Tunica Vaginalis Flap Versus Inner Preputial Dartos Flap as Waterproof Layer for Proximal Staged Hypospadias Repair: A Comparative Study

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Abstract

Background: Hypospadias is an abnormality of anterior urethral and penile development in which the urethral opening is ectopically located on the ventral aspect of the penis proximal to the tip of the glans penis, which, in this condition, is splayed open. [1] The urethral opening may be located as far down as in the scrotum or perineum. The penis is more likely to have associated ventral shortening and curvature, called chordee, with more proximal urethral defects.

Aim: To compare the outcome of using tunica vaginalis flap to dartos flap in proximal two stage hypospadias repair in reducing post-operative complication (dehiscence and fistula).

Materials and Methods: In the defined period of January 2015 to June 2018, 47 male patients with clinical diagnosis of penoscrotal hypospadias, The age of the patients range from 2 years to 10 years, All these cases were managed in 2 stages repair with buccal mucosal graft, with either tunica vginalis flap (group A) (25 cases) , or preputial dartos flap (group B)(22 cases) as a second cover over new tubularized urethra. We compared between these two groups regarding complications rate.

Result: we observed that tunica vaginalis flap was better than dartos flap (although it was statistically non-significant p value 0.214 > 0.05) specifically in fistula formation.

Conclusion: we observed that tunica vaginalis flap had excellent outcome when used as a second layer over the neourethral suture line in term of decrease the fistula rate and wound dehiscence because of its good vascular features.

Keywords: *Comparative study, preputial dartos flap, waterproof layer*

Introduction

The word “hypospadias” is derived from the Greek words hypo, which means below, and spadon, which means rent or hole. Hypospadias is the most common congenital anomaly of the penis. [1] A spectrum of abnormalities, including ventral curvature of the penis (chordee), a hooded incomplete prepuce, and an abortive corpus spongiosum, are commonly associated with hypospadias. Surgery is indicated where deformity is severe, interferes with voiding, or is predicted to interfere with sexual function. [2,3] More than 150 methods of corrective surgery for hypospadias have been described. Currently, many urologists perform one-stage repairs with foreskin island flaps and incised urethral plate. It now appears that buccal mucosa grafts are more advantageous than others and should be considered the primary grafting technique when indicated. [4]

So we need five basic steps for successful; orthoplasty, urethroplasty, meatoplasty and glanuloplasty,scrotoplasty,and skin coverage. [4] **Diagnosis includes clinical description of the local findings;** position; shape and width of the orifice,presence for the atretic urethra and division of corpus Spongiosum ,appearance of preputial hood and scrotum, with determination size of the penis, and curvature of penis on erection. **diagnostic evaluation also includes an**

assessment for the associated anomalies, such as undescended testis and inguinal hernia.

The using of protective intermediate layer is still evolving, Durham Smith (1973) de-epithelialization , Snow (1986) described the use of Tunica vaginalis wrap, Retik (1988) was the first to use dorsal subcutaneous flap from the prepuce, Motiwala (1993) described the use of Dartos flap from the scrotum, and Yamataka (1998) reported the use of external spermatic fascia flap.

Aim of this Study

To compare the outcome of using tunica vaginalis flap to dartos flap in proximal two stage hypospadias repair in reducing post-operative complication (dehiscence and fistula).

Patients and Methods

In the defined period of January 2015 to June 2018 a total of 47 male patients of proximal hypospadias were operated on in ghazi alhariri surgical specialties, medical city hospital, Baghdad.

The age of the patients range from 2 years to 10 years. All these cases were planned to be managed in 2 stages repair with buccal mucosal graft, with either using preputial dartos flap or tunica vginalis flap as a second cover over new tubularized urethra.

All patients and their family were given special formula included written informed consent for participation. The demographic data of all cases were recorded. Antenatal, postnatal and family history were taken. Local and general examination were done in all patients including examination of scrotum to exclude undescended testis. Penile anthropometry was documented in case sheet. . Routine investigations were performed (CBC, RFT, virology, CXR) in addition to renal ultrasound, and karyotyping to exclude intersex, operative details (anesthesia check list, notes of the surgeon, time of surgery, any complications), early postoperative examination (wound infection, seroma formation, hematoma formation, penile skin necrosis, wound dehiscence) and follow up data at 1,3,6,12 months (fistula, meatal stenosis , urethral stricture or diverticulum, testicular ascent or atrophy, penile torcque). All patients were kept fasting for 6 hours before surgery.

