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CHANGES OF URODYNAMIC FINDINGS AND LOWER URINARY TRACT SYMPTOMS AFTER RADICAL PROSTATECTOMY

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Introduction & Objectives: Lower urinary tract (LUT) symptoms including urinary incontinence and quality of life (QOL) have been considered more important recently, because radical prostatectomy (RP) has been established as a safe and effective treatment for localized prostate cancer. In the present study, we attempted to elucidate changes of urodynamic parameters and LUT symptoms in men followed for 1 year after RP compared to the preoperative situation.

Material & Methods: Fifty-eight patients, who undertook RP (laparoscopic: 35, retro pubic: 23, were enrolled in the present study. No patients complained urinary incontinence preoperatively. Two patients (4%) were excluded from the present study because of transurethral incision of the urethral stricture during follow-up. Urodynamics and questionnaire according to LUT symptoms and urinary continence were conducted at pre-RP and at 3, 6 and 12 months (M) after RP.

Results: Uroflowmetry at 6-12M after RP showed that maximum flow rate (Qmax) was significantly increased (17.1±6.9→20.8±10.2 ml/s, $p<0.05$) and residual urine volume was significantly decreased (63.2±100.5→14.5±21.8 ml, $p<0.01$) compared to pre-RP. Pressure flow study, which was performed in 33 patients at both pre-RP and 12M after RP, revealed that Qmax was significantly increased (11.8±5.3→17.1±7.6 ml/s, $p<0.01$) and detrusor pressure at Qmax was significantly decreased (46.0±14.8→31.5±16.9 cmH2O, $p<0.01$) at 12M after RP compared to pre-RP, while RP did not affect bladder capacity, bladder compliance, or detrusor contractility. Although detrusor over activity (DO) was seen in 2 patients (6%) preoperatively, DO disappeared in 1 (3%) and de novo DO appeared in 3 (9%) after RP. Continence rates (frequency: ≤2, amount: ≤2, impact: ≤3) in International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) were gradually increased during follow-ups, which was 69% in frequency, 94% in amount and 81% in impact at 12M after RP. While LUT symptoms in International Prostate Symptom Score (IPSS) at 3 (9.5±5.8), 6 (8.4±5.0) and 12M (7.2±4.6) after RP was not different from preoperative scores (8.5±6.9), QOL score in IPSS was significantly better at 6M (2.6±1.8, $P<0.05$) and 12M (2.4±1.7, $P<0.01$) after RP than at pre-PR (3.4±1.5).

Conclusions: The present study demonstrated that RP released bladder outlet obstruction without the effect of detrusor contractility, which improved urodynamic parameters. However, improvement of urodynamic parameters did not affect LUT symptoms in IPSS, but correlated QOL score. Urinary continence in ICIQ-SF was gradually improved to be satisfactory in more than 80% of patients at 12M after RP.

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TRANSURETHRAL ULTRASOUND GUIDED INJECTION OF AUTOLOGUS MYO- AND FIBROBLASTS IN INCONTINENT MEN: 2 YEAR DATA

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Introduction & Objectives: It was the aim to evaluate the two year data after transurethral ultrasound guided injections of autologous myo- and fibroblasts in treatment of incontinent men.

Material & Methods: Between April 2005 and December 2005, 65 incontinent men (mean age: 68.6 ± 6.4 years) were treated. All patients suffered from stress urinary incontinence after prostate surgery. Small skeletal muscle biopsies were taken from the upper arm under local anesthesia. The cells were then grown in a GMP-laboratory fulfilling strict clean room environment regulations. The fibroblasts were eventually mixed with a small amount of collagen as carrier material to prevent migration of the fibroblasts (about 2.5 ml). Using a transurethral ultrasound probe and a specially designed injection device, the fibroblasts were injected into the urethral sub mucosa to treat atrophies of the mucosa. The myoblasts were directly injected into the rhabdosphincter to reconstruct the muscle. Before and after therapy a defined incontinence score, changes in quality of life as well as morphology and function of urethra and rhabdosphincter were evaluated. Transurethral ultrasound was used to investigate and visualize the lower urinary tract. Furthermore, urodynamic and laboratory tests were performed pre- and postoperatively.

Results: All injections could be performed without problems. Mean number of pads used per day was 4.89 (SD: 3.2) before therapy, and after implantation of autologous cells mean number of pads used per day was 1.59 (SD: 1.68). 27.9% did not wear pads any more, 43.6% used one safety pad per day for special occasions, and 28.5% still had to use pads because of urinary incontinence. There were no severe side effects or complications, but in 2006 one perforation of the urinary bladder occurred in one patient who had undergone multiple operations and radiation therapy. Postoperatively, mean thickness of the urethra and the rhabdosphincter as well as mean contractility of the rhabdosphincter were significantly improved. There were no urodynamic signs of obstruction of the lower urinary tract.

