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Title: VISUALISATION OF THE PROLENE TAPE AND ITS TOPOGRAPHY (FOLLOWING TVT PLASTY) BY INTROITAL ULTRASOUND AND MR IMAGING

Aims of Study:

The success rate of TVT plasty (according to Ulmsten) in treating stress urinary incontinence is consistently reported to be 86% on average (1,2) whereas the rate of postoperative complications varies. New-onset urge symptoms, for instance, occur in 0 – 20.6% of cases (average 5.1%; 2). The causes of new-onset urge symptoms are often difficult to identify by clinical examination and urodynamic testing. A possible cause of this kind of complication is the displacement of the prolene tape towards the urethra or bladder (dislocation, position at the level of the bladder neck, contact with the lateral bladder wall as examples). The study presented here was performed to determine which imaging modality allows for visualizing the prolene tape and its topography.

Methods:

Twenty women (age: 53.5, range 42 – 75 years) with clinically and urodynamically proven stress urinary incontinence without prolapse and without prior urogynecologic surgery underwent TVT plasty. They were examined by introital ultrasound and MR imaging before surgery and 9 – 17 months (mean 13 months) postoperatively. The postoperative examinations were performed to assess the prolene tape suburethraly, retropubically, and in the abdominal wall. The following parameters were assessed: suburethral tape position (level of the distal, middle, and proximal urethra), suburethral tape width, retropubic tape integration into the periosteum or retropubic space or in contact with the bladder wall, and tape localization in the abdominal wall. *Introital ultrasound* by vaginal sector scanner, 5 MHz, sagittal planes of section sub- and paraurethraly. Experimentally, the tape is depicted as a hypoechoic structure with a width of 11 mm and its meshwork texture just barely visible. *MR imaging* (1.5 T) with proton-weighted sequences (TR/TE 2200/15), slice thickness 4 mm, field of view 200 x 200; transverse, coronal, and sagittal images of the pelvis to evaluate tape position; TIRM sequence (TR/TE 4000/30) in transverse orientation to evaluate tissue reactions around the tape. Experimentally, the tape is visualized as a 10-mm-wide structure of low signal intensity.

Results:

Introital ultrasound: The tape was clearly seen suburethraly in 20/20 women (at the level of the middle and distal urethra in 16/20 and 4/20 women, respectively). In this position, the tape was stretched along its width in 6/20 women or showed convexity towards the urethra, which was slight in 6/20 women and pronounced with the edges curled in 8/20 women. The mean suburethral tape width was 8.3 mm (range 5 – 11 mm). Ultrasound failed to depict the tape retropubically and in the abdominal wall. *MR imaging:* The suburethral part of the prolene tape was depicted reliably in only 15/20 women. The difficulties in delineating the tape precluded measurement of its width and determination of its position relative to the urethra (distal, middle, proximal; in sagittal and transverse planes). Retropubically, the tape was visualized in 20/20 women (at the level of the periosteum in 10/20 women on the right and in 12/20 women on the left; in the retropubic space in 8/20 women on the right, in 7/20 women on the left; in the area of the bladder wall in 2/20 women on the right, in 1/20 woman on the left; in coronal and transverse planes). In 20/20 women the tape was seen in the abdominal wall (sagittal, coronal, and transverse planes). No abnormal tissue reactions (excessive fibrosis, inflammation) were seen along the course of the tape. *Introital ultrasound / MR imaging:* In those cases where ultrasound showed the suburethral part of the tape to be

stretched, its retropubic part had grown into the periosteum. When the suburethral part showed curling, its retropubic portion was visualized in the retropubic space or even in the area of the bladder wall.

Conclusions:

Introital ultrasound sensitively depicts the suburethral tape position while MR imaging sensitively demonstrates the tape in the retropubic area and abdominal wall.

Comments: Patients who develop postoperative complications after TVT plasty such as new-onset urge symptoms or disturbed micturition should undergo not only urodynamic testing and clinical examination but also imaging to determine the position of the tape. Ongoing studies using the imaging modalities presented here aim at determining whether a tape too suburethral or proximal in position or too paravesicular near the bladder wall is the cause of new-onset urge symptoms. Another question to be answered is whether a suburethral tape position too proximal with compression of the urethra can lead to disturbed bladder voiding.

1. British J Obstet Gynaecol 1999;106:345-50
2. Clinical Obstet Gynecol 2000;43(3):670-5