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To Compare the Outcomes of Dartos Flap and Tunica Vaginalis Flap as Secondary Cover after Second Stage Durham Smith Repair in Reducing Post-Operative Complications

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Abstract

Background: The repair of severe hypospadias is always a major challenge to an operating surgeon. Two-stage repair is a good option that can be applied to almost any degree of deformity. Here in our study during the first stage, chordee correction was done and Durham smith first stage repair was carried out and during second stage after about 6 months, tabularisation was accomplished. This study aimed to compare the outcomes of lateral dartos flap (DF) and tunica vaginalis flap (TVF) as secondary intermediate layer after second stage Durham smith repair.

Aim: To compare the outcomes of dartos flap (DF) and tunica vaginalis flap (TVF) as secondary cover after second stage Durham smith repair in reducing post-operative complications.

Materials and Methods: It is a retrospective study where we obtained the data of 52 patients who had undergone Durham smith first stage repair and chordee correction initially and later preputial flap tabularisation with interposition of either Dartos or Tunica Vaginalis flap during second stage was done and data was collected over the duration for 2 years (2017-2019) and analyzed. Patients were divided in two groups with 26 patients in each group. Indications for staged repair included mid-penile (12 patients), proximal meatus (20 patients), peno-scrotal (18 patients) or perineal (2 patients), moderate or severe chordee and poor glans groove. Patients in Group A underwent Durham smith second stage repair with lateral Dartos soft tissue cover while Group B consisted of patients with TVF as soft tissue cover. We compared between these two groups regarding complications viz. wound dehiscence, Urethrocutaneous fistula, Meatal stenosis, skin necrosis and preputial edema.

Result: In group A wound dehiscence is seen in 2 (7.6%) patients, Urethro-Cutaneous Fistula in 8(30.7%), skin necrosis in 5(19.2%), meatal stenosis in 3(11.5%) and preputial edema in 10(38.4%) patients while in group B wound dehiscence is seen in 1(3.8%) patient, Urethro-Cutaneous Fistula in 3(11.5%), skin necrosis in 2(7.6%), meatal stenosis in 1(3.8%) and preputial edema in 5(19.2%) patients. We observed that tunica vaginalis flap was better than dartos flap especially in fistula formation and the difference was statistically significant.

Conclusion: We have seen in our study that TV flap is a good option as second cover with lesser complications as compare to Dartos flap.

Keywords: Hypospadias, Dartos flap(DF), Tunica vaginalis flap(TVF), urethrocutaneous fistula (UCF), Durham Smith Repair

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Introduction

Hypospadias is one of the common anomalies in boys occurring in approximately 1 in 250 male newborn children with proximal hypospadias (penoscrotal, scrotal, and perineal types) account for 20% of all cases.[1,2] Many techniques of repair have been described.[3] About 80-85% of hypospadias have a distal meatus and mild curvature, while the remaining present with a proximal meatus and severe curvature.[4]

Majority of cases can be treated in single stage but some cases with severe chordee where the penile curvature is severe and urethral plate is so poor and fibrotic that urethral plate needs to be sectioned to achieve an adequate straightening.[5] In our study we used staged Durham smith repair technique can be used to repair any degree of hypospadias.[6] This study aimed to compare the outcomes of lateral dartos flap (DF) and tunica vaginalis flap (TVF) as secondary intermediate layer after second stage Durham smith repair.

Material and Methods

It is a retrospective study where we collected, analyzed and followed up the data of 52 patients who had undergone second stage hypospadias repair with either Dartos flap cover or Tunica Vaginalis cover. The case records of all patients who have undergone DS II (Durham smith stage 2) repair were reviewed. At our centre both Dartos and Tunica vaginalis flaps are practiced for Durham smith stage 2 repair as per surgeon's preference. On case record review, those patients who underwent stage II repair with either Dartos flap were labelled as Group A and patients who underwent Stage II repair with Tunica vaginalis flap were labelled as Group B. Data was obtained over the duration for 2 years (2017-2019) and tabulated.

