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Title: STUDY OF BLADDER NECK CLOSURE AT INITIATION OF VOIDING IN MEN WITH BENIGN PROSTATIC ENLARGEMENT (BPE): CONTRIBUTION OF MODELING

Aims of Study:

To identify and to quantify the degree of bladder neck closure during the detrusor contraction, at the onset of voiding in men with lower urinary tract symptoms (LUTS) due to BPE by means of a mathematical micturition model allowing simulation of pathophysiological hypotheses.

Methods:

Seventy one files (119 tracings) of BPE patients were studied: 48 included 2 successive pressure-flow (P-F) studies, 23 included only one P-F study. Files were obtained from 3 urodynamic laboratories. Urodynamic data were recorded using Aquarius Laborie or menuet Medtronic unit; diameter of the urethral catheter was 7F or 8F. Analysis of flow- nad pressure curves was carried out using the previously validated VBN method [1]. We assume a contractile response of the smooth muscle cells of the bladder neck to nervous excitation similar to that of the detrusor ones. We tested the hypotheses of a subject-dependent detrusor to bladder neck coupling (B parameter).

Results:

Theory shows that high B values ($B > 2$) would lead to complete closure, while lower values would lead to a delayed onset of voiding with a steep ascending limb of the flow curve (effect of the cylindrical geometry of the bladder neck). The parameter B was successfully identified in all the P-F studies. In 56 files (65%) we did not observe any detrusor to bladder neck coupling ($B = 0$). In 25 files (35%), B had a non zero value and the recorded uroflows had the predicted shape. Moreover, in the files including 2 successive P-F studies, the same value of B was found.

Conclusions:

Simulation of pathophysiological hypotheses confirms the presence of bladder neck closure before the onset of voiding with a coupling mechanism during the ensuing detrusor contraction. Well predicted curve shapes and data reproducibility reinforce our description of the phenomenon. In addition, quantification of this phenomenon provides additional information on the obstructive status of BPE patients before treatment.

[1] Neurourol Urodyn 19: 153-176 (2000).