

Original Research Article

The Use of Tunica Vaginalis in Hypospadias Fistula Repair

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Abstract

In hypospadias surgery urethrocutaneous fistula is the most common complication, or might be an iatrogenic fistula as part of the staged hypospadias repair.

Carrying a supportive layer of vascularized tissue for closure between the urethra and the skin will provide safe closure and reduce the likelihood for fistula recurrence.

Evaluation of hypospadias fistula closure by using tunica vaginalis fascia as an interpositional layer between the neourethra and the skin to prevent fistula recurrence.

The tunica vaginalis fascia vascularized flap have been used for repair of hypospadias fistula. In 50 patients with age ranged from 1.5-15 years, from 2004 to the January 2015.

All patients had undergone previous hypospadias repair, the fistulae were closed primarily and urethral suture line was covered with a flap of tunica vaginalis which was harvested through scrotal incision ,then the skin closed as a third layer of closure.

A urethral catheter was kept for urinary diversion for 10-14 days. The repair was successful in all patients excepting only 6 cases where other factors affecting the repair, including catheter obstruction and direct trauma to the operation site.

The repair with tunica vaginalis is very effective, so fistulae should be closed in three layers for better healing and preventing the recurrence to the lower minimum.

Key words: Hypospadias, Tunica vaginalis, Urethrocutaneous fistula, Dartos muscle and fascia.

استخدام الغلالة الغمدية في علاج ناسور المبال التحتاني

الخلاصة

يعتبر ناسور الاحليل من المضاعفات المهمة في عمليات تقويم المبال التحتاني, وقد يكون الناسور مصطنعاً في العمليات التي يصنع بها الاحليل على مراحل. وعملية حمل نسيج إضافي كالغلالة الغمدية بتخلل طبقات غلق ناسور الاحليل يوفر ويضمن نسبة نجاح عالية في عملية غلق الناسور. تقييم غلق ناسور الاحليل باستخدام الغلالة الغمدية كطبقة تتوسط بين الاحليل والجلد لمنع تكرار الناسور. استخدمت الغلالة الغمدية لغلق الناسور لدى خمسون مريضاً اجريت لهم عمليات تقويم المبال التحتاني تتراوح اعمارهم من سنة ونصف الى خمسة عشر عاماً خلال الفترة الممتدة من ٢٠٠٤ ولغاية كانون الثاني ٢٠١٥.

نجاح عملية غلق ناسور الاحليل باستخدام الغلالة الغمدية لدى المرضى جميعاً عدا ستة حالات سجلت فيها عودة الناسور بسبب انسداد عرضي في مجرى البول {انسداد انبوب القولي} او التعرض المباشر لشدة خارجية.

يعتبر غلق ناسور المبال التحتاني باستخدام الغلالة الغمدية فعال جداً مع التئام سريع ومضمون مع نسبة منع عالية لعودة الناسور مرة ثانية.

الكلمات مفتاحية: مبال تحتاني, ناسور مبال تحتاني, غلالة غمدية, عضلة سلخية, غلالة سلخية.

Introduction

Fistula is the most common complication of hypospadias surgery, or it could be part of staged urethroplasty procedures. The fistulae usually requires reoperation. Several techniques of providing additional vascularized soft tissue cover to the neourethra have been described, including: de-epithelialized skin [1,2], corpus spongiosum[3], dartos fascia[4] and tunica vaginalis[5-7].

The fistula repair by tunneled tunica vaginalis flap was first did in 1970 by hosli[9] and subsequently popularized by Snow *et al*[6, 10].

The tunica vaginalis has an isolated blood supply and does not depend on the penile skin for its vascularity, so the tunica harvest did not compromise the skin flap viability unlike the dartos fascia flap elevation which might affect viability of the outer skin[8].

Materials and Methods

50 patients of age ranged from 1.5-15 years, with hypospadias fistula underwent repair from the year 2004 to January 2015, in Al-Karama general hospital in Al-Kut city and an Al-Wasity hospital of reconstructive and plastic surgery.

