

seen between cohorts receiving immediate versus deferred hormon-ablative therapy. These data support active therapy in patients with high-risk cancer.

Dr. Andreas Bohle
Professor of Urology
HELIOS Agnes Karll Hospital
Bad Schwartau, Germany
E-mail: boehle@urologie-bad-schwartau.de

NEUROUROLOGY & FEMALE UROLOGY

Correlation of morphological alterations and functional impairment of the tension-free vaginal tape obturator procedure

Yang JM, Yang SH, Huang WC

Division of Urogynecology, Department of Obstetrics and Gynecology, Mackay Memorial Hospital, Taipei, Taiwan, Republic of China

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Purpose: We explored the morphological features associated with functional impairment in patients undergoing the tension-free vaginal tape obturator procedure. **Materials and Methods:** We retrospectively reviewed the records of 98 women who underwent the tension-free vaginal tape obturator procedure alone or with concomitant pelvic surgery. Postoperative assessment included a symptom questionnaire, ultrasound cystourethrography and a cough stress test. During followup the measures of postoperative functional impairment included a positive cough stress test, new onset voiding dysfunction and the worsening or progression of urge symptoms.

Results: Median follow-up was 22 months. During follow-up 11 women had a positive cough stress test, 22 had voiding dysfunction and 12 had worsening or new onset urge symptoms. Failure was associated with 4 variables on multiple logistic regression analysis, including absent urethral encroachment at rest (OR 16.63, 95% CI 1.87-147.85, $p = 0.01$), bladder neck funneling (OR 8.27, 95% CI 1.99-34.26, $p < 0.01$), a urethral location of less than the 50th percentile (OR 6.01, 95% CI 1.43-25.25, $p = 0.01$) and a resting tape angle of less than 165 degrees (OR 5.21, 95% CI 1.15-23.54, $p = 0.03$). A resting tape distance of less than 12.0 mm (OR 3.00, 95% CI 1.44-6.26, $p < 0.01$) and urethral encroachment at rest (OR 2.86, 95% CI 1.30-6.30, $p < 0.01$) were the variables predictive of postoperative voiding dysfunction. Bladder neck funneling was the only risk factor for postoperative urge symptoms ($p < 0.01$).

Conclusions: The tension-free vaginal tape obturator procedure achieves its effectiveness in a process of biological reaction and mechanical interaction between the tape and urethra. When this mechanical interaction is too great or too little, there is functional impairment after the procedure.

Editorial Comment

The authors describe their experience and findings when examining a patient population who has undergone a transobturator tape procedure. Postoperative follow-up included questionnaire analysis, physical examination and ultrasound cystourethrography. The surgeons used transvaginal ultrasound at the time of surgery to assure that there was not indentation of the urethra on initial placement. Postoperatively, their success rate for stress urinary incontinence was approximately 90% with approximately 75% having resolved their urinary urge incontinence with a 3% de novo development of urinary urge incontinence. They found that urethral encroachment at rest and a distance between the tape and the symphysis pubis of < 12 mm were associated with obstructive voiding symptoms in their patient population.

The authors publish an excellent manuscript describing their observations of the dynamic forces and reaction of the transobturator suburethral tape during Valhalla maneuvers. They further break down the movement of the tape and its' effect on the urethra into 5 types. That they were able to identify urethral encroachment while the tape at rest as being significantly associated with obstructive voiding phenomenon definitely lends support to the consideration of using transvaginal ultrasound when evaluating for post-procedure urinary obstruction. We currently utilize fluorourodynamics as well temporal association of symptoms to diagnose postoperative urethral obstruction but will consider strongly the incorporation of transvaginal ultrasound in an effort to assist in this sometimes challenging patient population.

Dr. Steven P. Petrou

Associate Professor of Urology

Chief of Surgery, St. Luke's Hospital

Associate Dean, Mayo School of Graduate Medical Education

Jacksonville, Florida, USA

E-mail: petrou.steven@mayo.edu

Pubo-urethral ligament injury causes long-term stress urinary incontinence in female rats: an animal model of the integral theory

Kefer JC, Liu G, Daneshgari F

Glickman Urological Institute, Lerner Research Institute, Cleveland Clinic, Cleveland, Ohio, USA

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Purpose: We examined the long-term effects of pubo-urethral ligament deficiency as a potential model of stress urinary incontinence compared to an established model of stress urinary incontinence.

