

COMPARATIVE EVALUATION OF THE INDICES AT ARTIFICIAL URINATION

Aims of Study

Urodynamic evaluation of artificial urination for substantiation its diagnostic possibilities at assessment of detrusor contractility.

Methods

There were studied 71 men (mean age 68,6±8,7) treated owing to voiding dysfunction caused by benign prostatic obstruction (BPO) and/or diabetic neuropathy, or myogenic detrusor decompensation. Some of the patients (n=57) had chronic urinary retention but development of acute urinary retention required urgent drainage of urinary bladder in all the patients. By the beginning of the study duration of drainage ranged from 3 days to 4 weeks. Unified protocol for urodynamic examination has been used [1]. To be included to the study the patients would have normal detrusor function according to the results of filling cystometry [2].

Routine pressure-flow study (PFS) at closed drainage was undertaken in 27 patients whose urination indices were: voiding ≥ 150 ml, Qmax ≥ 5 ml/sec (group B). The remaining 44 patients (group A) were not able to urinate or their urination indices were not adequate (voiding < 150 ml, Qmax < 5 ml/sec).

Emptying of filled urinary bladder through suprapubic drainage (three-way Foley RUSCH® 20F catheter) permitted to provide urine flow and in this way gave an opportunity to carry out "artificial urination" for all patients. The last, as the natural one, contributed to the evaluation of a number of urodynamic indices at modified PFS: Qmax art, V void art, pdetQmax art, PVR art. This allowed calculating indices BCI art, BOOI art and compare them with those calculated for natural urination.

To eliminate a passive urine leakage at artificial urination we use a substitute for urethral resistancy – lifting of a drainage to a level, requiring a certain detrusor's work to overcome pressure of water column. Of 3 considered values for lifting suprapubic drainage – 40, 80 and 120cm, we found out the height of 40cm was the most optimal when BOOI art did not exceed normal ranges of those indices (at natural voiding).

Dependent on value of Qmax the patients of group 2 were divided into 2 subgroups: the 1st subgroup consisted of patients with Qmax art < 10 ml/s and the 2nd one with Qmax art > 10 ml/s. All the patients in group B voided at Qmax art ≥ 10 ml/s.

Results of urodynamic study were interpreted according to the Recommendations of ICS Committee on Standardisation of Terminology 1988 [3]. To evaluate detrusor contractility we used nomograms and bladder contractility index (BCI) [4].

Results

Findings of urodynamic study in 71 patients dependent on adequacy of their voiding and urine flow rate.

Main groups of patients	B		A	
	≥ 10 (n=27)		≥ 10 (n=39)	< 10 (n=5)
Devison of patients according to Qmax art, ml/s				
Type of urination	Natural	Artificial	Artificial	Artificial
Mean (SD)				
Qmax ml/s	7.1 (1.9)	16.4 (4.4)*	19.6 (7.8)	8.6 (0.5) [†]
V void ml	155.9 (44.7)	205.1 (47.7)	258.5 (105.0)	270.0 (83.4)
pdetQmax cm H ₂ O	112.1 (44.1)	37.7 (17.0)*	44.7 (28.9)	18.0 (9.5)
PVR ml	68.1 (62.4)	0	0	0
BCI	147.9 (44.4)	119.9 (28.6)	142.7 (56.5)	61.0 (8.5) [†]
BOOI	97.8 (44.6)	4.8 (18.6)*	7.5 (18.8)	0.8 (10.0)

* P < 0,05 – Artificial urination versus natural voiding in group B

† P < 0,05 – Artificial urination of patients in group A at Qmax art < 10ml/s versus patients in the same group at Qmax art ≥ 10ml/s.

Statistical differences in urodynamic indices of artificial urination at Qmax art ≥ 10ml/s among patients of groups A and B have not been found.

Urodynamic indices Qmax, V void, pdetQmax, PVR can be evaluated as well at artificial voiding.

Results of modified PFS allowed carrying out direct evaluation of detrusor contractility in every patient who had been studied using BCI.

At Qmax art ≥ 10ml/s detrusor contractility is reliably higher as compared with Qmax < 10 ml/s.

During urodynamic evaluation of artificial voiding, resistancy to urine flow may be easily adjusted and settled according to an investigator's desire (specifically at the level not exceeding normal urethral resistancy). It contributes to standardise the study, level urodynamic differences caused by BOO, and emphasize one's attention to detrusor component of emptying insufficiency.

Conclusions

Urodynamic evaluation of artificial urination (modified PFS) contribute to objective assessment of detrusor contractility at voiding dysfunction or absence of self-urination. Interrelation of BCI art and Qmax values in prospective allows to substantiate a simple and rapid method for evaluation contractility of a bladder drained in connection with acute urinary retention.

References

1. 5th International Consultation on BPH *Recommendations of the International Scientific Commitee*, Paris, 2000.
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3. P. Abrams, J. Blaivas, S. Stanton, J. Andersen// *Neurourology and Urodynamics* 7:403-427 (1988)
4. P. Abrams. // *BJU* -1999 – 84, p.14-15.