

Different Varieties of Urethrocutaneous Fistulae; A Single Solution

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Abstract

Introduction: Most common cause of urethro cutaneous fistula is hypospadias surgery. There are other causes like congenital, iatrogenic (circumcision, priapism, urethral injury after penile fracture, TURP, HIFU), traumatic (penile deglove injury, partial amputation), malignancy, chronic infection (peri-urethral) and radiotherapy induced. There is no universal single technique mentioned in literature

Materials and Methods: We have operated a total of 12 cases of urethrocutaneous fistulae during January 2013 to November 2016. The size of the fistulae was < 2cm in our study. The urethral cutaneous fistula ventral part was covered with a flap of Tunica vaginalis without tubularization, which was harvested through a small scrotal incision and mobilized via a subcutaneous tunnel into the penis underneath the buck's fascia over the urethra to cover the fistula site.

Results: All 12 patients in this series single stage ventral onlay tunica vaginalis was applied by single surgeon and minimum 6 months follow up taken. Age of patient ranged from 7 year to 45 year. Mean surgical time was 100 minutes. Mean hospital stay was around 7 days. Two patients developed a wound infection and one developed scrotal hematoma. Other complications, such as urethral stenosis, intraurethral obstruction, urinary retention, difficulty voiding, and epidermal inclusion cysts, were not seen in the other patients during the six - month follow-up.

Conclusion: The purpose of this study is to show results of tunica vaginalisonlay flap irrespective of the cause of fistula for upto 2 cm size single, primary fistula, at anterior urethra by a single surgeon.

Keywords: tunica vaginalis flap, urethrocutaneous fistula

Date of Submission: 11 -09-2017

Date of acceptance: 22-09-2017

I. Introduction

Although most common cause of urethro cutaneous fistula is hypospadias surgery. There are other causes like congenital, iatrogenic (circumcision, priapism, urethral injury after penile fracture, TURP more during bipolar than monopolar, HIFU), traumatic (penile deglove injury, partial amputation), malignancy, chronic infection (peri-urethral) and radiotherapy induced. Treatment of the urethral fistula must be directed not only to the defect but also to the underlying process that led to its development. There is no universal single technique mentioned in the literature. Closure of the fistula may require staged urethral reconstruction. The result of fistula repair is also affected by surgical skills and technique, causes of fistula, number, location, and the size of fistula, the condition of the local tissue, previous surgery and associate distal urethral stricture.

The purpose of this study is to show results of tunica vaginalisonlay flap irrespective of cause of fistula for up to 2 cm size single, primary fistula, at anterior urethra by single surgeon. The urethral cutaneous fistula ventral part was covered with a flap of tunica vaginalis, which was harvested through a small scrotal incision and mobilized via a subcutaneous tunnel into the penis underneath the buck's fascia over the urethra to cover the fistula site without tubularization. Serosal surface of Tunica Vaginalis flap would be ventral wall of neourethra.

II. Materials And Methods

We have operated a total of 12 cases of urethrocutaneous fistulae during January 2013 to November 2016. The size of the fistulae was < 2cm in our study. Preoperative retrograde urethrogram was done in almost all cases to rule out other fistula and confirm urethral continuity.

Operative technique

In all patients after painting and draping done, under aseptic condition, after administration of spinal anesthesia. Urethral calibration and cystoscopy were always done before surgery to exclude meatal or distal urethral strictures. At the time of surgery methylene blue solution was injected via the urethral meatus to identify any occult fistula. Urethrocutaneous fistula margin freshening was done. The surrounding skin margin is dissected all around to fall back the fistula from the cutaneous margin. The proximal skin flap dissected till the base of penis underneath buck's fascia for passage of tunica vaginalis flap. A 2-cm incision was then made at the upper pole of scrotum and a flap of tunica vaginalis was harvested, taking great care to avoid inclusion of cremasteric muscle fibers. Flap length was determined by the distance from the harvest site to the Urethrocutaneous fistula. The Tunica vaginalis flap was then tunneled underneath the penile skin and brought out to cover the most distal part of Urethrocutaneous fistula. The tunica vaginalis fistula was then fixed at margin of UCF site using 4-0 PDS. Serosal surface of tunica vaginalis fistula worked as ventral part of neourethra over 10 to 14 French silicon catheter according to patient age. The skin overlying UCF tract was then closed. We did not tubularise the urethral plate by suturing the both urethral plate margin, rather than we just put the tunica vaginalis ventrally and sutured all around the urethrocutaneous margin. For prevention of chance of diverticula we reinforced ventral tunica vaginalis flap by surrounding dartos tissue. Post operatively after 3 weeks per urethral catheter removal was done. Follow up at 3, 6 & 12 months uroflowmetry and if needed anterior urethrogram and cystoscopy. Parameters assessed include Immediate complications (wound infection, scrotal hematoma, presence of leak, orchitis, penile torque) delayed complication (testicular atrophy, failure leading to recurrent urethrocutaneous fistula or re-operation)

III. Results

All 12 patients in this series single stage ventral onlay tunica vaginalis was applied by single surgeon and minimum 6 months follow up taken. Age of patient ranged from 7 year to 45 year. There was no urethral scarring in any case and none of the patient previously underwent urethrocutaneous fistula repair. In three patients cause of fistula was hypospadias failure, three were iatrogenically created urethro cutaneous fistula following penile fracture with urethral injury repair, three cases were due to periurethral infection, one case due to post priapism proximal shunt, one following bipolar turp, last one due to post radiotherapy ischemic injury. Mean surgical time was 105 minute (range 90 to 120 minutes). Mean hospital stay was around 7 days. Two patients developed wound infection and one developed scrotal hematoma. Other complications, such as urethral stenosis, intraurethral obstruction, urinary retention, difficulty voiding, and epidermal inclusion cysts, were not seen in the other patients during the three-month follow-up.

