⁵Post Graduate, Department of Urology, Government Stanley Medical College, Chennai.

⁶Post Graduate, Department of Urology, Government Stanley Medical College, Chennai.

ABSTRACT: Hypospadias is a common congenital abnormality and reoperation of failed childhood hypospadias repair is seriously bothersome and is surgeon's nightmares because of lack of abundant penile and prepuce skin for urethroplasty and penile shaft coverage. We assessed the use of tunica vaginalis as an interposing flap over reoperative hypospadias repair. Our study has a 93.75% success rate (No urine leak) and 6.25% failure rate (Urine leak) which was comparable to other studies. (71.4% to 100%. - Mean was 93.1%). Thus, Tunica vaginalis flap reinforcement is an excellent and should always be in mind for reoperative hypospadias, especially when the local genital tissues appears to be scarred, tunica vaginalis flap as a second layer provides a well vascularised cover for adequate healing.

KEYWORDS: Hypospadias, Tunica Vaginalis Flap, Failed Hypospadias Repair.

HOW TO CITE THIS ARTICLE: Periasamy Ponnusamy, Thiruvarul Palanisamy Venkatachalam, Pitchai Balashanmugham Karrupaiah, Govindarajan Periasamy, Selvakumar Soman, Kulthe Ramesh Seetharam Bhat. "A Study of Tunica Vaginalis Flap in adult Reoperative Hypospadias". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 91, November 12; Page: 15624-15629, DOI: 10.14260/jemds/2015/2246.

INTRODUCTION: Hypospadias is most common congenital anomaly of penis.¹ Surgical correction of proximal hypospadias is technically challenging. Reoperation of failed childhood hypospadias repair is seriously bothersome and is surgeon's nightmares because of lack of abundant penile and prepuce skin for urethroplasty and penile shaft coverage. It is the surgeons' responsibility to answer them because of psychologic trauma of multiple previous procedures and associated expectations. The available techniques have mixed results.

AIM OF THE STUDY: To assess efficacy of tunica vaginalis flap as an interposing layer in reoperative hypospadias.

METHODOLOGY:

Study Design: Prospective study

Duration: August 2012 to January 2015

Institute: Government Stanley Medical College, Chennai.

PATIENT SELECTION:

Inclusion Criteria:

1. Patients with post childhood hypospadias repair urethrocuteaneous fistula.

2. Patients with post hypospadias repair long segment penile urethral stricture for which stage I Johanson's urethroplasty was already done.
3. Patients greater than 13 years of age.

Exclusion Criteria:

1. Cases with previous scrotal surgery (Hydrocele repair or orchidopexy).
2. Cases requiring salvage perineal urethrostomy.
3. Cases with perineal urethro cutaneous fistula.

Pre-operative variables:

- Age.
- Duration of symptoms.
- Uroflowmetry.
- AUG.
- Cystoscopy.
- Previous history of open or endoscopic urethral surgery and dilatation.
- Review of previous operative records.
- Type of Hypospadias.
- Type of initial procedure in childhood.
- Number of fistulae and associated strictures.
- Follow up.
- Operative technique.

For post hypospadias urethrocuteaneous fistula, initially urethra was distended with povidone iodine to identify the number of fistulas. The tract is traced to the retubularized urethra and fistulous tract removed. Fistula closed with inverting sutures & reinforced with tunica vaginalis flap.

Financial or Other, Competing Interest: None.

Submission 21-10-2015, Peer Review 22-10-2015,

Acceptance 30-10-2015, Published 10-11-2015.

Corresponding Author:

Periasamy Ponnusamy,
Department of Urology,

NSB, 6th Floor, Government Stanley Medical College,
Old Jail Road, Royapuram, Chennai-600001,
Tamilnadu, India.

E-mail: drppsamysubha@gmail.com

DOI:10.14260/jemds/2015/2246.

Testis was delivered by a separate scrotal incision and tunica vaginalis flap was harvested which was in turn transferred through a subcutaneous tunnel to fistula site:

- TVF was harvested by incising near testicular inferior pole and tongue of parietal layer of TVF developed with due care to prevent ductus deferens and spermatic vessels injury. We must achieve perfect hemostasis and replace testis in to hemiscrotum. Serosal surface of TVF placed over neourethra as interposing layer. 4-0 absorbable tacking stitches done to fix flap to Bucks fascia. Scrotal hemostasis should be achieved.
- For long penile urethra stricture, second stage was done at least 6 months following stage I repair; two asymmetric vertical incisions placed on penile skin on side of the plate and tubularisation done over 16-F silicone urethral catheter by 4-0 polyglactin sutures. An interposing layer of tunica vaginalis was drawn onto neourethra and fixed.

