



LIMITATIONS AND COMPLICATIONS OF TUNICA VAGINALIS FLAP AS AN INTERPOSITION LAYER IN HYPOSPADIAS :- A HOSPITAL BASED STUDY

Surgery

Bhatnagar Amit	Associate Professor, Department of Surgery, Subharti Medical College, Meerut (UP) - Corresponding Author
Kansal Sandeep	Associate Professor, Department of Surgery, Subharti Medical College, Meerut (UP)
Monga Y.P	Professor, Department of Surgery, Subharti Medical College, Meerut (UP)
Chauhan Adarsh	Post Graduate Student, Department of Surgery, Subharti Medical College, Meerut (UP)

ABSTRACT

Objective: To obtain better outcome of hypospadias repair, it seems that use of a vascularized tunica vaginalis flap as a second layer combined with Snodgrass procedure results in better outcome. This is a prospective study of 25 patients conducted during July 2015 to July 2017 to evaluate the limitations and complications of tunica vaginalis vascular flap as second layer in Hypospadias repair and redo surgery.

Material and Method: Patients were admitted on outpatient department basis and operated after proper workup. Wound infections/dehiscence, acute bleed, urinary leak, edema, stricture, development of meatal stenosis, scrotal disorders, etc were regarded as surgical complications. A need for repeat surgical intervention (fistula) during the follow-up was considered as a failure.

Result: Success rate was seen in 24 cases (96%), with 5 cases (20%) developing early / late complications and failure was seen in 1 case (4%).

Conclusion: Tunica vaginalis has good vascularity, easy availability, not affected by penile disorders, with long pedicle length to vascularise the entire neourethra to the glans. Tunica vaginalis flap may have a benefit in circumcised patients. Some may feel, harvesting the flap is meticulous, tedious and time consuming requiring a learning curve with risk of injury to testes, vas or spermatic cord or vessels.

KEYWORDS

Tunica vaginalis, hypospadias, Limitations

INTRODUCTION

The word (hypospadias) is Greek; hypo =under, and spadias to tear off. The condition occurs in approximately 1 in 150 to 1 in 300 males. For hypospadias repair more than 150 surgical procedures have been described in literature. To obtain better outcome in hypospadias repair after tubularised incised plate urethroplasty (Snodgrass procedure), some vascularized flaps like dartos fascia and tunica vaginalis flap were introduced. These vascularized flaps are placed on the neourethra as the second layer. It seems that use of a vascularized tunica vaginalis flap as a second layer combined with Snodgrass procedure results in better outcome.

AIM AND OBJECTIVE

In this study, our objectives/aims was to evaluate the limitations and complications of tunica vaginalis vascular flap as second layer in Hypospadias repair and redo surgery.

MATERIALS AND METHODS

Ours is a prospective study conducted during July 2015 to July 2017 in Department of General Surgery in Chatrapati Shivaji Subharti Hospital Meerut, India, after taking permission from the institutional ethical committee.

The study was carefully and meticulously performed and an attempt made to cover every possible aspect. Patients were admitted outpatient department basis. Proper work up of patients was done including history, clinical examination, blood profile, KUB Ultrasonography, and other relevant investigation if necessary were also done in each patient preoperatively. Parents/patients were explained the procedure / prognosis, complications and follow up protocol and benefits versus risk of surgery. Parents gave informed consent regarding the same.

The present work is based on upon a study of 25 patients who underwent repair of hypospadias using tubularised incised plate (TIP) urethroplasty (Snodgrass Technique) with tunica vaginalis flap as second layer). The penis was degloved to correct chordate. Straightening of penis shaft was confirmed by Gittes test. Thereafter, the testis was delivered via separate scrotal incision and a vascularized tunica vaginalis flap was harvested and transferred to the site of surgery through a subcutaneous tunnel or was either delivered from same incision as used for urethral reconstruction. Care was taken to make a wide tunnel to avoid compression of flap pedicle. Scrotal dissection was done gently with paying attention to complete hemostasis. Orchidopexy was done and corrugated drain placed in scrotum. Ventral side of the urethra was covered by serosal layer of tunica

vaginalis flap. The penile skin was then layered sutured with 4-0 or 5-0 vicryl sutures, scrotal drain was removed after 2-3 days. Dressing done on alternative days. Following repair, the patient had a urethral stent (8-12 Fr) to drain the urine into the diapers or urobag for 15 days, to allow healing of the urethroplasty before resumption of normal voiding. During this time, antibiotics are prescribed to reduce the likelihood of urinary tract infection. Pain, cleaning and bathing of patients was managed. Urethral catheter was removed 15 days after the surgery after sequential clamping of catheter.