Approval from ethics committee of institution was taken. Both groups had 26 patients each. Indications for staged repair included - mid-penile (12 patients), proximal meatus (20 patients), peno-scrotal (18 patients) or perineal (2 patients), moderate or severe chordee (more than 30 degree of chordee) and poor glans groove. These patients had already undergone Durham smith first stage repair and during second stage after about 6 months, tabularisation was accomplished. On review of the files post-operative findings including preputial edema, skin necrosis, urethrocutaneous fistula, meatal stenosis and wound dehiscence on post-operative day – 10 were noted and compared. The outcome data points in both the groups were tabulated. The collected data were analysed and statistically evaluated using SPSS-PC V.17. Difference between proportions was tested by $\chi 2$ test and p value less than 0.05 was considered statistically significant. P value less than 0.05 considered as statistically significant.

Operative Technique

Patients in both the groups were those who had already undergone initial Stage I Durham smith repair and later second stage was accomplished after about 6 months of the first stage. We describe here briefly about Stage I Durham smith repair.[4]

First, the dorsal prepuce is cut longitudinally to the coronal groove. The preputial flaps are denuded of their inner layer and rotated from the dorsal to the ventral side. An area on the glans on either side of the central blind groove is denuded of epithelium to beyond the tip of the glans. At



Fig. 1: Showing chordee correction, preputial flaps rotated ventrally and sutured to denuded glans surface and final outcome of Durham smith stage I repair.

this point, urethral plate is sectioned and two raw areas are joined by transverse incision which allows total release of all the penile skin and access to all the elements contributing to chordee (skin release, Buck's fascia, and central chordee band). After this, the preputial flaps are sutured dorsally and laterally into the coronal groove. The preputial flaps are then applied ventrally to the glans and sutured. (Fig.1).

Second stage is done usually after about 6 months. The second stage involves fashioning a complete skin tube to the tip of the penis, supported by overlapping skin layers and denuded of epithelium on one side to allow "double-breasting" of raw surfaces. We modified this technique as after completion of tabularisation of skin tube we put an interposition layer of either dartos or tunica vaginalis soft tissue cover, so double breasting is not needed. After fashioning of secondary soft tissue cover preputial skin is rearranged and sutured. (Fig.2) (Fig.3).

In group A, lateral dartos flap was harvested and used to provide soft tissue cover while in group B, tunica vaginalis flap was used to provide soft tissue cover.

Results

Patients were divided in two groups based upon the procedures performed viz. Dartos flap and Tunica vaginalis flap after urethroplasty after second stage Durham smith repair. Both the group had 26 patients each. Results of each group is summarised in table 1 and Fig.4.

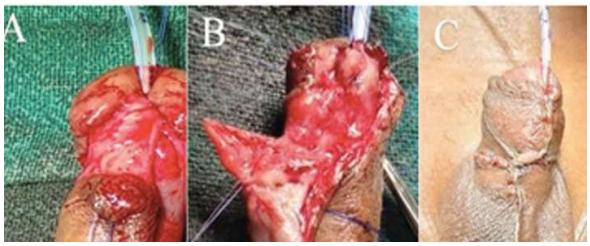


Fig. 2: Showing lateral Dartos cover and Final result after skin rearrangement

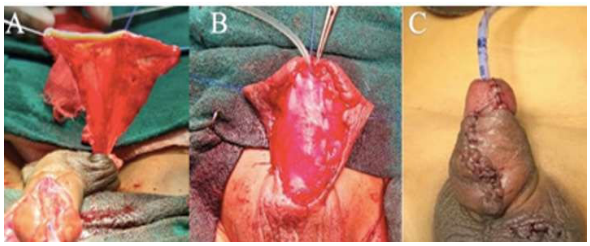


Fig. 3: Showing Tunica Vaginalis cover and Final result after skin rearrangement

Table 1:

		Group A (26)	Group B (26)	P value
Mean age (yrs.)		4.4	4.9	
Variety	Mid-penile	7 (26.9%)	5 (%)	-
	Proximal	10 (38.4%)	10 (38.4%)	
	Penoscrotal	8 (30.7%)	10 (38.4%)	
	Perineal	1 (3.8%)	1 (3.8%)	-
Complications				
Wound Dehiscence		2 (7.6%)	1 (3.8%)	0.281 (NS)
UC Fistula		8 (30.7%)	3 (11.5%)	0.046 (S)
Skin Necrosis		5 (19.2%)	2 (7.6%)	0.115 (NS)
Meatal Stenosis		3 (11.5%)	1 (3.8%)	0.153 (NS)
Preputial edema		10 (38.4%)	5 (19.2%)	0.065 (NS)