Materials and Methods: A total of 21 female Sprague-Dawley rats were randomly assigned to 1 of 3 groups, including pubo-urethral ligament transection, sham pubo-urethral ligament transection and bilateral pudendal nerve transection. Leak point pressure was measured 28 days later via an implanted suprapubic catheter. After leak point pressure measurement all animals were sacrificed. The pubic arch and pelvic organs were harvested for histological examination. The Wilcoxon rank sum test was used to evaluate differences in leak point pressure among the experimental groups. **Results:** At 28 days after pubo-urethral ligament transection mean +/- SD leak point pressure was significantly decreased when comparing pubo-urethral ligament transection and pudendal nerve transection to sham treatment (15.75 +/- 6.46 and 15.10 +/- 4.98 cm H₂O, respectively, vs. 42.56 +/- 11.58, $p < 0.001$). No difference was noted when comparing pubo-urethral ligament transection to pudendal nerve transection ($p = 0.76$), indicating the long-term durability of pubo-urethral ligament transection on inducing stress urinary incontinence in the female rat. Histological examination of en bloc suprapubic areas demonstrated an absent pubo-urethral ligament in the pubo-urethral ligament transection group, and an intact pubo-urethral ligament in the sham treated and pudendal nerve transection groups.

Conclusions: Our results show that pubo-urethral ligament deficiency in the female rat induces long-term stress urinary incontinence that is comparable to that in the established stress urinary incontinence model via pudendal nerve transection. Our novel rat model could be used to investigate mechanisms of stress urinary incontinence in females, including the role of urethral hypermobility and potential therapeutic interventions for stress urinary incontinence.

Editorial Comment

An interesting look into the development of a laboratory model to analyze and evaluate stress urinary incontinence. The authors noted that pubo-urethral ligament transection was very similar to pudendal nerve

transection in Sprague-Dawley rats in developing a model for stress urinary incontinence in the female rat. It is pointed out in the discussion that developing a model of stress urinary incontinence that avoids the use of pudendal nerve injury may help analyze nulliparous women who suffer with stress urinary incontinence. Much appreciation should go to the researchers in our field who help develop the models upon which to expand our ability to treat affected patients. Of note is that the support of structures of the female urethra including the pubo-urethral ligament had been reviewed in this journal in the past with some anatomic researchers noting that the pubo-urethral ligament may not be a ligament but instead mostly tissue containing smooth muscle cells (1). This is food for thought especially when quoting continence rates after suprimeatal transvaginal urethrolisis which takes down the attachments of the urethra to the underside of the pubic bone (2). In a contrary view, this may also explain the rate of incontinence that is noted in patients after therapeutic pubectomy (3).

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Dr. Steven P. Petrou

Associate Professor of Urology

Chief of Surgery, St. Luke's Hospital

Associate Dean, Mayo School of Graduate Medical Education

Jacksonville, Florida, USA

E-mail: petrou.steven@mayo.edu

PEDIATRIC UROLOGY

Long-term follow up of enteric bladder augmentations: the risk for malignancy

Husmann DA, Rathbun SR

Department of Urology, Mayo Clinic, Rochester MN 55905, USA

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Objective: To determine the risk of bladder cancer following enteric bladder augmentation.

Materials and Methods: Patients followed for care after an enteric bladder augmentation have been entered into a registry; individuals followed for a minimum of 10 years were evaluated.

Results: The study criteria were met by 153 patients. Indications for bladder augmentation were neurogenic bladder in 97, exstrophy in 38 and posterior urethral valves in 18. There was a median follow-up interval of 27 years (range 10-53). A total of seven cases of malignancy developed. Median time to tumor development following augmentation was 32 years (range 22-52). Two patients with neurogenic bladder developed transitional cell carcinoma; both were heavy smokers (> 50 pack per year history). Two patients with a history of posterior urethral valves and renal transplantation developed adenocarcinoma of the enteric augment. Three patients with bladder exstrophy developed multifocal adenocarcinoma of the augmented bladder. Two patients remain alive, 5 and 6 years following radical cystoprostatectomy; five died of cancer-specific causes.

Conclusions: Malignancy following enteric bladder augmentation arose in 4.5% (7/153) of our patients and was associated with coexisting carcinogenic stimuli (prolonged tobacco/chronic immunosuppressive exposure), or alternatively with the inherent risk of malignancy existing with bladder exstrophy.