Post-operative - Follow up:

- UC fistula closure alone - 10th POD - catheter removal.
- Staged repair - 21st POD - catheter removal after performing peri-catheter study.

- Follow up at 3, 6 & 12 months - Uroflowmetry and if needed AUG and cystoscopy.

Parameters assessed include:

Immediate complications:

- Wound infection.
- Scrotal haematoma.
- Presence of Leak.
- Splaying.
- Delayed complication.
- Meatal stenosis.
- Failure leading to urethrocutaneous fistula and
- Re-operation.

RESULTS:

Study Group:

Age Distribution: A total of 16 cases (18 to 26 years) of reoperative hypospadias were included.

Fig. 1: Age Wise Distribution of Cases.

In all our cases except one there was no apparent scarring of urethral plate.

Clinical Presentation	No. of Cases	Percentage
Structure with fistulae	12	75
UC fistula	4	25

Table 1: Cases at presentation

The initial surgery done in all our cases are shown in the table below.

Initial Procedure done	Penoscrotal hypospadias	Proximal penile	Mid penile hypospadias	Total
Theirsch-duplay principle	0	2	6	8
Snodgrass TIP procedure	0	0	2	2
Inner preputial skin tubularisation	2	4		6
Total	2	6	8	16

Table 2: Initial procedure done for Hypospadias.

Total number of prior surgeries are given in the figure below:

Fig. 2: Number of Surgeries done in patient

Total number of fistulae present in the patients is given below:

Fig. 3: Number of fistulae in patients.

We performed the following procedure in the study group

Procedure	No. of cases	%
Two stage repair with TVF cover	12	75
Single stage repair with TVF cover	4	25

Table 3: Procedure done in patient at our centre

In the case with scarred urethral plate-we did Bracka's two stage repair using buccal mucosal graft.All cases had tunica vaginalis flap interposed over the repair.

Fig. 4: Harvesting of tunica vaginalis flap

Fig. 5: Tunica vaginalis flap secured over the neo urethra

Outcomes of surgery in our series is shown in figure below:

Fig. 6: Flow chart showing patient surgeries and outcomes

Fig. 7: Complication of surgery in our study

The results of our study was comparable with other studies as shown in the table below.

Variables		Sharma N et al. ¹⁰	Y. S. Singh Kadian et al. ¹¹	Landau EH et al. ⁸	Xue WY et al. ¹²	Routh JC et al. ¹³	Ahmed M. Khairi et al. ¹⁴	Our study
No. of patients		18	14	14	38	16	14	16
Success (No UC Fistula)		17 (94.4%)	13 (92.8%)	14	38	16	10 (71.4%)	15 (93.75%)
Failure (UC Fistula)		1 (5.5%)	1 (7%)	0	0	0	4 (29.6%)	1 (6.25%)
Complications	Scrotal Hematoma	0	1	0	0	0	1	1
	Wound Infection	0	0	0	0	0	1	1
	Meatal Stenosis	0	0	0	0	0	1	0
Follow up months		6	12	44	12	18	9	12
Table 4: Comparing outcome of other studies with our study.								

DISCUSSION: In spite of improvements in hypospadias surgical techniques, many patients present with failed repairs. Surgical repair of such failed cases is always a challenging undertaking. Most common complication of this failed previous surgeries is urethro cutaneous fistula. Many techniques suggested in these situations like repaired urethra buried in the scrotum.² staged repair.^{3,4} overlapping denuded subcutaneous tissue.⁴ adjacent local spongiosus tissues and rotating skin flaps.⁵

Factors limiting successful outcome are dense scarring, reduced vascularity and lack of prepuce and sufficient penile shaft skin. Dorsal subcutaneous option is not available mostly because it is lost in previous surgeries. But many still continue to use the adjacent genital tissue like dartos as a covering layer.

Snow introduced the tunica vaginalis flap (Parietal layer) to cover the neo-urethra.^{6,7}

The place of this flap in hypospadias surgery is more than that. It is also used for substitution urethroplasty successfully. The advantage in redo cases.^{8,9} it has its vascular supply from outside source and not rely on vascularity of local genital tissues, which might be scarred or destroyed due to previous repairs. Flap can be developed of sufficient length of the pedicle to cover entire neo-urethra till the distal neo meatus. Dissection of flap is not difficult. Only drawback is that if pedicle length is inadequate, it results in tethering of testis.

