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The outcome of Tunica Vaginalis flap in Hypospadias repair

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ABSTRACT

Background: Putting vascularized flaps over the neourethra is indicated in hypospadias surgery. This will lessen the complications rate, mostly the urethrcutaneous fistula, this is more indicated in secondary and complicated cases.

The study's Aim: To assess our initial experience with tunica vaginalis flap (TVF) in proximal primary and secondary hypospadias.

Materials and methods: This study prospectively included secondary and primary proximal hypospadias which are corrected using tubularized incised plate (TIP). The age of the patient, type of hypospadias, complications of primary repair, complications of our repair and the follow up results were reported.

Results: Between December 2011 to December 2018, 33 children with primary proximal or failed cases were repaired using TIP with the use of (TVF) interposition. Seventeen cases were primary with peno-scrotal opening repaired by single stage (Group A).

Sixteen cases were secondary hypospadias (Group B), 5 of them had distal opening as their original pathology while the remaining 11 cases had peno-scrotal opening with complete dehiscence of the previous repair.

The follow-up time extended from 2 to 60 months, Group A (n=17); 4 cases (23%) developed Urethral fistula and 2 cases (12%) developed Meatal Stenosis. While in Group B (n=16); 3 cases (19%) developed fistula and 3 cases (19%) developed Meatal Stenosis. Only one case (6%) developed glandular dehiscence. The scrotum was obviously normal in both groups.

Conclusion: TVF looks to be good interposition layer and good option in crippled and proximal hypospadias. It is a vascularized layer that could cover any urethroplasty length.

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Introduction:

Despite the recent advances in the field of Hypospadias surgery, still we are facing many complications which include meatal stenosis, Fistula, Diverticulum, urethral stricture and rarely complete dehiscence.

To reduce the frequency of these complications, a vascularized layer should be applied over the neourethra, as well as, the skin coverage [1]. These vascularized tissues consist of de-epithelialized skin [2], Corpus spongiosum [3], dartos fascia [4], and TVF [5, 6].

In 1994 Snodgrass described a tubularized incised plate (TIP) urethroplasty involving deep incision and tubularization of superficial urethral plate distal to the hypospadiac meatus [7].

Although TIP was initially used in primary lesion of distal hypospadias, it is currently employed in repair of redo or proximal hypospadias cases [8].

Aim of the study:

To assess the end results of using tunica vaginalis interposition flap in TIP urethroplasty for proximal primary and failed hypospadias.

Patients and Methods:

Over a period of seven years, from December 2011 till December 2018, 33 boys with virgin proximal (17 cases) [Group A] and redo (16 cases) [Group B] hypospadias were prospectively chosen for TIP urethroplasty using TVF as a vascular tissue cover.

All patients with virgin hypospadias (Group A) had peno-scrotal meatus and the ventral curvature was corrected with the preservation of urethral plate, four of them needed dorsal placation.

In all redo cases [Group B] the condition of urethral plate was assessed and considered suitable for TIP urethroplasty if it was pink, elastic and >6mm in diameter.

We excluded from study:

- Patients with injurious urethral plate.
- Patients with previous history of bilateral herniotomy, hydrolectomy, orchiopexy and other scrotal surgery.

- If penile ventral curvature is 30 degrees larger during erection test.

Operative technique:

In both groups, the general technique was the same with the use of magnification (2.5 x loupes), fine instruments, bipolor electrocautery, fine suture material and good haemostasis.

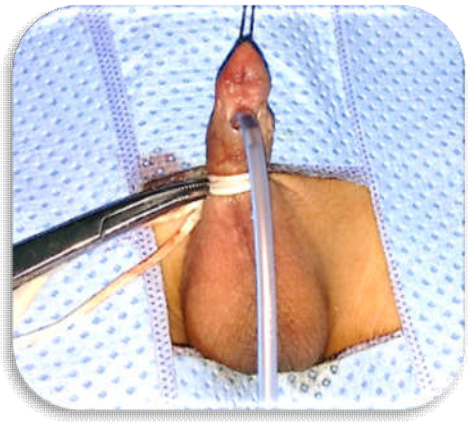

Figure (1): introduction of suitably sized catheter

The urethral plate turned to be tubularized over suitably sized catheter in a sub-epithelial manner.

The testis and spermatic cord sit into the operative meadow by blunt & sharp dissection of peno-scrotal junction after degloving the penis or through separate scrotal incision.

