

URETHRAL PRESSURE PROFILE REVISITED: THE RIGHT PARAMETER FOR URETHRAL SPHINCTER FUNCTION IN MALES.

Aims of Study

Urethral pressure profilometry (UPP) has been used widely to evaluate cases with urinary incontinence, with high maximum urethral pressure (MUP) and maximum urethral closure pressure (MUCP) denoting good sphincteric function and low pressures denoting poor function. However, its clinical value has been questionable and the subject of considerable debate. We attempt to determine the significance of some parameters of UPP in relation to urethral sphincter function in males.

Methods

The findings of UPP in 3 groups of patients were reviewed. Group 1- thirteen men, mean age 69 years, who had undergone retropubic prostatectomy for benign prostatic hyperplasia and are continent of urine (as a function of both smooth and skeletal muscle components of distal urethral mechanism). Group 2-six men, mean age 71 years, with post-prostatectomy incontinence, 4 after transurethral resection and 2 after retropubic prostatectomy (as a result of injury to smooth muscle component of distal urethral mechanism).(1) Group 3-eight patients, mean age 31 years, who had undergone bulboprosthetic anastomotic urethroplasty for posterior urethral strictures complicating pelvic fracture urethral disruption and are continent of urine (as a function of smooth muscles of proximal urethral mechanism).(2)

Results

In prostatectomy cases, the continent group showed much higher means MUP and MUCP as well as much longer mean functional profile length (FPL) than the incontinent group 2 (59 and 54 versus 32 and 27 cm H₂O, and 2.7 versus 1.3 cm, respectively, $p < 0.001$). Maximum pressures were recorded in the region of membranous urethra. In urethroplasty cases of group 3, means MUP and MUCP (48 and 39 cm H₂O, respectively) were significantly lower than those of group 1 ($p < 0.001$), whereas mean FPL (2.4 cm) showed no significant difference between 2 groups. Maximum pressures were recorded in supramontanal prostatic urethra. Hold maneuver significantly ($p < 0.025$) increased MUP, MUCP and FPL in group 1 (89, 82 cm H₂O and 3.3 cm, respectively) and in group 2 (52, 47 cm H₂O, and 1.9 cm, respectively).

As the urethral smooth musculature form one continuous layer extending along the prostatic and membranous urethras, and conceptually contributing equal pressures all through (mean 48 cm H₂O), then skeletal sphincter in group 1 shares in MUP at rest by 11 cm H₂O (59 minus 48). In the incontinent group 2, as the skeletal sphincter is intact (positive hold maneuver), smooth muscles share by a mean pressure of 21 cm H₂O (32 minus 11).

Conclusions

Continence at rest is dependent mainly on sphincteric function of the urethral smooth musculature and maintained at a urethral pressure much lower than that of the traditionally recorded MUP and MUCP. Incontinence occurs when the smooth muscles contribute an abnormally low pressure irrespective of how much pressure is contributed by the skeletal sphincter. Accordingly, urodynamic parameters that measure the function of urethral smooth musculature rather than that of skeletal sphincter are needed to evaluate continence and incontinence in clinical practice. The preliminary conclusions based on the data of this study is that the pressure in prostatic urethra (prostatic plateau), rather than the MUP may be used as the right parameter for the assessment of urethral sphincter function in males. The emphasis on a wrong parameter may explain the confusion and dispute that have surrounded the clinical value of UPP.

References:

- (1) J. Urol. 156: 1131, 1996.
- (2) Urol. Clin. N. Amer. 5: 295, 1978.