IMAGING

The urethra and its supporting structures in women with stress urinary incontinence: MR imaging using an endovaginal coil

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Purpose: The objective of this study was to evaluate the urethra and its supporting structures in patients with stress urinary incontinence using MR imaging with an endovaginal coil.

Materials and Methods: We reviewed MR images obtained using an endovaginal coil in 63 patients with stress urinary incontinence and in 16 continent women. We compared the two groups for the thickness of the striated muscle, smooth muscle, and mucosa–submucosa of the urethra; degree of asymmetry of the puborectalis muscle; frequency of distortion in the periurethral, paraurethral, and pubourethral ligaments; degree of the vesicourethral angle; and dimension of the retropubic space. Using the status of the urethra and its supporting structures as our basis, we scored the risk of stress urinary incontinence for each woman on a scale of 0–5.

Results: The striated muscle layer of the urethra was thinner in the group with stress urinary incontinence (mean ± SD, 1.9 ± 0.5 mm) than that in the continent group (2.6 ± 0.4 mm) ($p < 0.001$). A high degree of asymmetry of puborectalis muscle (> 1.5) was more frequent in the group with stress urinary incontinence (29%) than in the continent group (0%) ($p = 0.015$). Supporting ligaments were more frequently distorted in the incontinent group than in the continent group. Distorted periurethral ligaments were found in 56% of the patients with stress urinary incontinence versus 13% of the women who were continent; distorted paraurethral ligaments were found in 83% of the patients with stress urinary incontinence versus 19% of the women who were continent; and distorted pubourethral ligaments were found in 54% of the patients with stress urinary incontinence versus 19% of the women who were continent ($p < 0.05$). The group with stress urinary incontinence had a greater vesicourethral angle (148° vs. 125°) and larger retropubic space (7.5 vs. 5.1 mm) than did the women who were continent ($p < 0.05$). The score for the risk of stress urinary incontinence was higher in the group with stress urinary incontinence (3.3 ± 1.4) than in the women who were continent (1.0 ± 1.2) ($p < 0.001$).

Conclusions: MR imaging with an endovaginal coil revealed significant morphologic alterations of the urethra and supporting structures in patients with stress urinary incontinence.

Editorial Comment

Recently several studies using different approaches has been shown that magnetic resonance imaging (MRI) may be a useful tool for the diagnosis of the problems of the female pelvic floor. Today's use of MRI of the pelvic floor includes both anatomical/topographical images of high quality and functional imaging. Functional MRI when done preferentially in open MRI systems seems promising because allows a potential of simultaneously examining, micturition, bladder motion and pelvic floor muscles. The problem is that the quality of images obtained with open MRI equipments is not comparable with the high resolution images of the closed MRI systems with 1.5 Tesla. The main purpose of this excellent study is to demonstrate superb high resolution images of urethra and its supporting structures obtained with an endovaginal coil .These examinations were performed in normal women and in patients with stress urinary incontinence. It is clear that direct visualization of the morphology of theses structures is important in deciding treatment options. Although a more detailed depiction of minute structures was obtained with this special endovaginal coil, In our opinion diagnostic, high resolution images obtained with the regular pelvic phased array coils are sufficient for the adequate evaluation of these abnormalities. As with others closed-magnet-systems the main limitation of this study very well pointed out by the authors are that these patients underwent pelvic floor examination only in supine position. Some dynamic changes of the urethra and vesicourethral angle as well some bladder descents can be missed unless the patients are examined in sitting position and during micturition and bladder motion.

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Incidence of malignancy in complex cystic renal masses (Bosniak category III): should imaging-guided biopsy precede surgery?

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Purpose: Complex indeterminate renal cystic masses (Bosniak type III) can have benign and malignant causes and have been traditionally considered surgical lesions. We sought to determine the incidence of malignancy and to assess a possible role for imaging-guided biopsy for this category of renal masses.

Materials and Methods: Three hundred ninety-seven renal biopsies were performed at our institution between 1991 and 2000. Between January 1997 and August 2000, 28 Bosniak category III lesions, based on established CT imaging criteria on helical CT scans, were identified for analysis. The incidence of malignancy, based on surgical pathology or imaging follow-up and percentage of lesions proceeding to surgery, among these 28 lesions, was determined. The surgical results were correlated with the biopsy findings.

Results: Of the 28 biopsied category III lesions, 17 (60.7%) were malignant (16 renal cell carcinomas and one lymphoma), and 11 (39.3%) were benign (six hemorrhagic cysts, three inflammatory cysts, one metanephric adenoma, and one cystic oncocytoma). Seventeen of the 28 lesions (16 renal cell carcinomas and one inflammatory cyst) had surgical resection after the biopsy. All resected lesions had pathologic diagnoses

identical to the percutaneous imaging-guided biopsy results. The remaining 11 patients who had undergone nonsurgical biopsies had radiologic follow-up for a minimum of 1 year, with benign lesions showing no interval change.

Conclusions: Renal biopsy and radiologic follow-up were useful in identifying nonmalignant lesions in complex cystic renal masses and avoided unnecessary surgery in 39% of patients.

Editorial Comment

Bosniak category III cystic masses are lesions which presents suggestive but not definitive signs of malignancy. For this reason they are designated as renal mass of indeterminate origin. The typical category III cystic mass shows thickened and irregular calcifications, uniform wall thickening, and thickened and irregular or multiple septa (>1 mm). It is well known that there is too much interobserver variability to distinguishing Bosniak II from Bosniak III cystic masses. Complementary evaluation with magnetic resonance imaging may be useful in some of these cases. Because there is 50-60% of chance of malignancy , the recommended treatment for Bosniak category III lesions is surgical resection(tumor enucleation, partial or total nephrectomy). Although imaging guided renal biopsy was performed for a different purpose (previous diagnosis for RF ablation), this study is useful to emphasize that if a percutaneous biopsy of a complex renal cyst should be done, it should be guided by CT and a 18 gauge needle should be used in order to obtain sufficient number of good quality cores. Fine-needle aspiration biopsy for cytology has too many false negative results. Some points are important when we are dealing with the management of a Bosniak category III renal cystic mass. First the patient's clinical factors such as age and the presence or not of intercurrent illness can interfere in the choice of the treatment modality. Second, if surgery should be done, whenever is possible a conservative procedure should be performed. Third, close follow-up or percutaneous CT-guided biopsy are both valid procedures and should be used accordingly.

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