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INVOLUNTARY CONTRACTION AWARENESS AND BLADDER STRENGTH IN MEN WITH IDIOPATHIC DETRUSOR OVERACTIVITY

Hypothesis / aims of study

In men with idiopathic detrusor overactivity (DO), to check whether the awareness of involuntary detrusor contractions would have any influence on bladder strength.

Study design, materials and methods

We studied retrospectively 23 adult males with irritative voiding symptoms who had idiopathic DO diagnosed during the period 1998-2002.

All of them had a detailed medical history, physical examination (including neurological examination), free flow uroflowmetry, invasive urodynamics (including water cystometry and pressure/flow study with synchronous recording of pelvic floor EMG), abdominal as well as transrectal ultrasound and, when felt necessary, cystourethroscopy and/or cystourethrography. Cerebral and spinal nuclear magnetic resonance and sacral evoked potentials were also performed if judged to be needed.

Exclusion criteria were genito-urinary tract infections, benign prostatic enlargement, urethral strictures, diabetes mellitus, overt neuropathies, mental diseases, high levels of anxiety, or any other condition (in particular, any drug treatment) that could possibly affect bladder function, urine production rate, or voiding habits.

At cystometry, all men showed several phasic involuntary detrusor contractions, of which the last always resulted in DO incontinence. Such contractions were preceded and accompanied in 13 men (Group 1) by severe urgency of voiding (defined as such by the fact that after it was first felt, micturition could be delayed only for <2 minutes [1]). The same contractions could not be perceived by the other 10 men (Group 2), who felt urgency only when DO incontinence eventually occurred. For each patient we recorded the following pressure/flow parameters: volume voided (VV, ml); post-void residual (PVR, ml); peak flow pressure ($p_{det.Qmax}$, cm H₂O); peak flow rate (Q_{max} , ml/s); Abrams-Griffiths number (AG, cm H₂O); maximum detrusor external voiding power per unit of bladder wall surface area (WF_{max} , $\mu W/mm^2$); the relative bladder volume at which WF_{max} occurred, $rV(WF_{max})$; and the bladder contraction strength decay factor $WF_{80}-WF_{20}$.

The same parameters have also been studied in 11 healthy controls (Group 3, including men referred for unexplained lower urinary tract infections who showed no abnormal findings at our examination).

Means, standard deviations and medians of the parameters were determined for each group (Table). Differences among DO-aware, DO-unaware and non-DO patients (Groups 1, 2 and 3, respectively) were checked for statistical significance by the Wilcoxon rank sum test for independent samples, with the Bonferroni correction for multiple comparisons being applied to all P-values.

Results

No man had PVR, except for 6 patients in Group 2, who showed PVRs of <50 mls. The parameters $p_{det.Qmax}$, Q_{max} and AG did not differ significantly in the 3 groups (which was also the case for patients' ages), whilst VV, WF_{max} , $rV(WF_{max})$ as well as $WF_{80}-WF_{20}$ were significantly different.

Table

| | Group 1 (DO-aware) | Group 2 (DO-unaware) | Group 3 (non-DO) |
|------------------------|-----------------------|-------------------------|---------------------|
| age | 34±9 (38) | 36±8 (38) | 38±13 (36) |
| VV | 266±48 (270) | 245±55 (238) | 372±50 (370) |
| P _{det.Qmax} | 35±11 (35) | 36±8 (39) | 33±10 (30) |
| Q _{max} | 25±6 (25) | 21±5 (20) | 22±4 (20) |
| AG | -14±17 (-20) | -6±14 (-6) | -16±19 (-10) |
| WF _{max} | 18.8±5.2 (16.0) | 20.7±5.9 (19.0) | 13.0±1.6 (13.0) |
| rV(WF _{max}) | 0.19±0.08 (0.18) | 0.42±0.06 (0.42) | 0.14±0.07 (0.13) |
| WF80-WF20 | -2.8±2.4 (-3.0) | 4.2±1.3 (4.0) | -2.7±2.1 (-2.0) |

Interpretation of results

In accordance with previous data [2], the presence of DO involved an increased bladder contractility (WF_{max}). Such an increase proved unrelated (contrary to expectation [3]) to the urethral resistance. It also proved unrelated to the awareness of involuntary detrusor contractions during filling.

Yet, compared to the DO-aware Group 1 and the control Group 3, the DO patients who did not feel involuntary contractions at cystometry (Group 2) had the detrusor contraction strength attaining its peak value at an earlier stage of micturition (and then decaying with no or only minimal fading).

We inferred from such data that lacking central perception of (the urge sensation associated with) involuntary detrusor contractions would affect the ability not so much to generate as to fully sustain a DO-related increase in bladder contractility.

Concluding message

Involuntary contraction awareness would likely provide afferent inputs whereby a DO-related increase in bladder contractility may be (reflexly) fully sustained.

References

- [1] NeuroUrol. Urodyn., 22: 223-226, 2003.
- [2] NeuroUrol. Urodyn, 17: 473-481, 1998.
- [3] J. Urol., 154: 2137-2142, 1995.