

RELATIONSHIP BETWEEN DETRUSOR OVERACTIVITY, AGE AND BLADDER OUTLET OBSTRUCTION IN MEN WITH BENIGN PROSTATIC HYPERPLASIA

Hypothesis / aims of study

Detrusor overactivity (DO) is one cause of lower urinary tract symptoms (LUTS) in patients with benign prostatic hyperplasia (BPH). Men with DO usually complain about urgency, frequency, nocturia, and, sometimes, urinary incontinence. Cystometric studies revealed DO in 50 - 75% and a meta-analysis of urodynamic studies demonstrated DO with a mean prevalence of 60.2% in men with BPH (95% confidence interval 52 – 68%). It is well known that DO is associated with ageing but, however, the pathophysiological mechanisms and origin of DO remain unclear. Preliminary data indicate that DO in patients with BPH might be caused by bladder outlet obstruction (BOO) as well but studies on this topic are scarce, included only small numbers of patients and reported inconsistent results. Therefore, it is still unclear if DO is associated with BOO. The aim of this study was to determine in a large group of BPH patients if DO is associated with BOO, the grade of BOO or age.

Study design, materials and methods

A urodynamic database of men with clinical BPH was retrospectively analyzed. Clinical BPH was defined by LUTS in men of 40 years or older, with or without benign prostatic enlargement. Between 1992 and 2002, all men with clinical BPH but without urinary tract infection or absolute indications for prostate surgery (urinary retention, bladder stones, or dilatation of the upper urinary tract) were assessed by history, IPSS-questionnaire, TRUS, and urodynamic investigation prior to therapy. All men with LUTS after operative treatment of the lower urinary tract were excluded from this study. For urodynamic investigation, a 6 F catheter was inserted transurethraly into the bladder and a 10 F catheter was placed in the rectum. The bladder was filled with physiological, sterile saline solution of 37° C with an infusion speed of 25 - 50 ml/min. The urodynamic investigations of this single center study were in line with the good urodynamic standard of the ICS. Cystometry and pressure-flow recordings were repeated in each patient 2 - 4 times during the same urodynamic session. The pressure-flow measurement with the lowest BOO grade was used for further analysis. DO was defined as every spontaneous or provoked (coughing) involuntary detrusor contraction during the filling phase accompanied with urgency; BOO was defined by the Schäfer algorithm. Because the data was unevenly distributed, non-parametric tests were used for statistical evaluation. The Mann-Whitney test and the Chi-square test were used to compare patients with or without DO and logistic regression analysis was used for multivariate exploration. A p-value of 0.05 or less was considered significant. The odds-ratio was calculated to demonstrate the probability of DO of obstructed (Schäfer grade 1 - 6) compared to not obstructed men (Schäfer grade 0).

Results

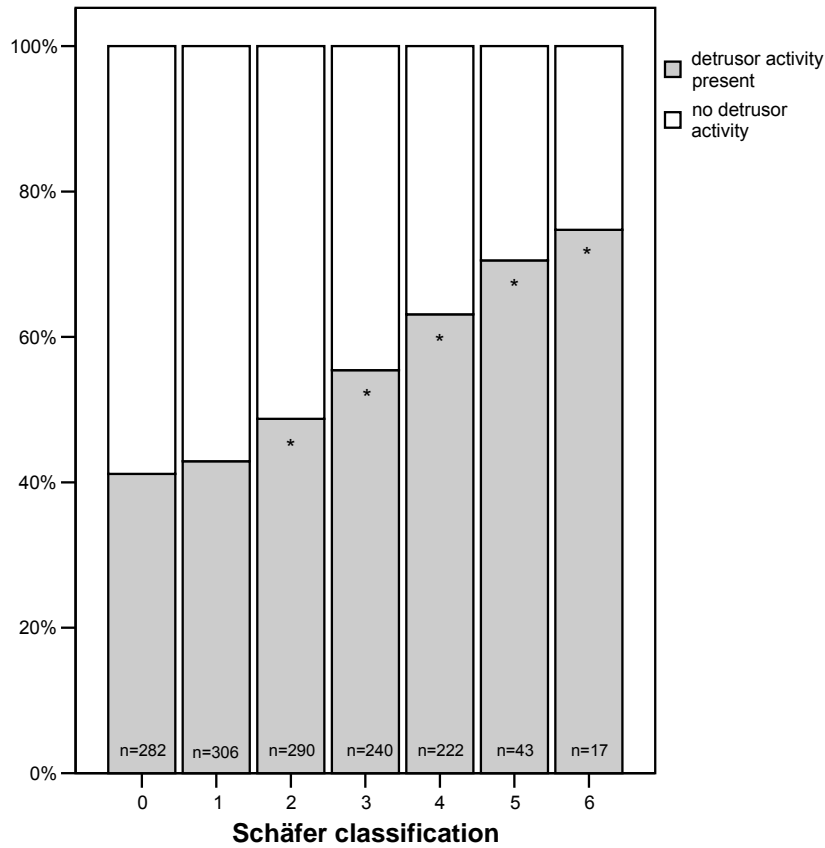
Urodynamic investigations were performed in a total of 1455 men. 55 men (3.8%) could not void during urodynamic measurement and were excluded from further analysis. The remaining 1400 men had an average age of 63.2 years (range 40 – 96 years). DO was seen in 884 patients (63%). Compared to patients without DO, men with DO were significantly older (64 vs. 61 years, $p < 0.01$), had larger prostates (35 vs. 33 ml, $p = 0.008$), a higher total IPSS score (17 vs. 14, $p = 0.036$), higher irritative IPSS subscore (questions 2+4+7; 8 vs. 5, $p < 0.01$), lower bladder capacity (368 vs. 410 ml, $p < 0.01$), and a lower voided volume (216 vs. 265 ml, $p < 0.01$). There was also a significant relationship between DO and pollakisuria (daily frequency > 8), nocturia (≥ 2 voids/night), urgency and urinary incontinence (each symptom $p < 0.05$, Chi-square test). The distribution of DO in relation to the Schäfer grades is visualized in the graph. The probability of DO increases with increasing BOO grade, reaching from 40% in men with Schäfer grade 0 to 76% in men with Schäfer grade 6. Logistic regression analysis showed that age ($p < 0.01$) and BOO grade ($p < 0.01$) were independently associated with DO. After age-adjustment, the odds ratio of DO compared to Schäfer grade 0 was 1.2 for Schäfer grade 1 ($p = 0.404$), 1.4 for Schäfer grade 2 ($p = 0.31$), 1.8 for Schäfer grade 3 ($p = 0.01$), 2.6 for Schäfer grade 4 ($p < 0.01$), 3.3 for Schäfer grade 5 ($p = 0.03$) and 4.3 for Schäfer grade 6 ($p = 0.026$).

Interpretation of results

This study confirmed the relationship between DO and clinical parameters usually believed to be symptoms of DO (pollakisuria, nocturia, urgency, urinary incontinence). This study also demonstrated in a large group of BPH patients that DO is independently associated with age and BOO. The probability of DO increases with increasing BOO grade.

Concluding message

Detrusor overactivity is independently associated with age and BOO. The probability of detrusor overactivity increases with increasing BOO grade.



GRAPH: Detrusor overactivity in relation to obstruction grade (Schäfer). * Significant difference of the probability of DO compared to Schäfer grade 0 ($p < 0.05$)

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HUMAN SUBJECTS: This study did not need ethical approval because retrospective study but followed the Declaration of Helsinki Informed consent was not obtained from the patients.