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THE ASSOCIATION OF DETRUSOR CONTRACTILITY WITH OVERACTIVE BLADDER SYMPTOMS AND DETRUSOR OVERACTIVITY IN MEN WITH BENIGN PROSTATE ENLARGEMENT ASSOCIATED WITH DETRUSOR OVERACTIVITY

Hypothesis / aims of study
To investigate the association of the degree of detrusor contractility and detrusor contraction strength with urodynamic parameters of detrusor overactivity (DO) and the severity of symptoms related to overactive bladder (OAB) in patients with symptomatic benign prostatic enlargement (BPE) associated with DO.
Study design, materials and methods
All symptomatic BPE men who had undergone transurethral resection of the prostate TURP in our hospital within 7 years (January 1993 - December 2000) were retrospectively reviewed. Those who had urinary tract infection, bladder stones, bladder cancer, previously diagnosed or suspected carcinoma of the prostate, disease with BOO other than BPH (i.e urethral stricture), neurologic disorders and any other conditions and drug treatment that might interfere with bladder function, urine production rate, or voiding habits were excluded from this study. Only those who had DO confirmed by preoperative full urodynamic investigation including pressure flow study (PFS) were included in this study. Among 777 symptomatic BPE men who had undergone TURP, 317 patients were associated with DO. Those with complete data of urodynamic parameters of detrusor as well as urodynamic parameters of DO for statistical analysis were selected, thus resulting of 231 cases being enrolled into the final analysis. The severity of the symptoms related to OAB (urgency, nocturia and frequency) were graded based on IPSS. Preoperative evaluations including urodynamics with PFS were performed. Maximum urinary flow rate obtained from uroflowmetry and urodynamic parameters of detrusor pressure at peak urinary flow rate (Pdet.Qmax) were recorded and bladder contractility index (BCI = Pdet@Qmax + 5 Qmax) was calculated. According to BCI, detrusor contractility was categorized as weak (<100), normal (100-150) and strong (>150). Detrusor contraction strength defined by the maximum bladder external voiding power or maximum Watt factor (WF_{max}). The urodynamic parameters of DO included the amplitude of DO or maximum DO pressure (MDOP), the time for MDOP ($MDOP_{time}$), the ratio of MDOP to $MDOP_{time}$ ($MDOP_{velocity}$), the duration of DO (DO_{time}), detrusor pressure at the beginning of the first DO (Pdet@FDO) and bladder filling volume at the beginning of the first DO (BV@FDO). If more than one episode of DO occured during urodynamic study, only the parameters the predominant DO was analysed except for Pdet@FDO and BV@FDO which is by definition measured at the first episode of DO. Spearman correlation test was used for statistical analysis of the associations of the degree of detrusor contractility based on BCI and detrusor contraction strength with urodynamic parameters of DO and the severity of symptoms related to OAB.
Results
Among 231 symptomatic BPE associated with DO patients with mean age(SD) 72.7(7.0), 35 patients had weak detrusor contractility, 125 patients had normal detrusor contractility, and 71 patients had strong detrusor contractility. The BCI was significantly associated with MDOP (r=0.269, p=0.000), Pdet@FDO (r=0.215, p=0.001), $MDOP_{velocity}$ (r=0.137, p=0.037) (**Figure 1**), and the severity of urgency symptoms (r=0.180, p=0.006). The maximum bladder contraction strength or Watts factor (WF_{max}) was significantly associated with MDOP (r=0.187, p=0.004), $MDOP_{velocity}$ (r=0.179, p=0.006) (**Figure 2**), and the severity of urgency symptoms (r=0.161 ,p=0.014). BCI and WF_{max} were negatively correlated with age (r= -0.229, p=0.000 and r= -0.234, p=0.000) and positively correlated with prostate volume (r=0.203, p=0.002 and r=0.175, p=0.008) significantly.
Interpretation of results
The urodynamic parameters of DO were reported previously to be important in the association with the severity of symptoms related to OAB.(1) This study suggesting the facilitation of detrusor contractility and contraction strength in urodynamic parameters of non voiding detrusor contraction of male patients with symptomatic BPE associated with DO. The most powerful voiding contractility and contractions strength were accompanied by the highest amplitude of DO and the velocity of maximum DO pressure which induced the highest urge severity by stimulation of fast stretch receptors from fast stretch of relaxed muscle cell areas surrounding contracting muscular zones in bladder wall.(2)
Concluding message
This study confirmed the association of the detrusor contractility and detrusor contraction strength with urodynamic parameters of DO (MDOP and $MDOP_{velocity}$) and the severity of urinary urgency symptoms. Their facilitation in these urodynamic parameters of DO may be responsible for the higher degree of urinary urgency symptoms in symptomatic BPE associated with DO patients. Further study with larger number of patients associated with DO involving not only male but also female patients with and without BOO are required in order to determine these associations.