Conclusions: The present data support the conclusion that this new therapeutic concept represents an effective and minimally invasive treatment modality to treat urinary incontinence.

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REPAIR OF IATROGENIC SPHINCTER DAMAGE AND URINARY INCONTINENCE BY AUTOLOGOUS SKELETAL MUSCLE DERIVED CELLS (MDC)

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Introduction & Objectives: Urinary incontinence by iatrogenic damage of the external sphincter is not curable conservatively. We showed initial results of successful repair of sphincter function by implantation of MDC. Here we present data with a minimum follow up of 12 months after implantation in a homogenous cohort of 43 patients.

Material & Methods: A tissue biopsy was obtained from the left deltoid muscle. Primary cell culture, expansion and processing of cells for transplantation were performed in the local tissue engineering centre according to § 20 German pharmaceutical law (AMG). We investigated MDC by immunocytochemistry for the expression of different markers involved in muscle cell development and differentiation . 49.5% (standard error of mean SEM 2.8) were positive for a-sarcomeric actin, 7.3% (SEM 1.8) for a-smooth muscle actin, and 32.7% (SEM 10.1) for desmin. Co-immunostaining demonstrated that 2.8% (SEM 0.5) of the MDC were positive for both a-sarcomeric actin and a-smooth muscle actin. The myogenic transcription factor MyoD1 was present in up to 9.1% while no CD34 positive cells were detected. Cells injected into the sphincter were 50% of myogenic origin. Transplantation was performed 61 days (range: 16-122) after biopsy.

Results: Forty three male patients (mean age:70 years, range:56-81) were enrolled in the study. The iatrogenic sphincter defect had caused refractory grade III incontinence for 48.6 months (range:12-192). Endoscopic transplantation of 5.18x106 cells (range: 0.21-19.17x106) was performed. After a minimum period of one year (range:12-60 months), 4 patients were completely continent and 19 patients registered an improvement from incontinence grade III to grade I. The improvement was observed after 4.7 months (range:2-9) and remained during the follow up. In 20 patients, no improvement was observed. Minor side effects (grade 1) were observed in 5/43 patients.

Conclusions: Transplantation of MDC is a safe and successful procedure for the treatment of refractory urinary incontinence grade III caused by iatrogenic sphincter damage.

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ADVANCE™ MALE SLING: ANATOMIC EVIDENCE OF RETROURETHRAL POSITION AFTER TENSIONING WITHOUT DIRECT URETHRAL COMPRESSION

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Introduction & Objectives: To describe the anatomical effects of a transobturator (TO) male sling and the resulting urethral response. The AdVance™ male sling (American Medical Systems, Minnetonka, MN) is initially positioned and fixed onto the proximal bulb and tensioned to reposition and support the dorsal membranous urethra.

Material & Methods: Anatomical observations were collected from 19 cadavers and 103 patients treated with male TO slings. 8 pre- and post-operative dynamic MRI examinations, 5 intraoperative transrectal ultrasound examinations, 24 intraoperative retrograde urethrographies and 76 intraoperative flexible and rigid cystoscopies were used to study the action of the sling and resulting effects on the form and position of the membranous urethra. A median low perineal incision is used, opening the bulbospongiosus muscle to allow detachment from the bulb mobilizing it off the perineal body. Helical introducer needles are passed outside-in through the obturator fossa to enter the perineal wound between bulb and corpus cavernosum. The point of passage through the obturator fossa is on its medial border, 1 cm inferior and lateral to the insertion of the adductor longus tendon. The sling is sutured to the proximal part of the urethral bulb. Finally, the sling is tensioned to move the proximal bulb 2-5 cm cephalad.

Results: The sling is positioned at the proximal bulb in close proximity to the perineal body and caudal to the lumen of the membranous urethra. When tensioned, the sling repositions and rotates the proximal bulb and retrourethral fascia proximally, parallel to the membranous urethra and anal canal. Circumferential coaptation of the membranous urethral lumen was observed immediately upon tensioning the sling. Cadaver dissections revealed that even with maximal sling tension, the urethral lumen is not compressed. The midportion of the sling moves from a vertical (at the bulb) to a horizontal position 5-10mm underneath the membranous urethra.

Conclusions: In contrast to a tension free female TO sling, the male TO sling is tensioned to augment the dorsal supporting structures of the membranous urethra parallel to the anal canal. Examination has shown an anatomic lengthening of the membranous urethra with the sling in its final retrourethral position. Postoperative pressure-flow studies demonstrated no obstruction.