About 40 cases were had perineal, scrotal or proximal penile hypospadias treated surgically by cutaneous tube urethroplasty with iatrogenic proximal fistula, the remaining 10 cases had fistulae

complicating hypospadias single staged repair, flip-flap or Snodgrass procedure.

The fistulae were of different sizes ranging from pinpoint to 8 mm in dimension.

In all cases, magnification loupes, fine instruments and bipolar electrocautery were used.

After good sterilization of the area with povidone iodine 10% solution, the meatus and the neourethra examined carefully to exclude any stenosis, stricture or distal obstruction. Foleys catheter of suitable size should be inserted first.

The fistula marked with special pen, diluted adrenaline could be used safely to provide a bloodless field, and then after 7 - 10 minute a circumscribing incision around the fistula with inversion of the wound edges toward the lumen of the urethra and sutured by 6-0 absorbable suture.

An extension incision to the scrotum or through a tunnel, the tunica vaginalis vascularized flap harvested to cover the repaired urethra and sutured with 6-0 absorbable suture.

A wide skin flap elevated to cover the tunica flap and close the wound without tension where 4-0 absorbable suture were used.

Glove made drain is necessary to prevent hematoma collection and affecting the repair.

Antibiotic cover for 10-14 days, and the patient encouraged for more fluid intake.

Wound dressing was changed every 4-5 days and the catheter was removed in 10 - 14 days.

Table 1 : numbers of cases according to fistula type

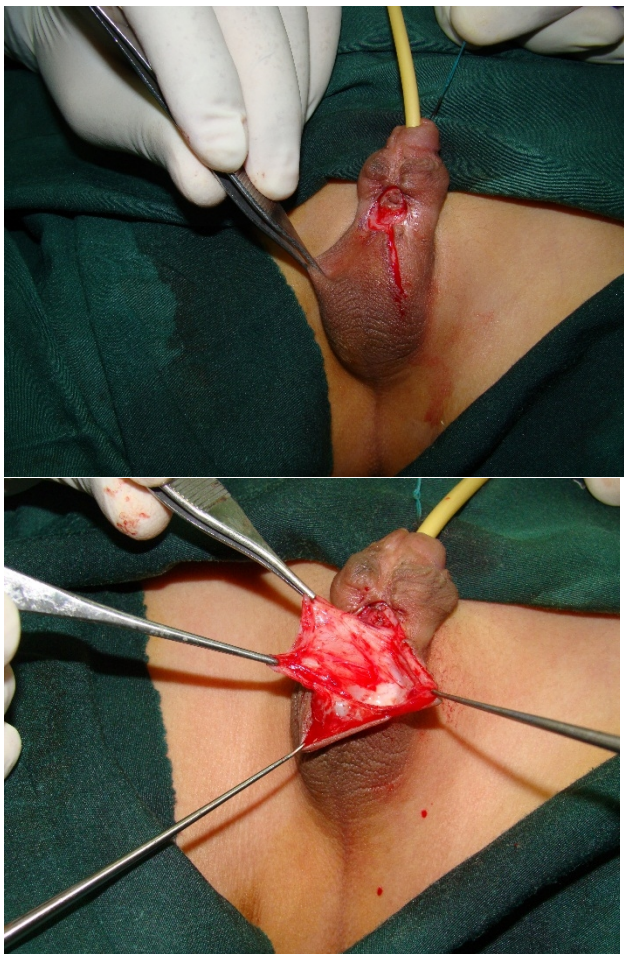
Type of urethrocutaneous fistula	No. of cases
Iatrogenic	40
Hypospadias surgery complication	10

