

NEUROPHYSIOLOGICAL EVALUATION OF THE EXTERNAL URETHRAL SPHINCTER AFTER RADICAL RETROPUBIC PROSTATECTOMY COMPARED TO CONTINENCE: A PROSPECTIVE STUDY OF 44 PATIENTS.

Hypothesis / aims of study

The widespread of preventive prostate exams and nerve sparing radical prostatectomy (NSRP) changed the stigma of this pathology to a potential curable disease. The side effects as incontinence and erectile dysfunction and consequent quality of life limitations remain the concern to this procedure. Better knowledge of the intrinsic urethral sphincter activity after this surgery may offer improvement to the surgical outcome and has been studied lately by means of new approaches (1,2). Herein, we aim to use a series of electrophysiological tests (3) to verify the neurological integrity of the external urethral sphincter in the same patient pre and post radical prostatectomy, comparing the findings to the urinary continence status.

Study design, materials and methods

From February 2003 to July 2005, we enrolled 44 patients with localized prostate cancer in a controlled prospective study, according to our institutional ethics committee. All were neurologically normal. Urinary leakage was measured by the UCLA continence protocol. Neurophysiological evaluation of the external urethral sphincter (EUS) was done through sensory threshold and latencies of the pudendo-urethral (PUR), urethro-anal (UAR) and pudendo-anal (PAR) reflexes, previously to prostate cancer treatment and repeated six months after NSRP. The results were related to urinary continence.

Results

Six months after NSRP, EUS motor innervations were similar (PUR, $p=0.61$ and PAR, $p=0.61$, unaltered). A significant membranous urethral mucosal sensory denervation was registered by means of UAR threshold and latency evaluation (77.2% of patients). Regarding continence, only one patient was considered fully incontinent using diapers 24 hours a day. A total of 24 patients (54.5%) present occasional stress urinary leakage. Sensory denervation was present in 91.67% of patients with eventual urinary drops leakage evaluated through UAR latency. UAR threshold changed in both totally continent and in those with eventual urinary leakage, although more significantly damaged in patients urinary leakage (11.43 mA x 6.59 mA, $p=0.014$). (Table 1).

Table 1. Neurophysiological tests and urinary leakage						
Sample	n	Neurophysiological test	Before NSRP	After NSRP	p value	
All patients	44	PUR Threshold Latency	2.59 mA 29.45 msec.	2.84 mA 30.32 msec.	p = 0.16 ⁺ p = 0.61 ⁺	
All patients	44	PAR Threshold Latency	2,63 mA 33.50 msec	2,84 mA 22.18 msec	p = 0,16 ⁺ p = 0.61 ⁺	
All patients	44	UAR Threshold Latency	3.86 mA 100% preserved	9,23 mA 22.73% preserved	p < 0,001 p = 0,003	
Patients with some urinary leakage	24	UAR Threshold Latency	4. 54 mA 100% preserved	11.43 mA 8.34% preserved	p < 0.001 ⁺ p = 0.012 [*]	
				45.83% Impaired		
				45.83% Absent		
Patients totally dry	20	UAR Threshold Latency	3.39 mA 100% preserved	3.59 mA 40% preserved	p = 0.011 ⁺ p = 0.012 [*]	
				40% Impaired		
				20% Absent		
mA = miliampère n = sample size + = T test * = Qui square test						

Interpretation of results

The motor innervation to EUS wasn't affected by NSRP nor related to urinary continence. Latency of UAR showed pronounced sensory mucosal denervation of the remained membranous urethra as a common consequence of this surgery and was significantly related to occasional stress urinary leakage.

Concluding message

Sensory impairment of mucosal membranous urethra is a common consequence of NSRP, lasting at least for 6 months after the procedure. Motor innervation seems unaffected by the surgery. The relation to occasional stress urinary leakage can be explained by harmed afferences to the EUS reflex contraction normally triggered when urine reaches this urethral area. The anaesthesia will permit some leakage before the urine perception at the sensory intact bulbous urethra.

References:

1. BJU Int, 2004, 93(4): 507-9.
2. J Urol, 163: 1761, 2000.
3. Neurourol Urodyn, 23(5/6): 585, 2004.

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HUMAN SUBJECTS: This study was approved by the Ethics committee of Federal University of Sao Paulo and followed the Declaration of Helsinki Informed consent was obtained from the patients.