Female Urethral Diverticula in the Contemporary Era: Is the Classic Triad of the "3Ds" Still Relevant?

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OBJECTIVE To evaluate the correlation between signs and symptoms of urethral diverticulum (UD), especially the classic triad of 3Ds including dysuria, dyspareunia, and postvoid dribbling, before and after transvaginal urethral diverticulectomy, in relation to anatomic configuration on imaging.

MATERIALS AND METHODS After IRB approval, records of 54 females who underwent transvaginal urethral diverticulectomy were retrospectively reviewed. Urinary symptoms before and after the procedure were correlated with the anatomical configuration of the UD on magnetic resonance imaging.

RESULTS The median age of the patients was 52 years (range 29-77). Common presenting symptoms were stress urinary incontinence (60%), dyspareunia (60%), and recurrent urinary tract infections (70%). The classic 3Ds were present collectively in only 5% of patients. Dyspareunia was the most common of the 3 "Ds." Twenty-seven percent of patients had none of the classic 3Ds. On physical examination, the most common finding was a tender anterior vaginal wall mass (52%). Presenting signs and symptoms did not correlate with anatomic configuration in terms of radial urethral involvement, size, or length of urethral involvement on preoperative magnetic resonance imaging. After median 14 months of follow-up, no patient reported the classic 3Ds after surgery.

CONCLUSION Recurrent urinary tract infections, stress urinary incontinence, dyspareunia, and vaginal mass are the most common presentations of UD. The classic triad "3Ds" is rarely seen in the individual patient. Preoperative anatomic configuration on imaging is not correlated with the severity or nature of presenting symptoms. UROLOGY 94: 53–56, 2016. © 2016 Elsevier Inc.

Urethral diverticulum (UD) is a relatively rare condition and the diagnosis requires a high index of suspicion especially in females with atypical voiding symptomatology. Prevalence of UD has been estimated to be as high as 1%-6% in the general population and 1.4% in women with urinary incontinence.[1] Historically, UD was considered to be a difficult diagnosis due to the array of nonspecific symptoms associated with the condition. Indeed, even in the contemporary era, patients may have symptoms for many years and see many physicians prior to a definitive diagnosis. In a series of 46 consecutive patients with UD, women consulted with an average of 9 physicians prior to a definitive diagnosis despite the fact that 52% of them had a palpable mass on examination.[2]

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UD is often highly symptomatic. Historically, the classic presentation of UD has been described as the "3Ds" (dysuria, postvoid dribbling, and dyspareunia). However, a vast array of nonspecific symptoms usually accompanies the diagnosis including irritative and obstructive lower urinary tract symptoms. Signs may include recurrent urinary tract infections (UTI), vaginal mass, and/or urethral discharge upon stripping of the anterior vaginal wall. Upwards of 20% of patients with a UD are completely asymptomatic and the UD is found incidentally on physical examination or on radiographic imaging for an unrelated indication.[3] Incontinence is a common presentation, which may be due to concomitant stress urinary incontinence secondary to intrinsic sphincteric deficiency, or paradoxical incontinence due to loss of urine associated with intermittent drainage of the diverticulum (postvoid dribbling). The location and competence of urethral sphincter have important implications when considering surgical repair of UD due to close anatomic overlap.[3]

The anatomical configuration and size of UD on presentation are widely variable. These lesions may be simple, saddlebag, or circumferential; small or quite large in

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diameter; or extend over a considerable length of the urethra. Preoperative knowledge of the anatomy and configuration of UD are important in operative approach and reconstruction. To our knowledge, it is unknown whether presenting symptoms and signs correlate with anatomic configuration of UD.

The objective of the current report is to compile the presentations of patients with UD in the contemporary era of modern imaging, with attention to the classic presentation of the "3Ds," and assess whether such presentations correlate with presenting anatomy or outcomes.

MATERIALS AND METHODS

This is a retrospective chart review using an Institutional Review Board-approved database maintained at our institution. Records from all adult females who underwent transvaginal urethral diverticulectomy with or without any other concomitant procedures from 2004 to 2015 were obtained and retrospectively reviewed. Two senior surgeons performed all operations. Preoperative evaluation included history, symptom assessment with standardized questionnaire, physical examination, voiding diary and urine culture, as well as cystoscopy, urodynamic study when indicated, and imaging (ie, voiding cystourethrogram [VCUG] and/or magnetic resonance imaging [MRI]) to confirm the diagnosis. Urinary symptoms were assessed pre- and postoperatively by the attending physician using a combination of a thorough history and a validated questionnaire (Incontinence Symptoms Severity Index). Stress urinary incontinence was defined as any visible urethral leakage of urine with increased abdominal pressure during physical examination or urodynamic studies.

