International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2015): 6.391

Tunica Vaginalis Flap as an Interposition Waterproofing Layer for All Cases of Hypospadias Repair: Ensuring Completeness of the Outcome

Nilanjan Roy[1], Amit Agrawal[2]

[1]Senior Advisor (Surgery) & Reconstructive Surgeon, Armed Forces Medical College, Pune
Email: nilanjanroyd604[at]rediffmail.com
[2]Classified Specialist (Surgery) & Urologist, Command Hospital (Southern Command), Pune
Email: majoramitagrawal[at]gmail.com (Corresponding Author)

Abstract: ***Aims and objectives: This study aims at assessing the use of Tunica Vaginalis flap as an interposition waterproofing layer for all cases of hypospadias repair thereby ensuring completeness of outcome which includes not only orthoplasty, urethroplasty, glansplasty but also preputioplasty. Preputioplasty could be done as the use of tunica vaginalis flap spared the dartos thus leaving better blood supply for the prepuce. Material and methods: This was a prospective study carried out at tertiary care centre by a single surgeon. Age group varied from 2.5 years to 12 years. Mean age group was 3.25 yrs. 25 cases of hypospadias were included in the study. Proximal penile hypospadias with chordee - 05. Mid penile shaft with acceptable chordee- 10 (chordee correction was achieved with degloving alone. No dorsal plication or excision of the urethral plate were needed). Coronal hypospadias without chordee - 06 and glanular hypospadias- 04. All proximal penile hypospadias underwent two stage procedure: The first stage included orthoplasty (Degloving + Byars flap). In 2nd stage urethroplasty, glansplasty and preputioplasty were done. Tunica vaginalis flap was used as waterproofing interposition layer in all. In cases of mid penile, distal and coronal hypospadias, single stage reconstruction with tunica vaginalis flap as second layer were carried out. Snodgrass technique was used for urethroplasty. Glanuloplasty with preputioplasty was carried out in all. Conclusion: Use of tunica vaginalis flap as interposition cover of neo-urethral tube has not only prevented fistula formation yet at the same time spared the prepuceal hood to be used for preputioplasty.***

Keywords: Hypospadias, tunica vaginalis flap, preputioplasty

1. Introduction

Hypospadias repair perhaps has generated more interest and controversies than any other surgery in the urological practice. This is evident by the fact that more than 300 types of Hypospadias repair have been described in the medical literature. These surgical techniques are aimed at achieving the four basic tenets of Hypospadias repair, which are [1]:

1. To achieve a straight penis (orthoplasty)
2. A slit-shaped and adequate caliber meatus at the apex of the glans (urethroplasty)
3. A conical reconfigured glans (glanuloplasty)
4. Either a circumcised penis or a foreskin that is complete circumferentially and easily retractable (preputioplasty).

However, the un-operated appearance of a normally voiding penis can only be achieved when preputioplasty is considered a component as important as orthoplasty, urethroplasty and glanuloplasty. This would in turn have a favorable impact on the patients' psychology once they grow up [2]. An equally important component of hypospadias repair is the absence of complications, the most common of which is the urethro-cutaneous fistula. And as is true for any reconstructive surgery, the first chance at repair is the best chance [1]. Many techniques have been described to prevent fistula formation and the use of tunica vaginalis flap is one of them. It has been classically used for either a proximal hypospadias repair or re-do cases. We used this flap in all cases of hypospadias repair with an aim not only to prevent the fistula but also to spare the dorsally hooded prepuce to achieve a fully covered prepuce at the end of the procedure.

2. Material and Methods

25 cases of hypospadias were operated using the tunica vaginalis flap from June 2016 to June 2017. Informed consent was obtained from all patients. The 25 consecutive cases of hypospadias were included irrespective of the site of the hypospadias or the presence of chordee. Tunica vaginalis flap was used in all these cases. The technique was assessed for its functional and cosmetic outcomes. The patients were followed up for a minimum period of six months.