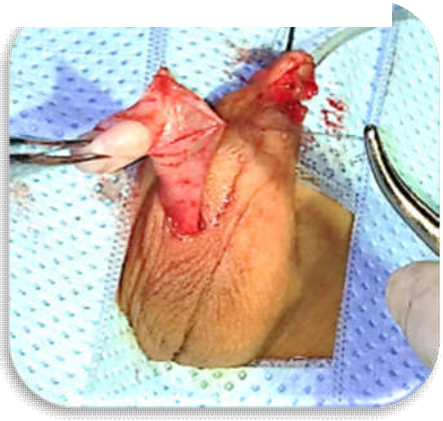

Figure (2): Tunica vaginalis was incised near the lower pole of the testis

Tunica vaginalis was cut near the inferior pole of the testis, and a flap was lifted from the testis and cord structures, with care taken not to harm the vas and vessels, as shown in figures (1, 2).

Adequate piece of the flap was made sure by cautious dissection till reaching the external ring as figure (3) shown.

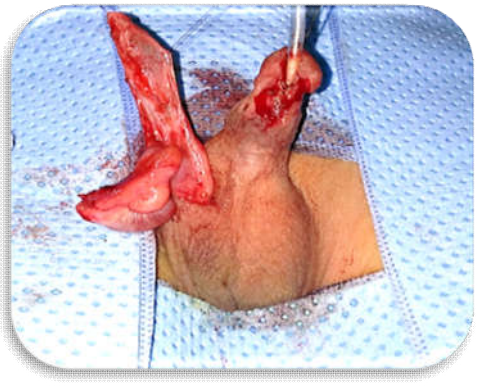

Figure (3): Ensuring sufficient length of flap

The testis was returned back inside the scrotum after accomplish hemostasis without fixation. The TVF was brought over the urethral tube to provide a cover along the entire length sutured into Buck's fascia and the bases of glanular wings around the urethra figures (4, 5, and 6).

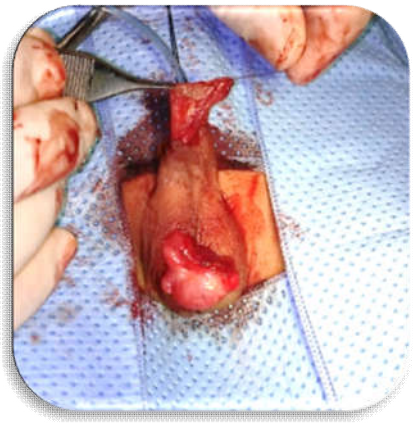

Figure (4): TVF was brought over the urethral tube

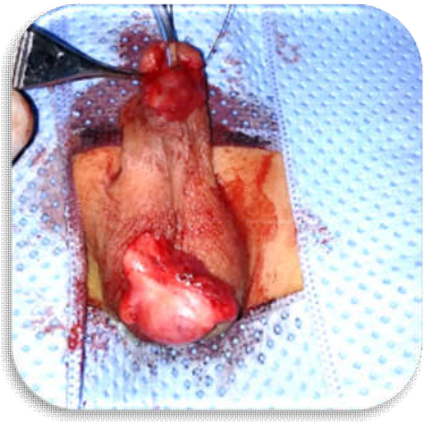

Figure (5): suturing into Buck's fascia and the bases of glanular wings

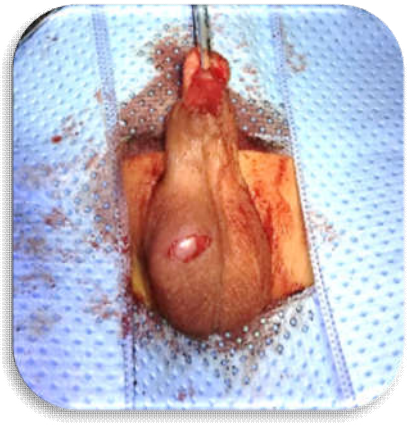

Figure (6): returned back of testis inside the scrotum

Results:

In this series, 33 boys were corrected using TIP technique in combination with the use of TVF interposition as displayed in figure (7; a and b), including:

- 17 cases with peno-scrotal primary hypospadias (Group A).
- 16 failed previous repairs (Group B).

The overall mean age at operation was 6 years (range 9 months- 16 years) with the mean follow up of 30 months (range 2-60 months).

In group A, 4 cases developed Urethral fistula (23.0%), 2 of them treated successfully with surgical closure 6 months after primary surgery, other 2 were pin point and spontaneously closed. Two cases developed Meatal stenosis (12.0%) and both responded to urethral dilatation only.

In group B, all patients had previously failed one primary repair except one who had 4 failed surgeries before; the reason for redo surgery was complete dehiscence in all patients. Five of them had distal opening as their original pathology while the remaining 11 cases were peno-scrotal. Three cases developed Urethral fistula (19.0%) and treated with surgical correction without recurrence.

Three cases developed Meatal stenosis (19.0%) and recovered with urethral dilatation without the need for meatotomy or meatoplasty. One case

(6.0%) ended with Glannular dehiscence and treated surgically.