IV. Discussion

For newly diagnosed urethrocutaneous fistulae, initial evaluation should be made for distal urinary obstruction. If present, the obstruction should be treated, if possible, or bypassed. Patients who have nonhealing urethrocutaneous fistulae caused by chronic infection, occult malignancy or an undiscovered foreign body not only should be evaluated for an occult cause, but also should undergo a nutritional evaluation because these individuals may be catabolic, immunosuppressed, and unable to mobilize adequate metabolic reserves to initiate wound closure.

In fistula repair first attempt has best result as in our series all are primary fistula. Shankar et al. in his study of 10 cases of refistulas at second attempt found 50% success rates at third, fourth and fifth attempts but without any waterproofing layer.(1)To achieve higher success rate for closure of fistula various surgical techniques are described including simple closure, the trapdoor technique, an envelope-like closure, multilayered repair, and Tubularized Incision Plate urethroplasty .Few articles reported that multilayer closure with intermediate waterproofing layer between the neourethra and the skin plays a major role in decreasing the incidence of urethrocutaneous fistula recurrence, irrespective of the surgical repair method. (2)Larger the size of fistulae more difficult is their closure and correction (1.) Vascular jeopardization and stricture formation are common complications of tubularization by urethral margin approximation. As the larger the size the more difficult closure this due to the closure with tension sutures thus we avoid this tension sutures and ischemia problem by directly applying tunica vaginalis flap without ventral urethral approximation. We perceive no difference in results regarding urethrocutaneous fistula size. Various methods and techniques have been reported in the literature for the management of these urethrocutaneous fistulae with variable results.(4)Mohamed et al. used the midline relaxing incision for large fistulas, and then covered it with a vascularized dartos-based or

tunica vaginalis flap. This method demonstrated a high success rate for repairing midline and proximal urethral fistulas (3)

We did not incise the urethrocutaneous fistula, just refreshing the margin of urethrocutaneous fistula and applying Tunica vaginalis flap to refreshing margin done, no recurrences occurred in our cases after three months of follow-up, the surgical sites showed no tension, and there were good cosmetic results. The results showed that our simple method had a high success rate (100%) for all fistula < 2cm size urethrocutaneous fistulas. Our method is equal to previous methods in terms of success rate, and it involves a short operating time and an easy learning curve. In our series we included all urethrocutaneous fistula with different etiologies and all are treated with same tunica vaginalis flap reinforced by surrounding dartos tissue this makes our series unique from other.

This technique makes our surgery unique, simple and gives better result than other techniques. We suggest conducting a large, randomized, controlled clinical trial with a longer follow-up period to confirm the results of the present study by different surgeon and centre. Further studies should also be conducted on patient with fistulas larger than 2 cm.

V. Conclusions

Tunica vaginalis flap repair is a very highly successful technique for the treatment of urethrocutaneous fistula due to any cause. The technique is technically simple to perform, and we encountered manageable complications and no recurrence. No technique has zero recurrence rates but probably our technique can be a game changer. Although, largemulticentric trials are needed. Tunica vaginalis flap repair without urethral margin approximation should be considered for treating urethrocutaneous fistulas as the first choice.

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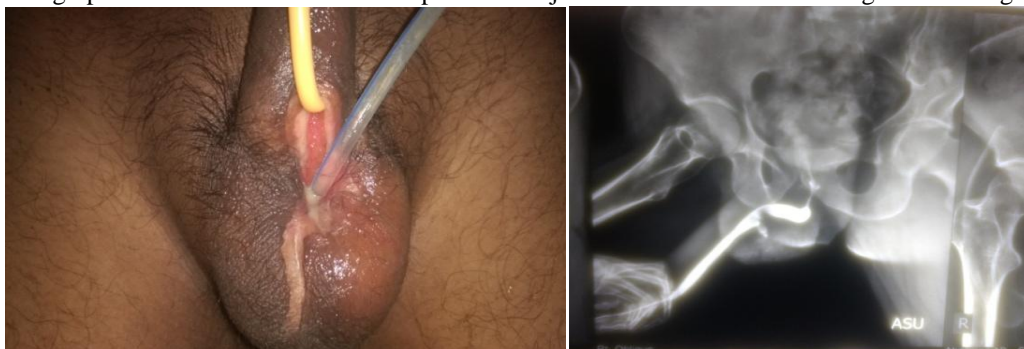
Causes of urethrocutaneous fistula

Clinical Presentation	No. of cases	Percentage
hypospadias failure	3	25%
Iatrogenic fistula	3	25%
periurethral infection	3	25%
post priapism shunting	1	8.33%
bipolar turp injury	1	8.33%
post radiotherapy ischemic injury	1	8.33%

Results

Complication	No. of cases
UC fistula	None
Scrotal hematoma	1
Wound infection	2
Tethering of testis	None
Orchitis, testicular atrophy	None
Cordee	None
Any other	Nonsignificant

Pre-op photograph: urethra cutaneous fistula at penoscrotal junction and anterior urethra gram showing fistula



Per op photograph: proximal urethra calibration , UCF margin refreshing an TV flap application to margin



Post operative photograph : urethral continuity in anterior urethrogram and healthy operative site



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IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 16.9 (2017): 82-85