



#131 Bladder outlet obstruction significantly correlates with detrusor overactivity in patients with benign prostatic hyperplasia

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ABSTRACT

Aims of study

We often experience the detrusor overactivity with impaired contraction (DHIC) in male patients without obvious neurogenic diseases in video urodynamic studies. The aim of study is to investigate the relationships between bladder outlet obstruction and detrusor overactivity (DO) by comparing urodynamic findings between the patients with DO and patients without DO.

Study design, materials and methods

We retrospectively reviewed medical records of male patients with benign prostatic hyperplasia who underwent urodynamic studies (UDS) between 2001 and 2016 in our institute. We divided the patients into 2 groups by the existence of DO in the UDS and evaluated urodynamic parameters in each groups. We also divided the patients by the degree of obstruction (ICS nomogram) and projected isovolumetric pressure.

Results:

487 patients who underwent UDS were investigated in this study. Mean age was 72.0 ± 7.2 years. (median 72.0 years). 211 of them (43.3%) showed DO, and mean ages in DO group and non-DO group were not significantly different (72.0 years and 71.6 years, respectively). Mean maximum cystometric capacity and mean bladder compliance were significantly lower in DO group than in non-DO group ($P < 0.0001$, respectively) (Table 1). Furthermore, detrusor pressure at maximum flow was significantly higher in DO group than in non-DO groups ($P < 0.0001$, Table 1). When all participants were divided into 3 groups by ICS nomograms (unobstructed, equivocal, and obstructed), the incidence of DO significantly correlated with the bladder outlet obstruction, whereas mean ages were not significantly different among 3 groups. The incidence of DO also significantly correlated with projected isovolumetric pressure.

Interpretation of results

Bladder function during filling was impaired in patients with DO as expected. Interestingly, detrusor contraction during voiding is significantly higher in patients with DO regardless of age. These data indicates that the age deterioration of patients with DO and bladder outlet obstruction is not associated with pathophysiology of DHIC.

Concluding message:

Bladder outlet obstruction in male patients correlates with the incidence of detrusor overactivity regardless of age. The pathophysiology of DHIC is further complex and further studies are needed to clarify this point.

METHODS

We retrospectively reviewed medical records of male patients with benign prostatic hyperplasia (BPH) who underwent urodynamic studies (UDS) between 2001 and 2016 in our institute. We divided the patients into 2 groups by the existence of DO in the UDS and evaluated urodynamic parameters in each groups. We also divided the patients by the degree of obstruction (ICS nomogram & Schafer nomogram), and projected isovolumetric pressure.

RESULTS

STUDY PARTICIPANTS

487 patients were enrolled in this study. Of them 211 patients (43.3%) showed DO during bladder filling. Mean age is not significantly different between DO group and non-DO group. DO (+): 72.4 ± 7.5 DO (-): 71.6 ± 6.9

Urodynamic Data during bladder filling

	DO (+)	DO(-)	P value
FDV (mL)	185.2 ± 74.0	207.5 ± 80.5	< 0.0048
MDV (mL)	280.6 ± 101.8	320.4 ± 92.8	< 0.0001
Bl.compliance (mL/cmH2O)	32.8 ± 24.4	50.9 ± 45.8	< 0.0001
UUI(%)	36.6	0.4	< 0.0001

Patients with DO showed significant decrease in FDV, MDV and bladder compliance. The group also showed the significant increase in the incidence of UUI.

Urodynamic Data during voiding

	DO (+)	DO (-)	P value
Voided volume (mL)	120.5 ± 72.4	190.5 ± 109.7	< 0.0001
Qmax (mL/s)	7.4 ± 3.7	7.6 ± 4.3	0.8360
PdetQmax (cmH2O)	103.2 ± 40.3	88.6 ± 35.0	< 0.0001
Residual urine (mL)	106.9 ± 104.8	155.9 ± 136.7	< 0.0001

Patients with DO showed significant decrease in voided volume, residual urine and significant increase in PdetQmax.

RESULTS

Relationship between the severity of bladder outlet obstruction and detrusor overactivity

	DO (+)	DO (-)	P value
ICS nomogram	1.80 ± 0.45	1.64 ± 0.66	0.0086
Schafer nomogram	3.91 ± 1.32	3.50 ± 1.43	0.0038
PIP	139.5 ± 41.3	126.3 ± 35.9	0.0006

ICS nomogram: we defined the score as follows: unobstructed 0 pt., equivocal 1 pt., obstructed 2 pts and calculated the mean score.

PIP: projected isovolumetric contraction: PdetQmax + 5Qmax

BPH patients with DO showed significantly higher grade of bladder outlet obstruction and detrusor contraction compared to the patients w/o DO.

Incidence of DO classified by the grade of ICS nomogram

	unobstructed	equivocal	obstructed
Mean Age (yrs.)	67.3	72.5	71.0
Number of Patients with DO	7	31	173
Number of Patients w/o DO	25	44	199
Incidence of DO (%)	21.8	41.3	46.5

Incidence of DO was directly proportional to the grade of ICS nomogram ($P=0.003$).

Incidence of DO classified by the grade of Schafer nomogram

	I	II	III	IV	V	VI
Mean age (yrs.)	71.7	73.6	73.3	71.9	70.4	70.3
Number of Patients with DO	6	27	44	70	31	24
number of patients w/o DO	32	38	55	87	40	33
Incidence of DO (%)	15.8	41.5	44.4	43.7	43.7	57.1

Incidence of DO has tendency of direct proportion to the degree of Schafer nomogram but not statistically significant ($P=0.05$).

Incidence of DO classified by the degree of PIP

	Weak	Normal	Strong
Mean age (yrs.)	75.4	71.7	69.7
Number of Patients with DO	34	96	81
number of patients w/o DO	57	156	62
Incidence of DO (%)	37.4	38.1	69.7

Weak(PIP:50-100), Normal(PIP:100-150), Strong(PIP:>150)

Incidence of DO was significantly direct proportional to the degree of PIP ($P=0.0007$).

CONCLUSIONS

Bladder storage function is impaired in BPH patients with DO as expected. Interestingly, detrusor contraction during voiding is significantly higher in patients with DO regardless of age. These data indicates that the age deterioration of patients with DO and bladder outlet obstruction is not associated with pathophysiology of DHIC.

Concluding message:

Bladder outlet obstruction in male patients correlates with the incidence of detrusor overactivity regardless of age. The pathophysiology of DHIC is further complex and further studies are needed to clarify this point.

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All authors declare that they have no conflicts of interest related to the study.

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