

MR Evaluation of the Female Urethra: Is There a Role for Dynamic Imaging?

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Introduction: MRI is an important diagnostic tool in the evaluation of patients with urinary symptoms and suspected urethral abnormality [1,2]. Dynamic imaging can be combined with static images to evaluate for associated pelvic organ prolapse which may contribute to patient symptoms and impact management. The purpose of this study is to determine the additive value of dynamic imaging in the MR evaluation of the female urethra.

Materials and Methods: A search of the MRI database at our hospital from 3/16/01 to 10/10/05 identified 99 women (mean 43 years) referred for MRI of the urethra in whom a dynamic sequence was also performed. Indications for the MR exams included: suspected urethral diverticulum n=50, recurrent urinary tract infection n=16, urinary symptoms including pain/ frequency n=27, other suspected periurethral mass n=4, and incontinence n=2. All patients were imaged using a 1.5 T magnet (Siemens Medical) and a torso phased array coil. Sequences included sagittal and axial T2 Turbo Spin Echo (TSE) with the following parameters: TR=7240, TE= 107, FA 180°, FOV 200 mm, matrix 512, ST= 4 mm and a sagittal dynamic True Fisp (Fast Imaging with Steady State Precession) alternating between rest and strain with the following parameters: TR= 3.9 ms TE=1.9 ms; FA= 70°; FOV=300-350 mm, matrix=256, single slice ST=8 mm with 90 consecutive measures. Images were reviewed retrospectively on a PACS system by two experienced radiologists in random order and in consensus. Urethral pathology was recorded. The presence and degree of pelvic organ prolapse at rest and with strain was determined. Prolapse was diagnosed when the pelvic organs descended below the pubococcygeal line (PCL) which was used as a reference standard. Prolapse was graded as mild (descent < 2 cm), moderate (between 2 to 4 cm) and severe (> 4 cm). Hypermobility of the urethra was defined as horizontal orientation of the urethra with strain (mild <45° and severe > 45°). Rectocele was defined as anterior bulging of the rectum of at least 2 cm.

Results: Urethral MRI findings were as follows: urethral diverticulum, n=5, Skene's gland abscess, n=5, diverticulum and Skene's gland abscess, n=1, other periurethral mass, n= 1. In 5 patients, there was evidence of pelvic organ prolapse at rest. However, in 33 patients (33.3%), prolapse was identified on the dynamic sequence (Table 1). Findings of prolapse included: cystocele, n= 24, urethrocele, n=28, vaginal vault prolapse, n=24, uterine prolapse, n=2, rectal descent, n=26, rectocele, n= 13. Hypermobility of the urethra was present in 24 patients. In 27 patients with demonstrated prolapse (72.4%), no urethral abnormality was found (Fig. 1). In 6 of the 12 patients with urethral abnormality (50%), prolapse was also demonstrated.

Conclusion:

In patients with urethral symptoms, dynamic imaging may demonstrate unsuspected pelvic organ prolapse involving all three compartments. Our data show that the addition of a dynamic sequence to the MR evaluation of patients with urethral symptoms is of added diagnostic value.

Table 1	All pts with prolapse	Abnormal urethra/ prolapse	Diverticulum/ prolapse	Skene's gland abscess/prolapse
All pts (N=99)	33 (33.3%)	6 (6.1%)	3 (3.0%)	3 (3.0%)
Cystocele	24 (24.2%)	3 (3.0%)	1 (1.0%)	2 (2.0%)
Urethrocele	28 (28.3%)	4 (4.0%)	1 (1.0%)	3 (3.0%)
Urethral Hypermobility	24 (24.2%)	3 (3.0%)	1 (1.0%)	2 (2.0%)
Vaginal prolapse	24 (24.2%)	4 (4.0%)	1 (1.0%)	3 (3.0%)
Uterine prolapse	2 (2.0%)	1 (1.0%)	1 (1.0%)	1 (1.0%)
Rectal descent	26 (26.3%)	4 (4.0%)	1 (1.0%)	3 (3.0%)
Rectocele	13 (13.1%)	3 (3.0%)	2 (2.0%)	1 (1.0%)

References:

1. Hricak, H et al. AJR 1993; 16: 809 –815.
2. Hahn, WY et al. AJR 2004; 182 (3): 677-82.

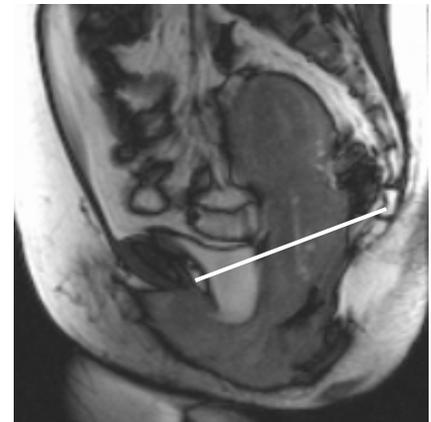


Figure 1: With strain, unsuspected 3 compartment prolapse was identified in a patient without intrinsic urethral pathology.