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Clinical Efficacy of Tunica Vaginalis Flap As An Interposition Layer in Hypospadias: - A Hospital Based Study

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Abstract: *Hypospadias refers to incomplete urethral development due to incomplete fusion of urethral folds that results in a meatus located anywhere from the proximal glans to the perineum.This is a retrospective analysis of a prospective study of 25 patients who underwent repair of hypospadias using tubularised incised plate (TIP) urethroplasty (Snodgrass Technique) with tunica vaginalis flap as second layer, conducted during July 2015 to July 2017 in Department of General Surgery in Chatrapati Shivaji Subharti Hospital Meerut, India. Results were analysed. Tunica vaginalis when used as interposition layer is a highly reliable flap in both primary hypospadias repairs and redo surgery with minimal complication rate. The study is an attempt to evaluate safety and efficacy of tunica vaginalis flap as an interposition layer in hypospadias and redo surgeries.*
Keywords: *Tunica vaginalis, hypospadias ,efficacy*

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I. Introduction

The word (hypospadias) is Greek; hypo =under, and spadias to tear off. The condition occurs in approximately 1in 150 to 1 in 300 males, making hypospadias the second most common birth defect in boys after cryptorchidism. Hypospadias surgery has evolved with more than 150 procedures described for surgical correction of a single anomaly. Tubularized incised plate method was first described by **Snodgrass in 1994** and has rapidly become a procedure for various types of hypospadias. The principal advantage of this technique is the excellent cosmetic appearance with the minimum scarring in the urethra

To obtain better outcome of hypospadias repair, 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.

II. Aim And Objective

In this study, our objectives/aims was to evaluate the safety and clinical efficacy of tunica vaginalis vascular flap as second layer in Hypospadias repair and redo surgery(Fistula).

III. Materials And Methods

This is a retrospective analysis of 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 through plastic surgery outpatient department. Each patient was thoroughly examined by taking history, clinical examination, blood investigations, KUB Ultrasonography, and other relevant investigation if necessary were also done in each patient preoperatively .Patients with penile hypospadias/fistula were confirmed and diagnosed as presenting with abnormal meatus below the level of glans by detailed history and clinical examination. Parents/patients were explained the procedure / prognosis, complications and follow up protocol and benefits versus risk of surgery and they 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 tunicavaginalis 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 5-0vicryl 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 15days, 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 micturation (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 years and whenever the patient experienced a problem..

Inclusion criteria:-

1.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 Hospital.

2. Patients with or without chordee.

Exclusion criteria: -

1. Glanular, coronal hypospadias
2. Age less than 3.5 years
3. 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**.**

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IV. 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.

Age Distribution:-

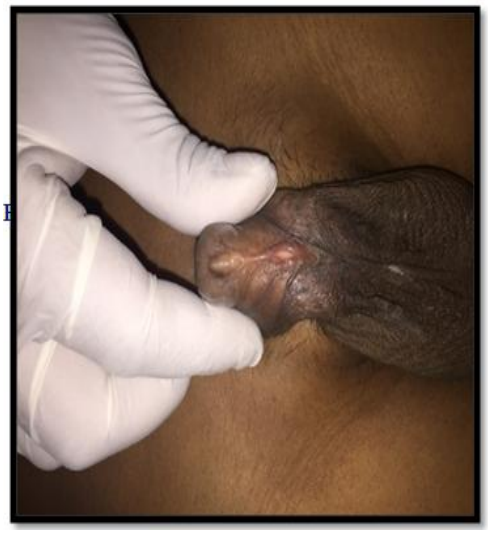
	No of patients	Percentage
3.5 -9 years	7	28%
9 – 14years	8	32%
14 – 19 years	5	20%
19 years>	5	20%

The study had patients more than 3.5 years of age. For the purpose of better data analysis these were divided into 4 subgroups as follows: - On analysis of the data it was found that the maximum (8) patients (32%) were in the age group of 9 to 14 years. 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. On observation it was found that 13 patients presented with mild to moderate chordate and 12 patients without chordate. It was found that 8 patients who were previously operated were circumcised and their urethral plate was not identifiable. Success rate in our study was 96% (24 patients) where patient reported normal stream and cosmetically normal meatus with only one patient out of 25 patients, developing permanent urethrocutanous fistula and was considered as a failure of surgery.In our series, 5 patients (20%) who developed early/late complications in form of wound dehiscence, acute bleed, urinary leak and stricture were managed accordingly and showed complete recovery with no urethrocutaneous fistula formation.