Inclusion criteria was penoscrotal hypospadias with good graft intake and successful chordoplasty.while exclusion criteria were previous circumcised patient, poor taking or retracted graft,un succeeded chordoplasty. and bilateral orchiopexy.

In the 2nd stage which was usually happened 6-9 months from the 1st stage, after tubulariztion of new urethra, we divided the patients into two groups; Group A (25 cases) those who underwent tunica vaginalis flap as a second waterproof layer, and Group B (22 cases) for whom we used preputial dartos flap as a second waterproof layer .

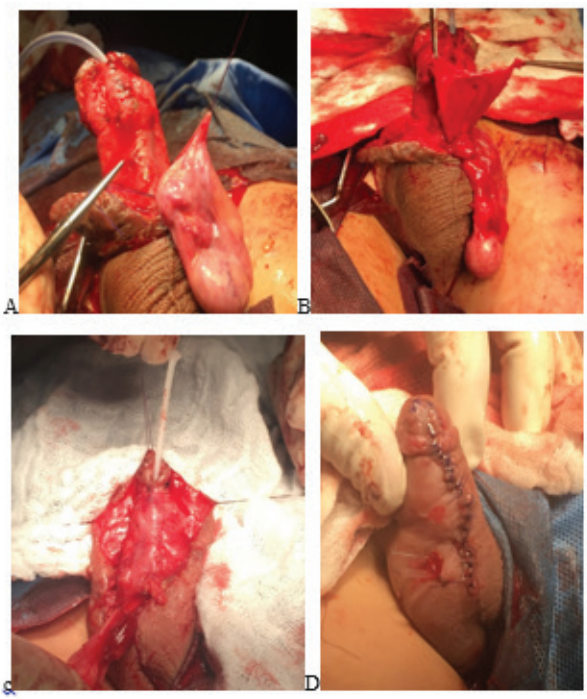

Figure1: (A) dissection of testis and spermatic cord and mobilization to surgical field , (B) harvesting TVF , (C) fixation of TVF over neourethra, (D) penile skin closure.

Silicone catheter or stent were removed on average 7days post operatively then we followed the patients sequentially for up to 6 months, Outcome was assessed at Day 7 after removal of the stent and at first follow up visit.

During follow up visit, we concentrated on any urine leak from the wound and examined the wound to ensure good healing. The maximum follow-up is up to 2 years for earlier operated patients.

Statistical Analyses

Statistical analyses were performed using SPSS statistical package for Social Sciences (version 20.0 for windows, SPSS, Chicago, IL, USA). Data are presented as mean ± SD, and number and percentage for qualitative

variables.Qualitative relations were evaluated using Chi-square test. P value of <0.05 was considered statistically significant.

Results

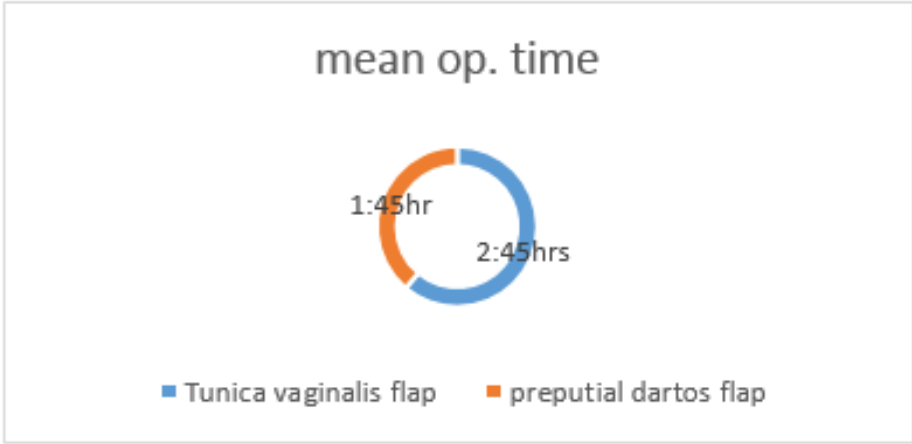

Figure 2: the mean operative time in both groups

Table 1: the percentage of each complication in both group.