The parents/patients were asked about the stream of urine on micturition (whether straight, splashed or weak), also they were asked about any leak of urine from the site of repair, and any pain or retention of urine. A clinical examination of the external genitalia was performed to assess the progress of healing and detect any stenosis of the external meatus or any fistula or other complications at the site of repair. During discharge we explain proper dilatation protocol to be done under all aseptic condition dilatation done with the help of infant feeding tube. We followed up the patients every week for initial first month, every third monthly for next one year, thereafter every sixth monthly for next one year and whenever the patient experienced a problem.

Inclusion criteria:-

- Boys more than 3.5 years old, with either penile hypospadias or fistula were treated using TIP with tunica vaginalis flap as a second layer for repair in Subharti Medical College and Hospital.
- Patients with or without chordee.

Exclusion criteria:-

- Glanular, coronal hypospadias
- Age less than 3.5 years
- Patients with a history of herniotomy, orchidopexy or orchidectomy were excluded

Wound infections, acute bleed, urinary leak, edema, stricture, development of meatal stenosis, scrotal disorders, etc were regarded as surgical complications. A need for repeat surgical intervention (fistula) during the follow-up was considered as a failure.

OBSERVATIONS AND RESULT

The study was conducted in department of general surgery N.S.C.B Subharti Medical College, Meerut. At present 25 patients were included in the study.

On analysis of the data it was found that the maximum 8 patients (32%) were in the age group of 9 to 14years,7 patients(28%) were in age group of 3,5-9 years,5 patients (20%) each were in age group of 14-19 years and more than 19 years respectively .

On analysis of the data it was found that maximum number of patients presented with distal penile type of hypospadias 8(32%) patient,, 5 (20%) patients with mid penile hypospadias,2(8%) patients each presented with proximal type and penoscrotal type of hypospadias and 8 patients (32%) presented with fistula(previously operated).

8 patients were previously operated for hypospadias elsewhere, where there was a failure of surgery, were included in our study. Of 8 patients who were previously operated, 2 cases each had had proximal and penoscrotal hypospadias .One case each had external urethral opening(with complete disruption of suture line) in distal penile, mid penile and scrotal region.One patient presented with 2 fistulae, one distal penile and one proximal penile fistula.

It was observed that 13 patients presented with mild to moderate chordee. It was found that 8 patients who were previously operated were circumcised and their urethral plate was not identifiable.

It was observed from 25 patients in thisgroup,4 patients developed early complication during their hospital stay. 2patients(8%) developed wound infection (dehiscence) over glans from the surgical incision. One patient aged 23 year had proximal penile fistula and other patient aged 11year had scrotal fistula. Both the patients were managed conservatively in the form of daily aseptic dressing. They had external meatus atsubglanular region which was well accepted by patients. One (4%) patient aged 18 year with mid penile hypospadias presented with primary haemorrhage with soakage present over dressing. Patient accidently toyed with the penis there by sustaining bleeding from the suture line. Patient was advised to refrain from these misadventures. Patient was taken in OT and sutures were opened and wound inspected. No active bleeder was found. Wound was irrigation with betadine/saline and closed with corrugated drain. One (4%) patient 10 year old operated for mid penile hypospadias developed urinary leak after removal of catheter, for which placement of a urethral catheter for another 14 days resulted in urinary leakage improvement as well as prevention of permanent fistula formation.

All patients improve and discharge with satisfactory condition It was observed that 1patient who came in follow up developed late complication in form of stricture. Patient operated for distal hypospadias came to the hospital after 5 months after discharge. He presented with retention of urine with supra pubic lump. The patient, 6 year age was admitted under urology unit of Subharti Medical College. Under general anaesthesia a guide wire was passed under vision using paediatric cystoscope and a stent was placed across stricture, thereby gradual sequential dilatation was started and patient was managed conservatively.

One patients developed urethrocutaneous fistula. Patient aged 27 year was operated for penoscrotal fistula developed urinary leakage after catheter removal. A urinary catheter was placed for another 14 days, but patient developed permanent urethrocutaneous fistula and was considered as failure of surgery.

At present out of 25patients, 21 patients are undergoing proper dilatation protocol and have shown improve urine stream 4 patients awaited for follow up. Success rate in our study was 96% (24 patients) where patient reported normal stream and cosmetically normalmeatus.

COMPLICATION



Patient presented with retention of urine with supra

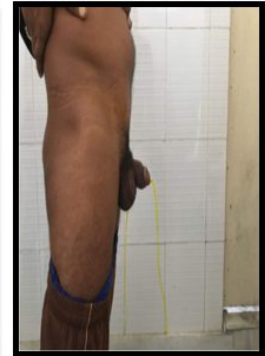


Patients developed wound infection (dehiscence) over glans from the surgical incision with subglanular meatus.

