

CONCENTRIC AND EXCENTRIC COMPENSATION MECHANISMS IN PATIENTS WITH BENIGN PROSTATIC SYNDROME - A RETROSPECTIVE ANALYSIS OF 3162 MEN WITH CONVENTIONAL URODYNAMIC/VIDEOURDYNAMIC STUDIES

Hypothesis / aims of study

Benign prostatic syndrome in men is the major cause of voiding dysfunction. Several internationally acknowledged nomograms (1, 2, 3) categorize the grade of subvesical obstruction. Nevertheless, in other organ systems, not only elevation in pressure, but also increasing in volume is recognized as possible compensatory mechanism.

Whether other mechanism than pressure elevation are clinically relevant in these patients will be addressed as issue in this paper.

Study design, materials and methods

During 1980 – 2005 altogether 3162 out of 14811 urodynamic investigations were conducted in men presenting with symptoms indicative of BPS with suspected bladder outlet obstruction. This paper focuses on 3162 male patients with suspected benign prostatic syndrome (BPS). The urodynamic assessment included measuring of intravesical, abdominal and detrusor pressure as well as uroflowmetry and pelvic floor EMG.

15% of these urodynamics included a fluoroscopic examination.

All patients received a urological examination including sonography before the conventional urodynamic study.

All obstructed patients underwent cystoscopy and were treated.

As reference group results obtained in 345 healthy volunteers are presented.

Results

Table 1*: Results of healthy volunteers versus patients with BPS

	Healthy volunteers (n=345)	Patients with BPS (n=3162)
Maximum flow rate (ml/s)	24,1 (± 10.1)	11,3 (± 6.1)
Voiding time (s)	42,5 (± 21.2)	76 (± 46,8)
Opening time (s)	6,9 (± 5.0)	10 (± 16.6)
Pressure at maximum flow (cmH ₂ O)	38,3 (± 11.2)	42,5 (± 23.0)
Opening pressure (cmH ₂ O)	32,9 (± 11.3)	37,8 (± 22.4)
Maximum cystometric capacity (ml)	515 (± 221)	512 (± 260)
Voided volume (ml)	508 (± 210)	360 (± 204)
Post void residual >50ml (%)	0	37.6

Table 2*: Results of patient groups with concentric versus excentric hypertrophy

	Group I: patients with concentric hypertrophy (n=1992)	Group II: patients with excentric hypertrophy (n=1170)
Maximum flow rate (ml/s)	11,7 (± 5,7)	10,6 (± 3,2)
Voiding time (s)	63 (± 15,2)	81 (± 34,5)
Opening time (s)	9,1 (± 4,8)	12,7 (± 3,8)
Pressure at maximum flow (cmH ₂ O)	82,5 (± 9,5)	27,6 (± 8,4)
Maximum cystometric capacity (ml)	240 (± 157)	750 (± 313)
Voided volume (ml)	240 (± 143)	450 (± 297)
Post void residual >50ml (%)	2	98
Differences in morphology and symptomatology	Thick bladder wall, big trabecula, intense LUTS	Thin bladder wall, thin trabecula, highly elevated post void residual

*: arimetric means, ±: standard deviation

Cases for patient group I and II, also including postoperative results will be presented.

Interpretation of results

1. Patients with benign prostatic syndrome compared to healthy volunteers showed a decreased maximal flow rate of 53%, a decreased voided volume by 30%, voiding time was prolonged by 79%, opening pressure was increased by 31% and 37.6% showed post void residual > 50ml.
2. In patients with BPS 2 compensatory mechanisms, manifesting in different urodynamic observations and clinical symptoms must be strictly differentiated due to therapeutic consequences:
 - a. Concentric hypertrophy of the bladder:
 - i. Urodynamic observations: High detrusor pressure, decreased maximum cystometric capacity and voided volume, decreased flow rate, prolonged voiding time
 - ii. Clinical symptoms: overactive bladder syndrome (12,5%), intense

LUTS, increased bladder sensations, thick bladder wall, big trabecula, rarely post void residual > 50ml

b. Excentric hypertrophy of the bladder:

- i. Urodynamic observations: Low detrusor pressure, increased maximum cystometric capacity, decreased flow rate, prolonged voiding time
- ii. Clinical symptoms: hypocontractile detrusor, chronic retention of urine (8,4%), reduced bladder sensations, post void residual > 50ml in nearly all patients, thin bladder wall, thin trabecula

Concluding message

The acknowledged nomograms are highly specific and sensitive for BPS with concentric hypertrophy as compensation mechanism.

However, for excentric hypertrophy as compensation mechanism these nomograms should be amended with respect to parameters indicative of the dimension of volume, which is reflected in increased post void residual.

References

1. World J Urol. 1995;13(1):34-9
2. World J Urol. 1995;13(1):59-64
3. World J Urol. 1995;13(1):47-58

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HUMAN SUBJECTS: This study did not need ethical approval because Positive vote of the ethics committee has been obtained for group of healthy volunteers (who also gave informed consent). As this study is retrospective neither ethics committee approval nor informed consent of patients was necessary. but followed the Declaration of Helsinki Informed consent was not obtained from the patients.