After initial hypospadias repair, urethral stricture may occur decades later. Perineal urethrostomy might be the only treatment option for such long segment urethral stricture. This stress the importance of lifelong follow up in such situations to detect such complications at earliest state.

In our study we have assessed the effectiveness of tunica vaginitis flap in preventing urethro cutaneous fistula.

We applied it as an interposing waterproof layer over the neo urethra either after closure of isolated fistula or after second stage repair of the complete urethral disruption.

Our study has 93.75% success rate (No urine leak) and 6.25 % failure rate (Urine leak). Our success rate was compared to other studies, which was from 71.4 % to 100%. (Mean was 93.1%)

We followed our case for 12 months. With every visit at 3rd, 6th and 12th month, none of our patient required AUG or uroflowmetry in the follow up.

LIMITATION OF OUR STUDY: Small sample size (16) with short follow-up duration (12 Months). Large, RCTs with long follow up period is essential to confirm our result and to assess the efficacy of tunica vaginalis flap in urethrocutaneous fistula prevention. However this may not be feasible as only a small subset of patients following hypospadias repair require a reoperation and hence designing such a study may not be possible.

CONCLUSION: Tunica vaginalis flap reinforcement is an excellent and should always be in mind for reoperative hypospadias, especially when the local genital tissues appears to be scarred, tunica vaginalis flap as a second layer provides a well vascularised cover for adequate healing.

REFERENCES:

1. Baskin LS. Hypospadias and urethral development. J Urol 2000;163:951-6.
2. Culp OS. Experience with 200 hypospadias: Evolution of a therapeutic plan. SurgClin North Am 1959;39:1007-23.
3. Bracka A. Hypospadias repair: the two-stage alternative. Br J Urol 1995;76:31-41.
4. Snodgrass, Elmore J. Initial WT experience with staged buccal graft (Bracka) hypospadias reoperations. J Urol 2004;172:1720-4.
5. Aslan G, Karg E, Erdogan B. Use of Circular Subcutaneous Tissue Flaps to Prevent Fistulas in Urethroplasty. Annals of Plastic Surgery 2001;46:86-7.
6. Snow BW, Cartwright PC, Unger K. Tunica vaginalis blanket wrap to prevent urethrocutaneous fistula: an 8-year experience. The Journal of Urology.1995;153(2):472-473.
7. Snow BW. Use of tunica vaginalis to prevent fistulas in hypospadias surgery. The Journal of Urology. 1986;136(4):861-863.
8. Landau EH, Gofrit ON, Meretyk S, Katz G, Golijanin D, Shenfeld OZ, et al. Outcome analysis of tunica vaginalis flap for the correction of recurrent urethrocutaneous fistula in children. J Urol 2003;170:1596-9.

9. Voges GE, Reidmiller H, Honenfellner R. Tunica vaginalis free grafts for closure of urethrocutaneous fistula. *UrolInt* 1990;45:88-99.
10. Sharma N, Bajpai M, Panda SS, Verma A, Sharma M. Tunica vaginalis flap cover in hypospadias cripples: Our experience in a tertiary care center in India. *Niger J SurgSci* 2014;24:7-11.
11. Kadian YS, Rattan KN, Singh J, Singh M, Kajal P, Parihar D. Tunica vaginalis: An aid in hypospadias fistula repair: Our experience of 14 cases. *Afr J PaediatrSurg* 2011;8:164-7.
12. Xue WY, Qu CB, Wang XL, Zhang FX, Kang CS. *J Urol*. 2003 Oct;170(4 Pt 2):1596-9.
13. Routh JC, Wolpert JJ, Reinberg Y. Tunneled tunica vaginalis flap is an effective technique for recurrent urethrocutaneous fistulas following tubularized incised plate urethroplasty, *J Urol*. 2006 Oct;176(4 Pt 1):1578-80.
14. Ahmed M. Khairi, Nour El-Kholi, Sherif M. Soliman , Ahmed Demairy Tunica Vaginalis Flap; A Feasible Second-Layer for Proximal Hypospadias Re-Do *Annals of Pediatric Surgery*, Vol3, No 1, January 2007 PP 44-47.