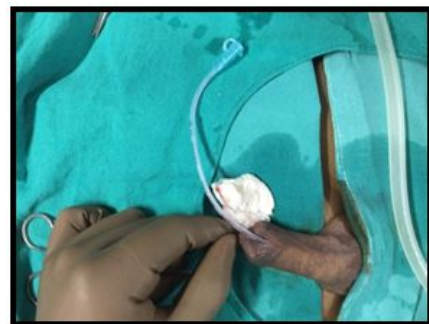
Acute bleeding



One patient mid penile hypospadias presented with primary haemorrhage



Penoscrotal Fistula



Distal Hypospadias



One patients developed urethrocutaneous fistula

TV flap Harvested



Urethroplasty completed



Final Repair



DISCUSSION

Out of 25 patients, two patients (8%) developed wound dehiscence at glans, thereby leading to subglanular meatus.

Similar rate of subglanular meatus formation 2(9.1%) following glanular wound dehiscence was seen by **Yogender et al (2016)**. In patients where local anatomy does not favour extending the neourethra up to glans, a subglanular meatus is acceptable by patients and their family as in our series, though proper pre repair counseling with

Tavakkoli et al (2010) (n=27)	Amit et al (2015) (n=38)	Ahmed et al (2015) (n=500)	Jonathan et al (2008) (n=12)	Raashid et al (2015) (n=35)	Hazim et al (2014) (n=23)	Yogender Singh Kadianet al (2016) (n=22)	Author (n=25)
8.79 months	3 years	11 years	32 months	5 years	5 years	3 years	24 months

Average duration of follow-up was 3 years in **Yogender et al(2016)** and **Amit Jain et al(2015)**.

Raashid et al (2015) and **Hamid et al(2014)** had a longer duration of follow-up upto 5 years in these respected series.

In our series average follow-up was 24 months.

CONCLUSION

This study showed that Tunica vaginalis flap as interposition cover of neo- urethral tube helps in reduction of fistulae rate in variety of hypospadias procedures with minimal complication rate as compared to other flap. Tunica vaginalis has good vascularity, easy availability, not affected by penile disorders, with long pedicle length to vascularise the entire neourethra upto the glans. Tunica vaginalis flap may have a benefit in circumcised patients. Some may feel, harvesting the flap is meticulous, tedious and time consuming requiring a learning curve with risk of injury to testes, vas or spermatic cord or vessels. An operative difficulty/ limitations using tunica vaginalis flap may be assessed in patients who have undergone herniotomy or orchidopexy, and yes, though not common, but possible in patients with orchidectomy. A limitation of this study may be, it is not a comparative study. Our relatively small size of study with an average follow-up of 24 months may not be adequate to fully demonstrate all complications and thus may falsely lower our complication rate. The ultimate proof for this can be obtained only on the basis of long term follow-up study in forth coming decades.

ACKNOWLEDGEMENT

We are thankful to the medical superintendents of C.S.S.H. Hospital attached to Subharti Medical College, Meerut for granting us the permission to publish this material. We declare that this is our work, except where acknowledged specifically as the published or unpublished work of others. We are also grateful to patients and their relative for their cooperation during this study.

Conflict of Interest: - Nil

patients and family of utmost importance. Moreover it is well established that meatal position at coronal or subglanular level can be functionally and cosmetically considered normal. Wound dehiscence was noted in 2 cases (5.7%) by **Raashid et al(2015)**, 2 cases (8.7%) **Hazim et al(2014)** and in 4 cases (13.79%) by **Tavakkoli et al(2010)**.

One patient developed primary hemorrhage from margins of penile skin. Patient 18 year old accidentally physically toyed with the penis there by sustaining bleeding from suture line. Patient was advised to refrain from these misadventures.

One patient (4%) developed urinary leakage following removal of catheter. Similar rate of urinary leakage was observed by **Yogender et al(2016)** in one patient(4.5%), **Chatterjee et al(2004)** in 3 patients (10%) and **Nitin et al(2013)** in 3(15%) patients.

It was observed that one patient developed late complication in form of stricture. Patient came to the hospital after 5 months after discharge. He presented with retention of urine and suprapubic lump. The patient 6 year age was admitted under urology unit of Subharti Medical College. Under general anaesthesia a guide wire was passed under vision using paediatric cystoscope and a stent was placed across stricture, thereby gradual sequential dilatation was started and patient was managed conservatively.

Failure of surgery was seen in one case (4%) where urethrocutaneous fistula developed. Patient was operated for penoscrotal fistula. Even though, catheter was placed for another 14 days, patient developed permanent urethrocutaneous fistula.