Complication	Tunica vaginalis flap (group A) (No.)(%)	Preputial dartos flap (group B) (no.)(%)	P value
Scrotal swelling	1 (4%)	0 (0%)	0.343 NS
Superficial wound infection	1 (4%)	1 (4.5%)	0.926 NS
Deep wound infection	0 (0%)	2 (9%)	0.214 NS
Wound dehiscence	0 (0%)	0 (0%)	
Urethrocutaneous fistula	0 (0%)	2(9%)	0.214 NS
Meatal stenosis	0 (0%)	1 (4.5%)	0.926 NS
Penoscrotal tethering	1 (4%)	0 (0%)	0.343 NS
Testicular ascent	0 (0%)	0 (0%)	equal
Preputual skin necrosis	0 (0%)	0 (0%)	equal
Urethral diverticulum	0 (0%)	0 (0%)	equal

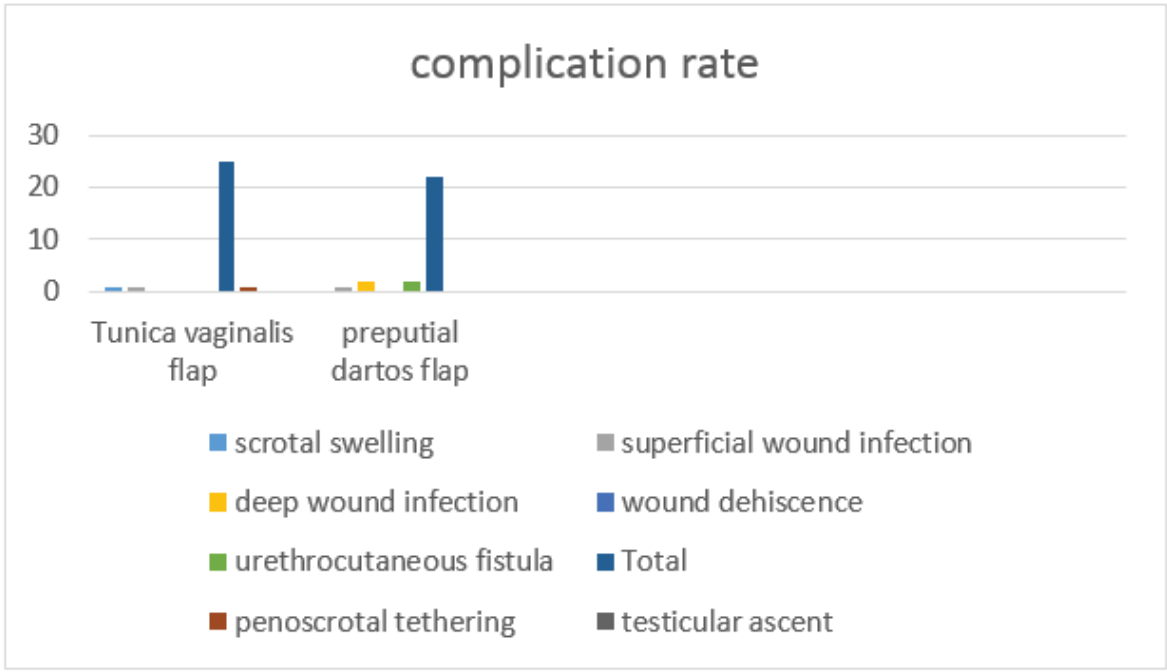

Figure 3: the distribution of complication in both patients groups

Discussion

The hypospadias surgery is permanently developing. Actually, the hypospadias field need good imagination, excessive delicateness.

In the present study, we enrolled 47 patients with mean age of 4.9 years most of them from 2-4 years, then we divided them in two 2 groups ; group (A)for whom we applied tunica vaginalis flap as a second waterproof layer and group (B) for whom we used preputial dartos flap as a second water proof layer . Regarding to the age and the number of the patients, our study was comparable to the jiwan *et al.* [5] Usually we deal with penoscrotal hypospadias as two stages procedure, which was well accepted in many literatures. [6,7,8] in the 1st stage our target to straight the penis by complete degloving with or without dorsal plication (in our study 5/47 (10.63%) needed dorsal plication which is comparable to Castagnetti and co-worker study (5%), [9] as well as to Yogender and his co-worker study.[10] In our study we achieved 100% success result of graft intake, these results are similar to johal *et al.* [11] and Faure *et al*. [12] Snow *et al* [13]. in 1995, were the first to announce the use of tunica vaginalis flap, the fistula rate reported was 9%. In his recent experience, Snodgrass in his new series reduced the fistula rate to 0% with the use of tunica vaginalis flap. [14]we recorded rate of fistula (0%) in TVF group which is better than Yogender *et al*[10] who reported (9%) fistula rate and also better than Shankar et al.[15] and Handoo et al.[16] Both report same fistula rate of (11%).but its comparable to Chatterjee et al.[17] who recorded (0%) fistula rate.