Technique

All proximal penile hypospadias underwent two stage procedure: first surgery was aimed at correction of chordee (orthoplasty) which included degloving of penis deep to the dartos fascia. Urethral plate needed excision in all as its mobilization with release of corpus spongiosum alone was not enough for correction of chordee. Penile skin was wrapped around keeping the dorsal hood intact. second stage surgery was performed after completion of six months where skin tubularization urethroplasty was done followed by harvesting of the tunica vaginalis flap as the second water proofing layer from the testis with the skin as the third layer.(Figure-1)

All mid penile hypospadias with acceptable chordee underwent a single stage reconstruction which incorporated limited degloving (orthoplasty), retention of

the urethral plate followed by a standard Snodgrass (Tubularised incised plate urethroplasty) with harvesting of the tunica vaginalis flap as the second layer and the skin closure with dartos as the third layer. None of these cases required dorsal plication or dermal patch graft placement for correction of residual chordee. (Figure-2)

For all coronal and distal penile hypospadias a standard Snodgrass urethroplasty procedure were done without degloving, with tunica vaginalis flap being the second layer and the skin with dartos as the third layer. (Figure-3,4)

Glanuloplasty was done in all the cases thereby bringing the meatal opening right at the tip of the glans. The urethral reconstruct was covered with tunica vaginalis flap followed by closure of the glanular wings as the third layer.

Preputioplasty were done in all cases following the standard technique as advocated by Snodgrass, utilizing the dorsal hood with intact dartos fascia. None of the cases needed supra pubic cystostomy. Self retaining silicon urinary catheters were used over which the urethroplasty was done. The size ranged from 8 FG to 12 FG depending on the age. A soft sponge splint was applied to the penis in the post op period for 07 days. Catheter was removed on the seventh post op day.

Tunica vaginalis flap dissection:

For all cases a separate incision was given at the root of the scrotum to deliver the testis along with the spermatic cord. Flap was marked on the outer anterior surface of the tunica vaginalis cover of the testis. Tunica vaginalis was raised along with the entire cremasteric muscle from the spermatic cord till the superficial inguinal ring. Any dissection short of superficial inguinal ring would cause loss of adequate flap length, tension during flap transfer and critical vascular compromise of this flap. It could also lead to testis being tethered or hitched up in the root of scrotum. Entire flimsy cremasteric muscle was also included in the flap as cremasteric artery is usually not identifiable and it remains the sole supplier of blood to the tunica vaginalis flap.

All surgeries were performed under general anesthesia using loupe magnification 4.5X with 1:200,000 adrenaline infiltrations at the dose of 1 ml/kg body weight. 6/0 PDS reverse cutting continuous sutures were used for the tabularization. Silicon Foley catheter was used with size ranging from 8 to 12 FG. Depending on the size of the Foley the urethral plate or the penile skin width for tabularization was marked (e.g.: Foley of 10 FG =3.33 mm external diameter; width of the urethral plate= $2\pi r$; 2X3.14X1.66 = 10.4 mm) thereby ensuring no tightness in closure.

3. Results

A total of 25 cases of hypospadias were included. The age group varied from 2.5 to 12 years at the time of surgery. 05 cases had the urethral meatal opening at peno-scrotal junction (proximal penile) with chordee; 10 cases had urethral meatus at mid penile shaft with acceptable chordee. 06 cases were coronal hypospadias without chordee and 04 cases had glanular hypospadias.

Early complications: None of the 25 patients developed urethral diverticulum, Urethro-cutaneous fistula, prepuceal necrosis or infection. 02 cases had blistering of the prepuce which could been have been due to soft padded sponge dressings. These cases responded well with loosening of the dressing alone. All the cases had an uneventful recovery of the scrotum with no scrotal complications.

The patients were discharged from the hospital on the 8th post op day after the catheter removal. The urinary stream on the day of discharge was normal.

The cases were followed for next 6 months. No cases were lost to follow up.

Two patients developed meatal stenosis; one with mid penile hypospadias and the other with coronal hypospadias. These were managed with urethral calibration with Foley catheter 8 and 10 FG once in the OPD and subsequently at home by the parents on daily basis for 06 weeks.

Prepuceplasty, which were done for all, achieved a good cosmetic result. None of the case appeared circumscribed though the prepuce looked retracted partially in all of them covering the proximal glans and the corona (Figure-5).

4. Discussion

The surgical repair for hypospadias has teased and stretched the imagination the surgeons for centuries. From the days of Egyptian civilization when its surgical remedies were first mentioned till the very end of 20th century we were blinded by the dust of uncertainty of plethora of surgical techniques, each claiming its reliability only to be falling well short of its own promises. We have seen evolutionary as well as revolutionary changes in the understanding of tissue behavior to innumerable maverick maneuvers but the ideal technique remained a distant dream. Probably the paradigm shift was noticed after the advent of Snodgrass technique in 1994 and subsequently with additional reinforcement in form of the dartos or the tuniica vaginalis flap as second interposition layer, that we have experienced a dramatic fall in the need for any different technique [2]. This standardized technique was adopted unanimously across the globe. It is the most popular procedure. No procedure for hypospadias can be accepted unanimously. It was now left to the expertise of the surgeons and the technological advancement with time to sharpen and fine tune and reap the rich dividends. Today with better understanding of tissue handling, better surgical hardware and optical magnification the fistula rates a prime concern for all have been reduced to below 7% worldwide. However the completeness of the procedure is far from over. Completeness is defined as incorporation of not only orthoplasty, urethroplasty, glanuloplasty but also

preputioplasty [3]. The aim today should not only be restricted to prevention of fistula formation but also recreate a phallus with unoperated appearance post op. There is a growing demand for an intact prepuce in Indian population. Intact prepuce has proven to be beneficial for the child's psychological development as he feels equal to his counterparts. Prepuce has a significant role in the erogenous function during sexual activity.