Fistula rate in different series varied from 1 case (2.85%) by **Raashid et al (2015)**, 1 case(4.5%) by **Yogender et al (2011)**, 1 case each (5%) by **Nitin et al (2013)**, and **Amit et al(2015)**, 1 case(7%) by **Yogender et al (2011)**, 2 cases(8.6%) by **Hazim et al (2014)**, 3 cases(10.34%) by **Tavakkoli et al(2010)** and 6 cases(12%) by **Ahmed Ali et al (2015)**.

Follow-up

Funding Sources:-Self – funding

REFERENCES:

1. Snow BW. Use of tunica vaginalis to prevent fistula in hypospadias. *J Urol.* 1986;136:861-3.
2. M. Samuel; D.T. Wilcox: Tubularized incised-plate urethroplasty for distal and proximal hypospadias. *paediatric Urol.* 2003 May :12.
3. Kamyar Tavakkoli Tabassi; Shabnam Mohammadi; Tunica vaginalis flap as a second layer for tubularized incised plate urethroplasty. *J Urol.* 2010 February; Vol 7.
4. Handoo YR: Role of tunica vaginalis interposition layer in hypospadias surgery. *J plast surg.* July-december 2006; Vol 39:152-6.
5. Jonathan C. Routh; James J. Wolpert: Tunneled tunica vaginalis flap for recurrent urethrocutaneous fistula. *J Urol.* 2008 August 11. Vol 18.
6. Snodgrass WT: Utilization of urethral plate in hypospadias surgery. *J urol.* 2008. Vol 7.
7. Raashid Hamid; Aejaz A. Baba; Altaf Shera: Tunica vaginalis flap following 'Tubularized incised plate' urethroplasty to prevent urethrocutaneous fistulae. *J plastic surg.* 2015 May-Aug; 48: 187-191.
8. Hazim R. Akal: Tunica vaginalis flap as a second layer for tubularized incised plate urethroplasty (Snodgrass method) in reoperation for hypospadias. *iosrphr.* Vol 4. 2014 February.
9. Sharma Nitin; Bajpai Minu; Panda SS; Verma Ajay. Tunica vaginalis flap cover in hypospadias cripples: Our experience in a tertiary care centre in india. *Nigerian J of Surgical science.* June 15, 2013. IP: 59.176.52.21.
10. Ahmed M. Khairi; Nour EL-Kholi; Sherif M. Soliman. Tunica vaginalis flap; A feasible second-layer for proximal hypospadias Re-Do. *Pediatric J.* 2007 January 1. Vol 13, 44-47.
11. Kadian YS, Rattan KN, Singh J, Singh M. The role of tunica vaginalis flap in staged repair of hypospadias. *Asian J Urol.* 2016 October 10. 11.004.
12. Jain Amit; Goyal Vipin; Agarwal Yuthika; Kumar Santosh et al. Preputioplasty in distal hypospadias repair with tunica vaginalis flap: A prospective study. *SJAMS.* 2015;3(3H):1570-1573.
13. Uday S, Manas M, Supriyo B, et al: Comparative study of dartos fascia and tunica vaginalis pedicle wrap for the tubularized incised plate in primary hypospadias repair. *BJU Int.* 94:1102-1104, 2004.
14. Probbas Kumar Sarkar. Single-satge repair of hypospadias using cremastero-tunica vaginalis pedicle flap. *Indian J Surg.* 2003 Set-Oct 5, Vol 65, 418-419.
15. Ahmed Ali Hassan Al-Kinani; Redha Ali Taher. The use of tunica vaginalis in hypospadias fistula repair. *MJB.* 2015. Vol 12. 3:739-744.
16. Raashid Hamid; Aejaz A. Baba; Altaf Shera. Tunica vaginalis flap following 'tubularised incised plate' urethroplasty to prevent urethrocutaneous fistulae. *Indian J plast Surg.* 2015 May-Aug; Vol 48. 187-197.
17. Sharma Nitin; Bajpai Minu; Shekhar Panda Shasanka; Singh Amit. Tunica vaginalis flap cover in repair of recurrent proximal urethrocutaneous fistula: final solution. *Paediatric J Surg.* 2013. Vol 10. 311-314.
18. Kadian YS, Rattan KN, Singh J, Singh M, Kajal P, Parihar D. Tunica vaginalis: An aid in hypospadias fistula repair. *Afr J Paediatr Surg* 2011;8:164-7
19. Snodgrass W. Tubularized, incised plate urethroplasty for distal hypospadias. *J Urol.* 1994;151:464-5.