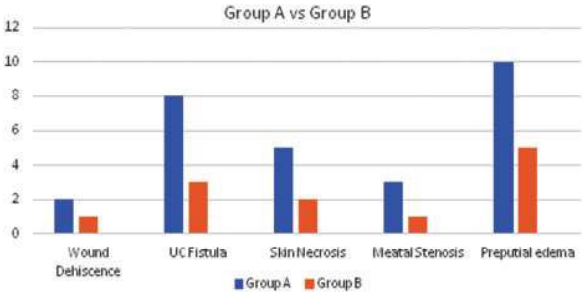


Fig. 4: Showing outcome comparison between Dartos (Group A) and Tunica Vaginalis Group (Group B)

Group A had median age of 4.4 years while 4.9 years for Group B. In group A, after successful repair of hypospadias with Dartos flap as secondary soft tissue cover, urethrocutaneous fistula was seen in 8 patients (30.7%) while it is seen in 3 patients (11.5%) after TV flap repair in group B and difference is statistically significant (p value 0.046, <0.05). Skin necrosis was seen in 5 patients (19.2%) in group A while 2 patients (7.6%) developed skin necrosis in group B and the difference is statistically insignificant (p value 0.115, >0.05).

Preputial edema was present in 10 patients (38.4%) in Group A while it was seen among 5 patients (19.2%) in group B and difference is statistically insignificant (p value 0.065, >0.05). Wound dehiscence including all layers was seen among 2 patients (7.6%) in group A while it was observed in only 1 patient (3.8%) in group B and difference was statistically insignificant (p value 0.281, >0.05). Meatal stenosis was seen among 3 patients (11.5%) in group A while it was seen in only 1 patient (3.8%) in group B and difference was

statistically insignificant (p value 0.153, >0.05).

Discussion

Hypospadias surgery is always evolving and no single procedure is considered perfect. In the present study, we reviewed 52 patients where interposition flaps like lateral dartos and tunica vaginalis were used. We found only few studies that compared the outcome of Durham smith staged urethroplasty technique with interposition secondary cover. In our study we recorded fistula rate of 30.7% in group A & 11.5% in group B and this difference was statistically significant. Studies like Mohajerzadeh et al.[7] shows urethrocutaneous fistula rate of 41% after Durham smith repair on 17 patients.

Other studies like Holland AJA et al.[8] on outcome analysis in terms of recurrent fistula shows approximately 9.1% of recurrent fistula rate after Durham smith repair on 34 patients. In Group B only 3.8% patients developed meatal stenosis and 11.5% patients developed meatal stenosis. In our study superficial skin necrosis is seen in 19.2% patients in Dartos flap group while 7.6% patients in TVF group. Although skin necrosis was inconsequential in the long run, it did cause anxiety and distress to the families and invited more hospital visits.

Wound dehiscence including dehiscence of glans penis was seen in 7.6% among patients in group A and 3.8% in group B. Mohajerzadeh et al.[5] shows meatal stenosis in 6% and complete dehiscence and failure in 6% patients. In our study we reported preputial edema among 38.4% patients in group A and 19.2% patients in group B. We have not found other similar studies that compared preputial edema and skin necrosis among two groups but we recorded higher incidence of preputial edema and skin necrosis among patients belonged to Dartos flap group although not statistically significant.

There are not too many studies that have compared outcome analysis of particularly Durham smith repair so additional large sample size study needs to be done so that results can be extrapolated on a large scale. Both tunica vaginal flap and dartos flap had good outcome but we have seen that TVF group patients had low incidence of Wound Dehiscence, skin necrosis, preputial edema, urethrocutaneous fistula and meatal stenosis.

Limitations

Although there could be lots of factors that might affect the outcome of hypospadias surgery, especially the wide variability in technical aspects of surgery and complexity for individual cases, additional large sample size, well-designed studies need to be conducted for optimal comparisons between these two flap techniques.

Conclusion

We have seen in our study that TV flap is a good option as second cover with lesser complications as compare to Dartos flap and our findings are going with other similar studies. TV flap has good vascularity and usually available in good length as compared to Dartos flap that need to be taken from the local skin that is already deficient. TV flap is better than dartos flap as secondary vascular cover.

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