Preputioplasty is being performed as a part of GRAP procedure for glanular hypospadias [2]. At times preputioplasty alone can successfully treat a glanular and coronal hypospadias without the need for meatal advancement giving almost a normal cosmetic appearance. However ventrally located meatus remained a concern for the parents. In many centers use of dartos fascia as second layer is practiced due to the ease of flap harvest. However the fistula rates were significantly higher than when compared to our study. Not only this, the prepuceal skin was sacrificed due to fear of skin necrosis. Snod grass et all advocated preputioplasty for distal hypospadias only where the limited dartos flap harvest from the prepuceal skin ensured adequate vascularity of the skin to be use for preputioplasty [4]. Amilal Bhat et al advocated preputioplasty for distal as well as the proximal hypospadias [4]. However the second water proofing layer was mostly done with spongioplasty alone [4]. Tunica vaginalis flap and the scrotal dartos flap were used in select few. In our study with use of Tunica vaginalis flap for all case of hypospadias not only ensured a complete avoidance of urethrocutaneous fistula but also spared the dartos fascia thereby allowing the prepuceal hood to be utilized for preputioplasty, even in proximal hypospadias with chordee which were done in two stages. The Byar's flap which was transposed ventrally ensured adequate prepuceal skin for preputioplasty in the second stage. Penile degloving deep to the dartos fascia ensured retention of good vascularity to the prepuceal skin [4]. In our study all cases underwent preputioplasty irrespective of the distance between the ventral aspect of the foreskin. No case had phimosis post op.

5. Conclusion

Tunica vaginalis flap is an extremely dependable. It's use as second waterproofing layer has reduced the fistula occurrence significantly in all types of hypospadias repair. This has spared the dartos fascia and prevented the sacrifice of the foreskin. Hence it is possible to perform preputioplasty in all thereby ensuring completeness of the outcome.

Figures

Figure 1: Penoscrotal hypospadias: second stage surgery with the use of Tunica vaginalis flap