Types of hypospadias

Distal hypospadias

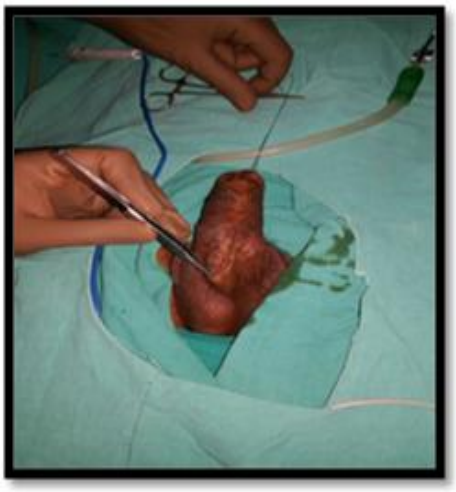
Mid shaft hypospadias



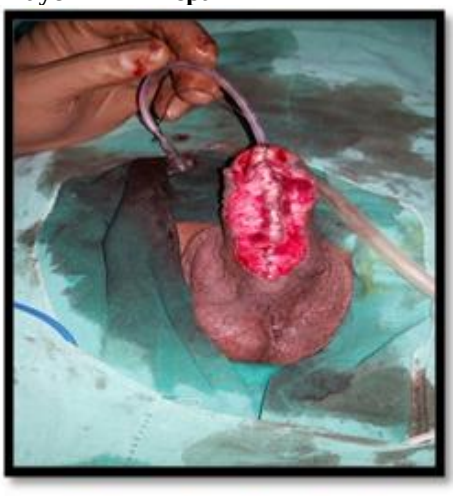
Proximal Hypospadias

Penoscrotal Hypospadias

TV flap used as interpositional layer in TIP repair

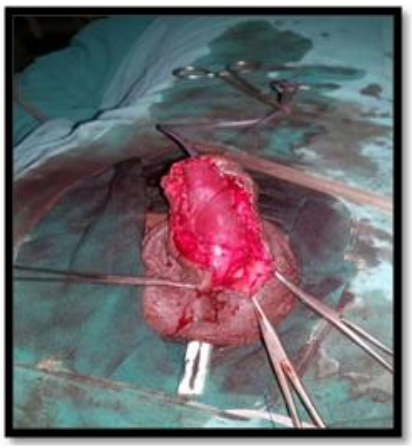


Penoscrotal Hypospadias

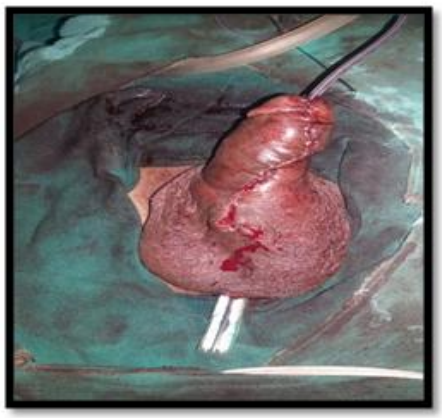


Urethroplasty Completed

TV Flap Harvested



TV Flap Placed Over Neo Urethra



Final Repair

Result

V. Discussion

The use of interposition flaps in urethroplasty is well documented in literature with various flaps used like, flaps from prepuce, corpus spongiosus, penile skin and dartos. Tunica vaginalis flap as an interposition layer over neourethra provides stable coverage of the neourethra. Its advantage may be stated as it is readily available and not affected by penile disorders. Its usage shows decreased fistula rate. Injury to vas and testicular artery is a remote possibility because dissection is much distally directed over the tunica vaginalis surrounding the testes.

Success rate was 80 % by **Nitin et al 2015**, 88% by **Ahmed et al 2015**, 89.6% by **Tavakkoli et al 2010**, 90.9% is series **of Yogender et al 2016**, 93% by **Yogender et al 2011**, 95% by **Amit et al 2015** and 97.15% by **Raashid et al** 2015. 100% success rate was reported by **Jonathan et al 2008, Hazim et al 2014**and **Probhas et al 2003. Snow et al (2008)** have advocated the preventive use of tunica vaginalis flap during primary repair of hypospadias. When with use of operative microscope they reported 100% success rate for prevention of fistula.

Snodgrass, the pioneer of this technique, obsreved zero fistula rate in 14 consecutive cases of proximal hypospadias treated with double layered urethroplasty and tunica vaginalis cover. Success rate in our study was 96% (24 patients) with only one patient out of 25 patients developed permanent urethocutaneous fistula and was considered as failure for surgery.

Follow-up

Tavakkoli et al (2010)	Amit et al (2015)	Ahmed et al (2015)	Jonathan et al (2008)	Raashid et al (2015)	Hazim et al (2014)	Yogender Singh Kadianet al (2016)	Author
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 **Hazim et al(2014)** had a longer duration of follow-up upto 5 years in there respected series. In our series average follow-up was 24 months.

VI. Conclusion

The efficacy of the tunica vaginalis flap was complete reconstruction in one stage procedure with correction of hypospadias. It gave an acceptable functional and cosmetic result with preservation of sensation; neither the patient nor the surgeon felt the need for any further corrective procedure. It is a highly reliable procedure in both primary hypospadias repairs and redo surgery for fistula with minimal complication rate. TIP into tunica vaginalis flap interposition technique provide good result in many patients with penoscrotal and scrotal hypospadias which were included in this study.

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Conflict of Interest: - Nil

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