Demographics, intraoperative findings, complications, and follow-up information were reviewed and descriptively analyzed. Emphasis was placed on preoperative clinical presentation, particularly concomitant presence of dysuria, dyspareunia and post-void dribbling as the "3D's".

All patients underwent preoperative MRI; however, unfortunately some of these studies were not entered digitally into our radiological database, and therefore were not available for analysis. Imaging findings on MRI were used to classify UD radial involvement of the urethra as either simple (<25% involvement of the circumference of the urethra), saddlebag (>25% but less than 75% of the circumference of the urethra), or circumferential (>75% of the circumference of the urethra). One objective of the study was to evaluate the correlation between preoperative UD characteristics on MRI (size, location, and radial involvement of urethra) and presenting symptoms and signs. The second objective was to evaluate the correlation between UD characteristics on preoperative MRI and radiographic success after diverticulectomy defined as no extravasation of contrast on first postopertive VCUG. All patients underwent postoperative VCUG with pericatheter void prior to Foley removal to assess for fistula or persistent diverticula at 2-3 weeks postoperatively. Postoperative MRI was obtained only in patients with symptoms, signs, or physical examination findings suggestive of a recurrent UD.

Continuous and categorical variables were compared using Student *t* test and chi-square test, respectively. Pearson correlation coefficient was used to investigate the presence of any statistical correlation among the variables. Statistical analysis was performed using the statistical package SPSS (version 21, IBM Corp.), and $P < .05$ was considered statistically significant.

RESULTS

From 2004 to 2015, a total of 54 patients underwent transvaginal urethral diverticulectomy with or without other concomitant procedures. The mean age of the patients was 52 years (range 29 to 77), and 54% of patients were African American and 46% were Caucasian. Subjective symptoms were present for an average of 11.5 (1-60) months prior to referral to our center.

The most common presenting symptoms were stress urinary incontinence (60%), dyspareunia (60%), vaginal mass (60%), urinary urgency (50%), dysuria (39%), and postvoid dribbling (9%). Recurrent UTI, defined as more than 2 cultures positive for a uropathogen in 1 year, was noted in 70%. The classic triad was present in only 3 (5%) patients. The combination of dysuria and dyspareunia was found in 16 (29%), dysuria and postvoid dribbling in 3 (5%), and dyspareunia and postvoid dribbling in 5 (9%). Fifteen (27%) patients had none of the classic "3Ds" at initial presentation. On physical examination, the most common findings were a palpable mass (60%), tender anterior vaginal wall (52%), and urethral discharge upon stripping of the anterior vaginal wall (31%). Seven percent of patients were incidentally diagnosed during physical examination or on radiographic imaging. All diverticula were confirmed on final pathology after diverticulectomy (Table 1).

Presenting signs and symptoms were correlated with MRI findings, which were available for review in 45 patients. UD was located in the proximal urethra in 32%, midurethra in 50%, and distal urethra in 10%. Three (8%) patients had panurethral involvement. Median (range) size of the UD on largest dimension was 2.5 cm (0.5-6.7 cm). UD configuration was noted to be simple in 30%, saddle bag in 45%, and circumferential in 25% of patients. There was no significant correlation between UD characteristics on MRI (size, location, or radial urethral involvement) and

Table 1. Presenting signs and symptoms of female urethral diverticula

Presenting Signs/Symptoms	No.	%
UTI	38	70
Stress urinary incontinence	35	60
Dyspareunia	33	60
Vaginal mass	33	60
Vaginal wall tenderness	28	52
Urgency	26	50
Frequency	22	41
Dysuria	21	39
Expression of pus/urine	17	31
Postvoid dribbling	5	9
Retention	4	7
Asymptomatic	4	7
Classic 3Ds	3	5
Dysuria + Dyspareunia	16	29
Dysuria + Dribbling	3	5
Dyspareunia + Dribbling	5	9
None of 3Ds	15	27

UTI, urinary tract infection.