

Preliminary report on the effect of urethral diverticulum magnetic resonance imaging configuration on the incidence of new onset urodynamic stress urinary incontinence following excision

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Abstract

Context: Excision of urethral diverticulum in females has been reported to be associated with new onset urodynamic stress urinary incontinence (USUI) in up to 49%.

Aims: We have assessed the incidence of new onset USUI in all patients having urethral diverticulum excision with Martius fat pad interposition under the care of a single surgeon between May 1, 2007, and December 1, 2011. The incidence of new onset USUI has been correlated with the preoperative magnetic resonance imaging (MRI) appearance of the urethral diverticulum.

Patients and Methods: All 33 patients (mean age 42) having urethral diverticulum with Martius fat pad interposition had prospective data tabulated on demographics, preoperative MRI appearance, and pre- and post-operative videocystometrogram.

Statistical Analysis Used: Statistical analysis was performed by Chi-squared and Fisher's exact.

Results: Of the 33 patients, 10 (30%) had preoperative USUI and have been excluded from this study. Other preoperative urodynamic findings included idiopathic detrusor overactivity in ten (30%) and bladder outflow obstruction in five (16%). Two (10%) of the patients had a simple diverticulum, 16 (73%) had a horseshoe diverticulum, and 5 (17%) had a circumferential diverticulum. The rate of new onset USUI was 0% for simple, 6% for saddle, and 20% for circumferential.

Conclusions: New onset USUI occurs in 9% of patients having excision of urethral diverticulum with Martius fat pad interposition. The incidence appears to increase with increasing complexity of urethral diverticulum on preoperative MRI – rising from 0% following simple urethral diverticulum excision to 20% following circumferential diverticulum excision.

Keywords: Diverticulectomy, magnetic resonance imaging, stress urinary incontinence, urethral diverticulum

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INTRODUCTION

A urethral diverticulum is a benign, epithelium-lined outpouching of the female urethra. It presents most commonly with urinary incontinence, recurrent urinary tract infections, and dyspareunia but can present in a multitude of ways. Treatment is generally by vaginal surgical excision with a three-layered closure that may or may not include Martius labial fat pad interposition.^[1,2]

New onset stress urinary incontinence (SUI) is the most common significant considerable long-term complication of excision of urethral diverticulum and has been reported in 8%–65%.^[3-7] Postexcision SUI may settle with pelvic floor muscle training but requires secondary surgical treatment in 4%–10% of cases. An increased risk of new onset urodynamic stress urinary incontinence (USUI) has been associated with excision of a proximal diverticulum and/or of a large size (>3 cm) diverticulum.^[3-7]

Recently, the transverse pelvic magnetic resonance imaging (MRI) configuration has been shown to predict recurrence of diverticulum – with circumferential being most likely to recur and simple least likely.^[8] We have assessed whether the incidence of new onset USUI postexcision of urethral diverticulum is correlated with preoperative MRI diverticulum configuration.

PATIENTS AND METHODS

A prospectively acquired database of all female urethral diverticulum surgery performed under the care of a single surgeon between May 1, 2007, and December 1, 2011, was retrospectively reviewed. All patients had preoperative T2-weighted fine slice postvoid pelvic MRI and videourodynamics. All patients complaining of persistent or new onset urinary incontinence at their 3-month postsurgery review had repeat videourodynamics. The incidence of new onset USUI has been correlated with the preoperative MRI appearance of the urethral diverticulum.

All 33 patients (mean age 42) having urethral diverticulum with Martius fat pad interposition had prospective data tabulated on demographics, preoperative MRI appearance, and pre- and post-operative videocystometrogram. All patients had follow-up at 3, 12, and 24 months postsurgery. After this, if asymptomatic (20/23), they were discharged from follow-up.

Statistical analysis was performed by Chi-squared and Fisher's exact tests, with $P < 0.05$ considered significant.

RESULTS

Of the 33 patients, 10 (30%) had preoperative USUI and have been excluded from this study. The mean age of the remaining 23 patients was 41 years (range 28–56). Mean duration of follow-up was 26 months (range 24–40). There were no losses to follow-up as patients failing to attend their 24-month review were telephoned for assessment.

Other preoperative urodynamic findings included IDO in ten (30%) and BOO in five (16%). One patient with preexisting IDO and persistent frequency and urgency postexcision of urethral diverticulum declined further urodynamic investigation and treatment at 30-month follow-up and was discharged. Postsurgery MRI had shown no evidence of diverticulum recurrence.

Two (10%) of the patients had a simple diverticulum, 16 (73%) had a horseshoe diverticulum, and 5 (17%) had a circumferential diverticulum. The rate of new onset USUI was 0% for simple, 6% for saddle, and 20% for circumferential [Table 1].

There was a tendency for increased risk of SUI with increasing complexity of urethral diverticulum postsurgery, but this did not reach statistical significance.

DISCUSSION

SUI preexisted in 30% of women with urethral diverticulum in this series. Rates of preexisting SUI of 27%–49% have been documented in other series.^[9,10] This may be related to coexisting SUI in the mainly postpartum women developing urethral diverticulum or be consequent to an adverse effect of the site or size of the urethral diverticulum on the function of the urethral sphincter.^[11]

New onset USUI has been documented in up to 49% of women following excision of urethral diverticulum and the 9% rate of new onset SUI reported in this series is, therefore, at the lower end of those reported.^[11] This may be due to patient selection – although all patients referred with a urethral diverticulum were offered surgery. It may also be consequent to the diverticula characteristics – although the majority (21) would

Table 1: Magnetic resonance imaging configuration and new onset stress urinary incontinence

MRI configuration	New onset SUI	No new onset SUI	Total
Simple	0	2	2
Horseshoe	1	15	16
Circumferential	1	4	5
Total	2	21	23

MRI: Magnetic resonance imaging, SUI: Stress urinary incontinence

be classified as complex according to the definition of >3 cm, loculated, and/or horseshoe or circumferential diverticulum on MRI. This is a far higher proportion of complex diverticulum than noted in other series and would consequently be expected to yield a higher rate of new onset SUI.^[7] It may be that the use of a Martius fat pad interposition is protective for the development of new onset SUI by way of improved vascularity and healing or possibly by way of acting as a natural tissue sling.

To our knowledge, this is the first series specifically correlating MRI appearance with rate of new onset SUI in a prospectively studied group. The incidence of new onset SUI following excision of urethral diverticulum appears to rise with increasing complexity of the diverticulum from 0% for simple to 20% for circumferential. This relationship did not reach statistical significance most likely due to the small numbers in each group – it does, however, make sense that a larger more complex specially and most likely longer standing diverticulum would cause more sphincter-related problems following excision. Han *et al.* have shown that the more complex the diverticulum is on MRI, the higher the likelihood of both asymptomatic and symptomatic recurrence.^[8]

CONCLUSION

New onset USUI occurs in 9% of patients having excision of urethral diverticulum with Martius fat pad interposition. The incidence appears to increase with increasing complexity of urethral diverticulum on preoperative MRI – rising from 0% following simple urethral diverticulum excision to 20% following circumferential diverticulum excision.

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Conflicts of interest

There are no conflicts of interest.

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