

Female Urethral Reconstruction Using Dorsal Vaginal Graft: A Single-center Study

Kumar Rohit¹, Prabhat Kumar¹, Rohit Upadhyay², Kamal Kant¹, Vijoy Kumar³

¹Resident, Department of Urology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India, ²Associate Professor, Department of Urology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India, ³Professor and Head, Department of Urology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India

Abstract

Introduction: Female urethral stricture (FUS) is relatively rare condition but can cause bothersome lower urinary tract symptoms. The common causes may include idiopathic, trauma, iatrogenic injury, infection, malignancy, and radiation. Here, we present our single-center experience of treating FUS with dorsal onlay vaginal graft in nine patients.

Materials and Methods: A retrospective review was performed on nine female patients with midurethral stricture who underwent dorsal onlay vaginal graft urethroplasty from January 2015 to January 2018. Six patients had a history of multiple Hegar dilatations and three underwent internal urethrotomies previously. All patients underwent pre-operative evaluation including detailed history, physical examination, complete blood count, routine urine, serum creatinine, uroflowmetry, ultrasound sonography (USG) abdomen and pelvis, and micturating cystourethrogram.

Results: Site of stricture was midurethra in all the nine patients. Mean pre-operative versus post-operative Q_{max} was 5 mL/s versus 22.33 mL/s, and mean residual urine was 186.66 mL versus 18.88 mL. Irritative voiding symptoms were present in two patients, which subsided after a week. None of the patients reported incontinence during follow-up.

Conclusion: Dorsal onlay vaginal graft urethroplasty is a simple and more effective technique than repeated painful dilatations and urethrotomy. Further study with more patients and longer follow-up is required to establish the success of this procedure.

Key words: Dorsal onlay, Female urethral stricture, Vaginal graft

INTRODUCTION

Female urethral stricture (FUS) is relatively rare condition but can cause bothersome lower urinary tract symptoms (LUTS). It has been estimated that BOO accounts for between 2.7% and 8% of women with LUTS.^[1-4] In those women with known BOO, FUS accounts for between 4% and 18% of these cases.^[5,6] Symptoms of FUS may be variable, but often include hesitancy, poor flow, frequency, urgency, and dysuria and may lead to recurrent urinary tract infection^[7] and overt urinary retention. No strict diagnostic criteria have been documented for FUS because of its rare incidence. However,

Defreitas *et al.* stated that a detrusor pressure (Pdet) of 25 cm of H₂O and maximum urinary flow rate (Q_{max}) of <12 mL/s is consistent with obstruction.^[8] The common causes of FUS may include idiopathic, trauma, iatrogenic injury, infection, malignancy, and radiation.^[9] Urethral dilation is a commonly performed procedure in women despite lack of proven efficacy. Moreover, this procedure is used for a variety of voiding complaints other than stricture. The long-term utility of dilation and urethrotomy for urethral stricture in women is unknown. Surgery is often the answer in such cases in the form of meatoplasty for distal urethral strictures and grafts or flaps for mid- and proximal-urethral stricture.

Here, we present our single-center experience of treating FUS with dorsal onlay vaginal graft in nine patients.

MATERIALS AND METHODS

A retrospective review was performed on nine female patients with midurethral stricture who underwent dorsal

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Corresponding Author: Dr. Prabhat Kumar, Quarter No. 22, New MDH, IGIMS Campus, Patna, Bihar, India. Phone: +91-7295903830.
E-mail: drpk Mishra2004@gmail.com

onlay vaginal graft urethroplasty from January 2015 to June 2017. Full informed consent was taken from all the patients. The following diagnostic criteria were applied for patient selection: (1) A maximum urinary flow rate of <10 mL/s, (2) inability to calibrate urethra with 10 Fr Nelaton catheter, and (3) narrowing of urethra with proximal dilatation on micturating cystourethrogram (Figure 1). All patients underwent pre-operative evaluation including detailed history, physical examination, complete blood count, routine urine, serum creatinine, uroflowmetry, USG abdomen and pelvis, and micturating cystourethrogram. Of nine patients, six presented with obstructive voiding and feeling of incomplete bladder evacuation, two patients presented with frequency and urgency as their main complain, and one had recurrent urinary tract infection. Six patients had a history of multiple Hegar dilations and three underwent internal urethrotomies previously. Idiopathic stricture was most common etiology and only one had multiple transurethral resections for bladder tumor. All patients had normal serum creatinine value preoperatively. None of the patients had pre-operative urinary incontinence.