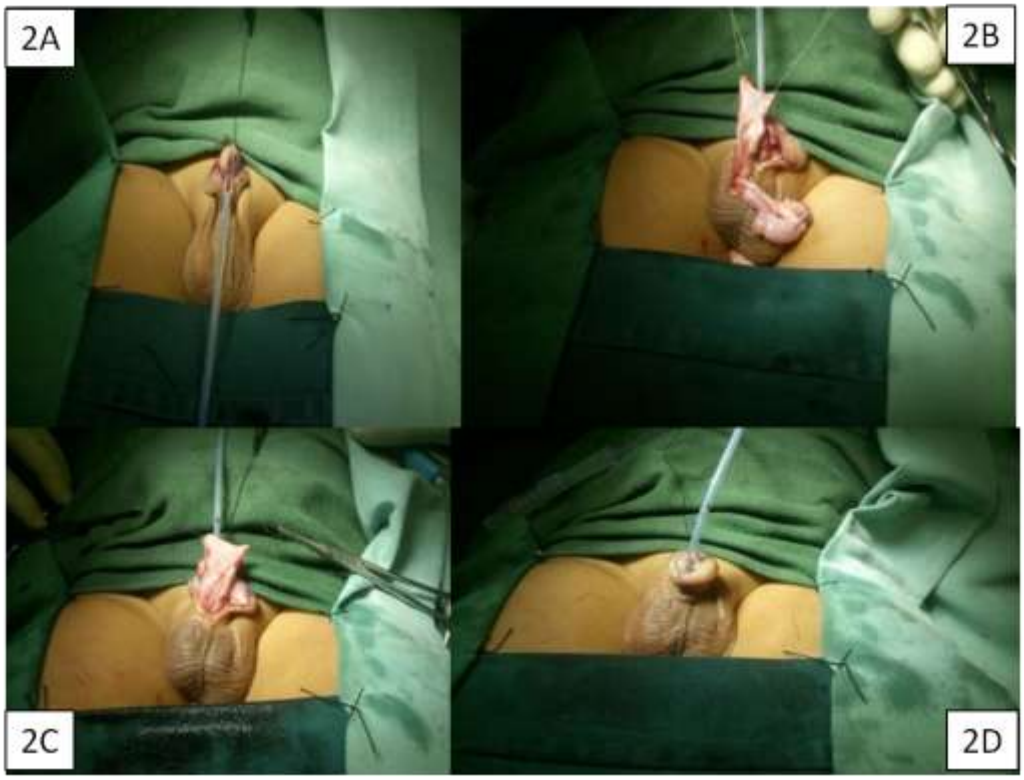

Figure 2: Mid penile hypospadias with acceptable chordee undergoing snodgrass urethroplasty, tunica vaginalis flap harvest and preputioplasty

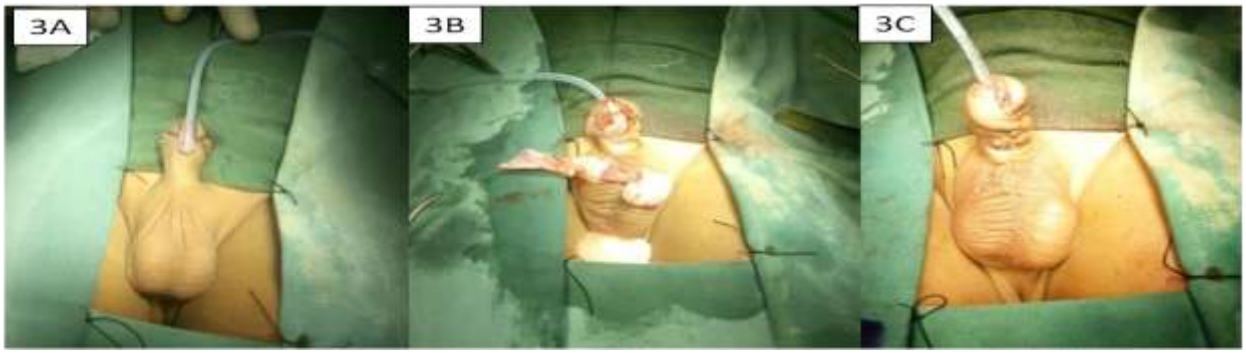

Figure 3: Distal penile hypospadias undergoing Snodgrass with tunica Vaginalis flap as second layer with preputioplasty

Figure 4: Coronal hypospadias undergoing snodgrass urethroplasty with tunica vaginalis flap harvest with preputioplasty

Figure 5: Post op cases showing an aesthetic foreskin cover over glans and a good urinary stream

References

[1] Keays M A, Dave S. Current hypospadias management: Diagnosis, surgical management, and long-term patient-centred outcomes. Can Urol Assoc J 2017;11(1-2Suppl1):S48-53.
[2] Stéphanie Vandendriessche, Dieter Baeyens, Eline Van Hoecke, Astrid Indekeu, Piet Hoebeke. Body image and sexuality in adolescents after hypospadias surgery. Journal of Pediatric Urology, Volume 6, Issue 1, 2010, pp. 54-59.
[3] Snodgrass WT, Bush NC. Reoperative urethroplasty after failed hypospadias repair: How prior surgery impacts risk for additional complications. J Pediatr Urol. 2017; 13(3):289.e1–289.e6.
[4] Snodgrass WT, Koyle MA, Baskin LA, Caldamone AA. Foreskin preservation in penile surgery. J Urol 2006;176:711-14.
[5] Walton P, Saintsupery G, Bucco P. Prepuce plastic surgery in distal hypospadias. Chir Pediatr 1984;25:53-7.
[6] Giplin D, Clement WBE, Boston VE. Grap repair; single stage reconstruction of hypospadias as an outpatient procedure. Br J Urol 1993;71:226-9.
[7] Snodgrass WT, Prieto J. Straightening of ventral curvature while preserving the urethral plate. J Urol 2009;182:1720-25.
[8] Bhat A. Extended urethral mobilization in incised plate urethroplasty for severe hypospadias: a variation in technique to improve chordee correction. J Urol 2007;178:1031-5.
[9] Gray J. Boston BE. Glanular reconstruction and preputioplasty repair for distal hypospadias a unique day case method to avoid urethral stenting and preserve prepuce. Brit J Urol Int 2003;70:268-70.
[10] Papouis G, Kaselas C, Skoumis K, Kaselas V. Repair of Distal Hypospadias and Preputioplasty in One Operation: Risks and Advantages. Urol Int 2009;82:183-6