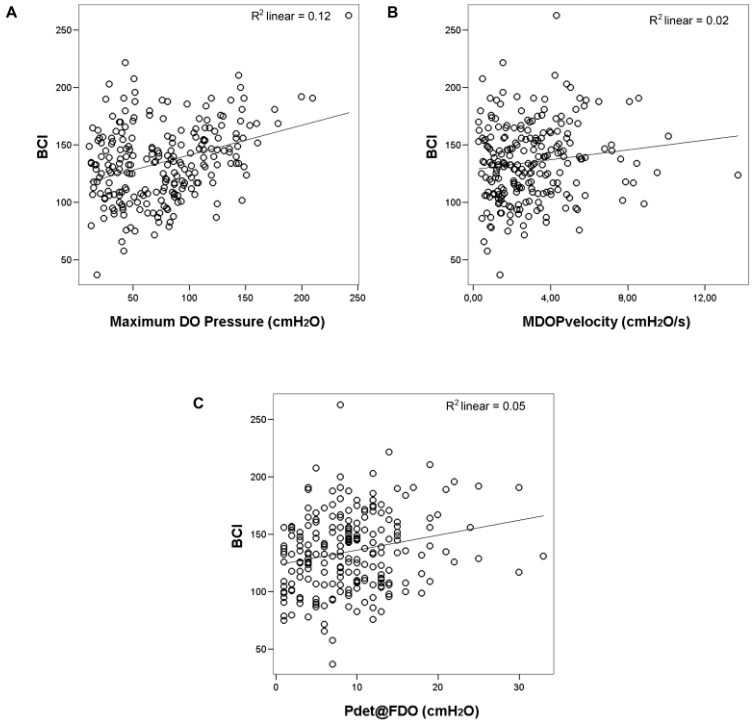

Figure 1. The significant association of urodynamic parameters of DO (MDOP, $MDOP_{velocity}$ and Pdet@FDO) with BCI. The amplitude of DO (A), $MDOP_{velocity}$ (B), Pdet@FDO (C), DO_{time} (D) were significantly increased with the increase of BCI.

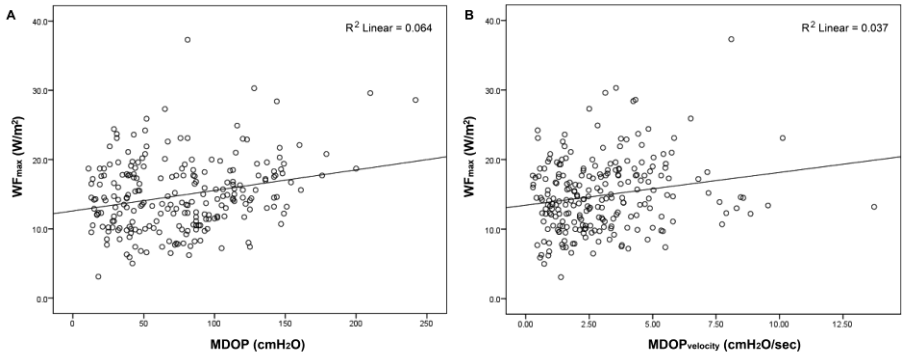

Figure 2. The significant association of urodynamic parameters of DO (MDOP and $MDOP_{velocity}$) with detrusor contraction strength or Watt factor (WFmax). The amplitude of DO (A), and $MDOP_{velocity}$ (B) were significantly increased with the increase of WFmax.

References

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Specify source of funding or grant	**NONE**
Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**No**
This study did not require eithics committee approval because	**This is a retrospective study**
Was the Declaration of Helsinki followed?	**No**
This study did not follow the Declaration of Helsinki in the sense that	**This is a retrospective study**
Was informed consent obtained from the patients?	**No**