In both groups, there were no scrotal hematomas, abscess or penile torsion recorded in our study.

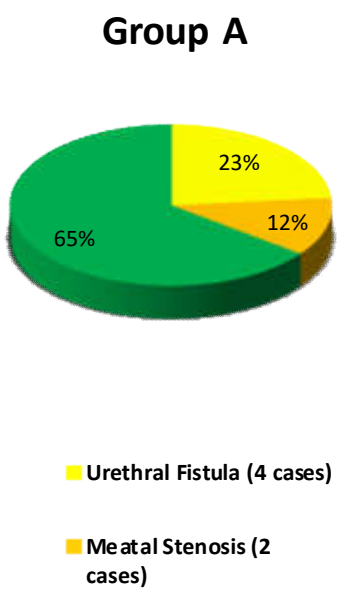

Figure (7 a): primary hypospadias

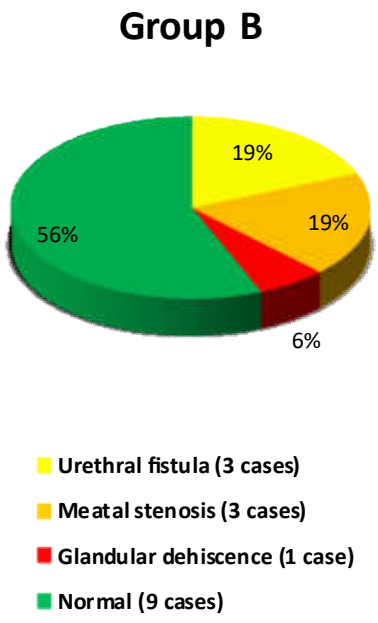

Figure (7 b): redo hypospadias

Discussion:

Although many techniques have been introduced for the treatment of hypospadias, Urethrocutaneus fistula and Meatal stenosis, which are the most frequent complications following repair, may develop even in the hand of experienced surgeon [1].

The utilization of TIP urethroplasty has significantly enlarged since its preliminary preface by Snodgrass since 1994 [8], with central centers describing it to be their primary urethroplasty techniques even for redo-cases. However, this procedure is not free from complications, to reduce the incidence of these complications; a vascularized layer is applied between skin coverage and neourethra [1].

The commonly used one is dartos fascia whether it obtained from dorsal or ventral site. However, this layer may be

not sufficient enough to cover the neourethra in proximal hypospadias or may fibrosed or scarred from previous surgery in redo cases.

The utilization of tunica vaginalis as an interposition graft was originally described by Snow *et al*., [9] 1995. The reported rate of fistula was 9.0%. Shanker *et al*., [10] and Handoo [11] have shown similar outcomes, indicating that soft tissue over for redo cases and posterior hypospadias surgery is reliable.

Chatterjee *et al*, in 2012 was compared between tunica vaginalis wrap and dartos fascia and they concluded that TVF is superior to dartos as a vascular cover because it has different blood supply, doesn't depend on the penis vascularity, and not affected by penis disorder especially for the redo-cases [12].

In this series, for group A, urethrocutaneous fistula occurred in 4 patients (23.0%) which were closed surgically after 6 months of primary repair. Snodgrass revealed that the most widespread complication following TIP was fistulas.

Snodgrass noticed in his series about proximal TIP repairs that the incidence of fistula decreased from 30.0% to 10.0% by using TVF and 2-layers urethroplasty [13].

In group B, 3 cases developed fistula that were corrected surgically without recurrence using TVF for coverage of fistula site.

Elicevik and colleagues reported 100 cases, which had TIP procedure for failed repair with 26.0% complication incidence as fistulae 18.0%, meatal stenosis 1.0% and dehiscence 2.0%, concluding that the TIP urethroplasty is efficacious and safe for hypospadias re-operations with favorable urethral plate [14].

Five patients from both groups developed meatal stenosis and treated conservatively with urethral dilatation without the need of meatatomy or meatoplasty, and hence, were not considered as failures, but were included in complication rates.

The complications of the use for TVF reported in other series like scrotal

hematoma and abscess [9], ascent of ipsilateral testis [10], severe penile torque [15], were not recorded in our series.

We avoid these complications probably by careful mobilization of TVF up to deep inguinal ring and separating cremasteric fibers from this flap together with meticulous hemostasis.

Conclusion:

Tunica vaginalis wrap is probably excellent interposition vascular layer that should be put in mind when dartos layer is deficient especially in proximal, crippled, and redo hypospadias.

To avoid complications, TVF should be taken under no tension by dissection up to the external inguinal ring with meticulous hemostasis.

Redo TIP urethroplasty can be safely performed after failure of primary repair as long as the urethral plate is supple with the use of TVF for urethral coverage.

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