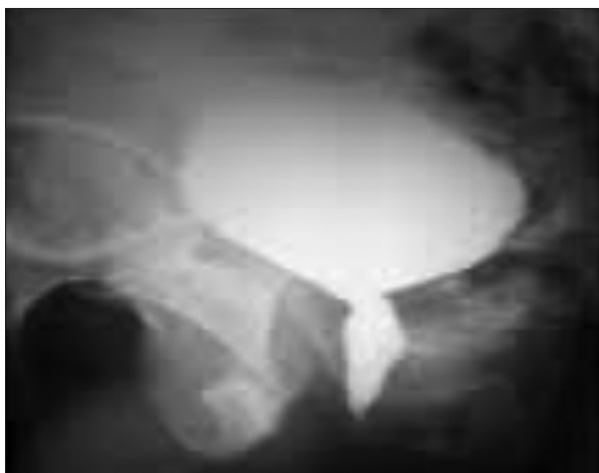


Figure 1: Stricture midurethra with proximal dilatation on MCU

Operative Description

The patient is prepared in the modified dorsal lithotomy position under either general or regional anesthesia. The vagina is prepared in the manner for traditional transvaginal surgery. Cystoscopy is done with 6 Fr ureteroscope to see the stricture area and assess its length from bladder neck. Normal saline mixed with 1% adrenaline is injected in periurethral tissues. Urethra is dissected dorsally and laterally from 3 to 9' O clock position by an inverted U-shaped incision. A full-thickness urethrotomy extending from proximal to distal healthy area is made over the stricture site at 12' O clock position. Urethra is calibrated with 18 Fr catheter. From the inner aspect of one labium minora, a thin free skin flap was prepared (Figure 2). The vaginal graft (Figure 3) is then sutured on the dorsal surface of urethra as onlay graft with 4-0 vicryl suture in interrupted fashion (Figure 4). First suture is taken at the apex of urethra and then on to the graft and tied. Then, suturing of the right and left margin of urethra is done with vaginal graft and urethra is sutured back to its normal position with 4-0 vicryl suture. Continence was evaluated by a stress test with a full bladder. Mean hospital



Figure 3: Harvested vaginal graft



Figure 2: Site of vaginal graft



Figure 4: Vaginal graft as dorsal onlay

stay was 4 days. After 14 days, patient is again called for voiding cystourethrography and catheter removal. Our follow-up protocol includes every 3 monthly assessment of voiding and storage LUTS, uroflowmetry, and 1 weekly self-calibration.

RESULTS

Site of stricture was midurethra in all the nine patients. Mean age of patients was 48.11 (39–57 years). Mean pre-operative versus post-operative Qmax was 5 mL/s versus 22.33 mL/s, and mean residual urine was 186.66 mL versus 18.88 mL. Mean stricture length was 1.4cm. Mean operative time was 105 min → mean duration of follow-up was 8 months. Patients did not report any significant post-operative pain or discharge suggestive of wound infection. At first follow-up at 3 weeks after surgery, micturating cystourethrogram showed a normal urethra without any proximal dilatation. On uroflowmetry, normal voiding was achieved. Irritative voiding symptoms were present in two patients, which subsided after a week. On urodynamic investigation, all patients had an unobstructed nomogram with Qmax more than 12 mL/s and detrusor pressure at Qmax <20 cm H₂O. After 6 months, the patients were well, minimal residual urine, and cosmetic results were satisfactory. None of the patients reported incontinence during follow-up based on patient–physician interview.

DISCUSSION

FUS is usually a subject of disregard. Its actual incidence as opposed to the rate of female urethral dilatation has been contrasted by Santucci *et al.*^[10] They noted that although urethral dilatation is practiced rather frequently in the clinic, it is of no therapeutic value with patients plagued with strictly irritative voiding symptoms in the absence of confirmed urethral stricture disease. The exact incidence of FUS disease is unknown with <100 cases having been reported in the contemporary literature.^[11] It is primarily treated with repeated urethral dilatations and internal urethrotomy. Many women not undergoing surgery but treated with chronic interval urethral dilatations and internal urethrotomies will have high recurrences and may result in increased scarring and fibrosis.^[11,12] As in males, urethral stricture disease in females can cause voiding and storage LUTS, recurrent urinary tract infections, and renal impairment. Stricture is commonly located in mid and distal urethra. Surgical treatment of FUS disease has not been adequately addressed in literature.

The present procedure is safe, simple, and effective. It can be performed in spinal anesthesia. The dorsal approach for vaginal graft has the advantage of strong mechanical

support and vascular bed provided by clitoral: Cavernosal tissue and physiological voiding (urinary stream away from vagina). Besides, ventral aspect of urethra is spared for future anti-incontinence surgery. Montorsi *et al.* described vestibular flap urethroplasty in 17 patients.^[13] However, this procedure could not be used in cases of vaginal fibrosis. Tanello *et al.* reported the use of a pedicle flap from the labia minora for the repair of FUS in two patients.^[14] Berglund *et al.* presented the technique of ventral onlay buccal mucosal graft urethroplasty for recurrent urethral stricture disease 30 months of follow-up.^[15] After surgery, one of the two patients developed a recurrence of LUTS because of meatal stenosis. Swender *et al.* used the technique of anterior vaginal mucosal flap in eight patients with complete cure in seven patients after a single procedure who previously underwent multiple dilatations.^[11] Simonato *et al.* presented a series of six patients who underwent vaginal inlay flap urethroplasty inspired by Orandi technique with good results.^[16]

This procedure of dorsal onlay vaginal graft seems to be an effective way to treat FUS. It may be done in cases of mid- and proximal-urethral stricture. It seems that the operative concept of the dorsal vaginal onlay graft could be tested in a larger series with a long-term follow-up, and compared with other urethroplasty techniques to further evaluate benefits and pitfalls.

CONCLUSION

Dorsal onlay vaginal graft urethroplasty is a simple and more effective technique than repeated painful dilatations and urethrotomy. Further study with more patients and longer follow-up is required to establish the success of this procedure.

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