we recorded no testicular ascent, wound dehiscence or testicular abscess (0%) which were comparable to Yogender et al [10].in the tunica vaginalis flap group patients, no body develop meatal stenosis (0%) which is better than Kamyar et al.[18] who reported (14%) meatal stenosis. In TVF group scrotal swelling developed in one case (4%) which resolved spontaneously after one week and its less or comparable to Yogender et al[10] who reported (4%) scrotal hematoma ,by the way he put scrotal drain in all his patients ,unlike in our study the scrotal drain used only in one case. In group (A) one case developed acquired chordee which is by examination felt as a cord like structure at the penoscrotal junction which tethered the proximal penis causing (penile torque) (4%), it's also recognized in many studies like Palabras et al.[19] which need reoperation for release of this tethered tissue.in group B, we used preputial dartos flap. This flap need meticulous separation of dartos from the skin and underlying bucks fascia with support of loupe magnification with avoidance of excessive cauterization to preserve minute blood supply in this

flap. Out of the 22 cases, 2 cases developed primary urethrocutaneous fistula which represented (9%) of total cases, this results was much less than most of the results of other similar studies about penoscrotal hypospadias repair like that which was done by Basavaraju et al (22%) [20], in Chatterjee et al.[17] ,(12%) in Dhua et al [20] while (66.67%)in jiwan et al.[5] this high worldwide rate of fistula in dartos flap is due to Structural amendments of the hypospadiac patients . The prepuce is insufficient in most proximal hypospadias cases to provide enough waterproof layer added that Cağrı Savaş et al. [21] Examined microvascular intensity of prepuce in hypospadias cases and found it to be gravely less. Soyer et al [22] established that there is decrease in the level of vascular endothelial growth factor in prepuce of hypospadiac patients and this subsequently cause impairment in the wound healing and recurrent complications after reconstruction. Also Pichler et al. [23] did a quantitative measurements of androgen receptors in prepuce of hypospadias and found androgen receptors mRNA (P = 0.013), and androgen receptors protein (P = 0.014) was significantly elevated. All these evidence suggested that dartos flaps of prepuce might not be the perfect tissue due to vascular, neural, and immunological alterations. 1 out of 22 of dartos group developed meatal stenosis (4.5%). This was possibly due to relatively loss of favourable anatomical feature of glans and urethral plate, which may resulted in a relatively tight closure of the glans over the dartos flap. Jiwan et al [5] reported (16.6%) meatal stenosis in proximal hypospadias repair with dartos flap.in both groups we didn't report skin necrosis (0%), urethral diverticulum (0%) or wound dehiscence (0%), this result was better than jiwan et al [5] who reported (30%) skin necrosis in dartos group and (0%) in tunica vaginali flap group. In addition, he recorded (16%) urethral diveticulum in both groups, wound dehiscence (7%) in dartos group and (3%) in tunica vaginali flaps group. Although both tunica vaginal flap and dartos flap had excellent outcome and our results were in favor of in comparison with counterpart recent studies and we observed that tunica vaginalis flap was better than dartos flap (although it was statistically non-significant p value 0.214 >0.05)specifically in fistula formation.

Conclusion

It is lucid that the staged hypospadias repair still propitious for proximal and crippled hypospadias. we found that tunica vaginalis flap is better than dartos because (No need to harvest local skin, which is already deficient, the tunica vaginalis flap looks to be better vascularity also tunica vaginalis flap if properly dissected give us longer length than dartos and It is of value if we need to do prepucioplasty). the only advantage of dartos flap that it is no need to extend the wound and do scrotal dissection. although both tunica vaginal flap and dartos flap had excellent outcome and our results were in favor of in comparison with counterpart recent studies and we observed that tunica vaginalis flap was better than dartos flap.

Recommendation

Apply the procedure on larger patients groups. we need longer follow up time for urinary and sexual issues.we recommend use the tunica vaginalis flap as a second layer in all cases of proximal hypospadias and in different age groups.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the ghazi alhariri surgical specialties, medical city hospital, Baghdad and all experiments were carried out in accordance with approved guidelines.

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