

CORRELATION OF NON-INVASIVE URODYNAMICS WITH IPSS AND PROSTATE VOLUME

Aims of Study

In a longitudinal survey of changes in urinary bladder contractility secondary to benign prostatic enlargement (BPE) 1300 volunteers will be studied [1]. In this study, the IPSS is self administered, the prostate volume is assessed, the free flowrate is determined and the isovolumetric bladder pressure is non-invasively measured. This report describes the correlation of these parameters based on results of the first 577 completely investigated males.

Methods

Volunteers, patients invited by general practioners, as well as colleagues from the Erasmus MC invited by email, took part in this study. Inclusion criteria were age 38-77, informed consent, and ability to void in the standing position. Men with any heart condition or history of heartfailure ever, known neurological condition, such as Parkinson's disease, previous surgery of the lower urinary tract (LUT), anticoagulating and or LUT drug use were excluded. In all cases the investigator decided on the basis of anamnesis and physical examination whether a man could enter the study.

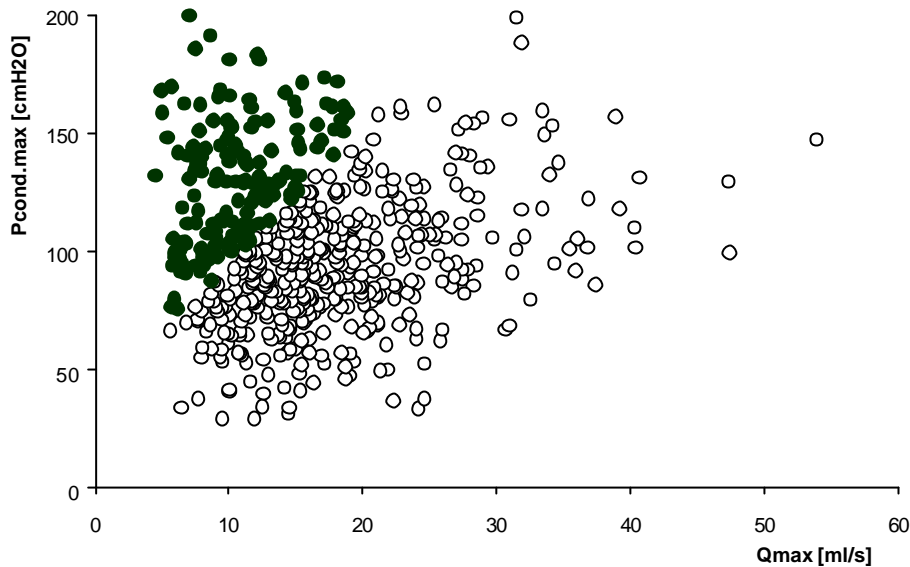
Thus far, 577 subjects were examined. First, the IPSS, including the quality of life (QoL) score, was completed and then the prostate volume was assessed by transabdominal ultrasonography. Subsequently a free flowrate measurement was done. If the maximum flowrate exceeded 5.4 ml/s, the isovolumetric bladder pressure was non-invasively measured using the condom catheter method [2]. The urethral resistance was provisionally calculated as the maximum condom pressure minus 5.8 times the maximum free flowrate minus 36.4. On the basis of a provisional method [3] for definition of obstruction using a diagram of the maximum condom pressure versus the free flowrate, the urethral resistance was classified. A high flowrate combined with a low condom pressure gave a negative result of the formula and was classified as a low urethral resistance. Contrary, a low flowrate with a high condom pressure or positive formula value was classified as a high urethral resistance. For the comparison with other studies, the IPSS was stratified in an irritative (sum of the answers to questions (q) 2, 4, and 7, i.e., storage symptoms) and an obstructive (sum of the responses to q1, 3, 5, 6, i.e., voiding symptoms) score.

Results

In this study the total IPSS ranged from zero to 26 with a mean of 6, and a standard deviation (SD) of 5, whereas the prostate volumes ranged from 8 to 140 ml with a mean of 33 ml, and an SD of 18 ml. In detail, the irritative score ranged from zero to 16 with a mean of 2.7 and an SD of 3.2, whilst the obstructive score ranged from zero to 14 with a mean of 3.5 and an SD of 2.5.

Based on the provisional formula 28 percent (159/577) of the men had a non-invasively documented high urethral resistance. Subjects with a high urethral resistance, closed circles in the figure, had a significantly higher total IPSS (7.4 ± 5.4) than those with a low urethral resistance (total IPSS (5.7 ± 4.6)), open circles. Mann-Whitney U-test: $p < 0.001$, $N = 577$. In fact, all separate scores of the IPSS, and the QoL score were significantly different between both groups, except the scores for frequency (q2) and nocturia (q7). The total IPSS and the urethral resistance were also significantly correlated, Spearman's rho (?) = 0.21, $p < 0.001$. With the exception of the score for nocturia (q7), the different scores and the QoL score were significantly correlated with the urethral resistance too. Therefore, the total obstructive score, $\rho = 0.16$, $p < 0.001$, and the total irritative score, $\rho = 0.11$, $p = 0.01$ were also significantly correlated with the urethral resistance.

On the other hand, a significant difference in the prostate volumes, which were 35 ± 20 ml in the high urethral resistance group versus 33 ± 17 ml in the low urethral resistance group was not found, Mann-Whitney U-test: $p = 0.49$, $N = 577$, and prostate volumes and the urethral resistance were not significantly correlated, $\rho = 0.03$, $p = 0.45$.



Conclusions

Two studies in the literature reported no correlation between invasive pressure flow parameters and the IPSS. In the first [4], a correlation between the obstructive score and the degree of urodynamically proven Bladder Outlet Obstruction (BOO) in 91% of the subjects studied could not be identified.

In the second [5], where the Abrams-Griffiths nomogram definition of obstruction was used, no significant correlation between $p_{det.Qmax}$ and IPSS was found. As no IPSS stratification was mentioned, we assumed the total score was used. Additionally, a modest but statistically significant correlation was found between $p_{det.Qmax}$ and prostate volume, supporting the hypothesis that prostate size is a contributing factor in symptomatic BPH. That was not the case in our present study, probably because our male population was not suffering from BPH, or BPE more precisely.

The non-invasive urodynamic data in this study were significantly correlated with the complaints as quantified by the IPSS. This (re)illustrates the value of the condom catheter method for non-invasive urodynamics.

References

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| [1] Neurourol Urodyn 2002; 21(4): 351-352. | [2] J Urol 2001; 165: 647-652. |
| [3] Neurourol Urodyn 2002; 21(2): 117-125. | [4] Neurourol Urodyn 1999; 18(3): 173-182. |
| [5] Neurourol Urodyn 1999; 18(1): 17-24. | |

Acknowledgements

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