Table 2: no. of cases according to age group

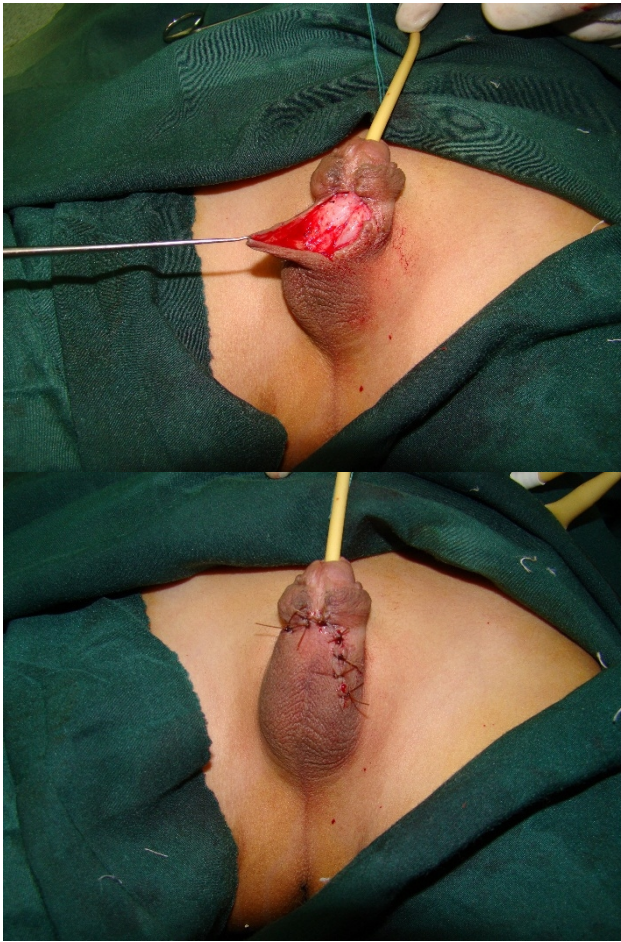
Patients age group in years	No. of cases
1.5-10	35
10-15	15



Planning of the fistula circumscribing and the scrotal incisions



Tunica vaginalis flap elevation through the scrotal incision



Tunica vaginalis flap mobilized and sutured over the repaired urethral layer then covered with skin flap.

Result

50 boys with hypospadias fistula treated by using the tunica vaginalis flap interposition,

40 cases of them were had iatrogenic urethrocutaneous fistula, and 10 cases

were had fistula as a complication of single stage hypospadias repair.

The repair was successful in 44 cases where no fistula recurrence observed during the whole period of study. While failure obtained in only 6 cases where attributed to Foleys catheter obstruction and trauma.

Table 3: no. of cases according to fistula closure result

Fistula closure result	No. of cases
Good long-term result	44
Fistula recurrence	6

Discussion

Following initial urethroplasty, utilization of tunica vaginalis by application of several methods with accompanied recurrence rate of 7.9% (11-15). Pattaras and Rushton have reported two patients who developed severe penile torque several years after primary urethroplasty using tunica vaginalis flap, the flap was simply divided with subsequent resolution of the torque [16].

The tunica vaginalis flap should be of sufficient length to prevent secondary chordee and that cremasteric fibers are excluded from the flap in order to avoid penile torque [17].

Snodgrass described the use of vascularized subcutaneous tissue dissected from dorsal prepuce and shaft skin but associated with high risk of dermal necrosis [18].

Duckett described reduced skin perfusion when dartos separated from the skin [19].

Snow et al in 1995 were the first to report the application of tunica vaginalis as an additional layer with fistula rate reported 9% [10].

In my study the high success rate of tunica vaginalis flap closure is attributed to the elevation of a wide flap with good vascularity that encouraging good wound healing, spacing the suture lines, mechanical support, good skin cover without tension, meticulous hemostasis, wound drain and the proper sized Foley catheter.

The six failure cases are due to foley catheter obstruction (small size catheter gage 8) and due to direct trauma to the repair site in hyperkinetic children. Reoperation was done to them after 6-8 months with good result.

Conclusion

The repair of urethrocuteaneous fistula with tunica vaginalis flap as an additional layer is associated with promising results

regardless fistula site, size and duration. The flap is easily harvested and rotated.

The technique is easy and time saving with limited morbidity and the tunica vaginalis is particularly useful as well vascularized additional layer for treating urethrocuteaneous fistula with excellent result at the long-term follow up.

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