

High prevalence of detrusor overactivity with impaired contractile function in patients with idiopathic normal pressure hydrocephalus

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[Aims of study]

Idiopathic normal pressure hydrocephalus (iNPH) is a chronic disorder affecting elderly over 60 years and was first described by Hakim and Adams [1965]. iNPH is characterized by gait impairment (94% to 100%), cognitive disturbance (78% to 98%), and urinary incontinence (76% to 83%) with ventricular dilatation and normal cerebrospinal fluid (CSF) pressure. These symptoms can be improved by appropriate CSF shunt surgery. Previous reports using urodynamic tests showed that patients with iNPH exhibited both storage and voiding symptoms with high prevalence (71 - 95%) of detrusor overactivity (DO)^{1, 2}. However, precise determination of lower urinary tract dysfunctions (LUTD) during the voiding phase evaluated by pressure flow studies (PFS) has not been well documented. In the present study, we examined LUTD in patients with iNPH by urodynamic tests including PFS.

[Study design, materials and methods]

The study cohort was 55 patients (38 males and 17 females) with a mean age of 78 years old (range 60-92 years old) who met the criteria for definite iNPH and underwent filling cystometry and PFS. Patients with other neurological diseases such as diabetic neuropathy, brain and spinal diseases, and urological diseases such as benign prostatic hypertrophy, bacterial and interstitial cystitis were excluded. Parameters of filling cystometry and PFS were evaluated according to the ICS terminology.

Detrusor underactivity (DU) was defined as follows³;

[Male] bladder contractile index (BCI) < 100, bladder outlet obstruction index (BOOI) < 20, and bladder voiding efficacy (BVE = volume voided/ [volume voided + post void residual volume] x 100%) < 90%

[Female] maximum flow rate (Qmax) < 15 mL/s, 2) detrusor pressure at Qmax (Pdet Qmax) < 20 cmH₂O, and 3), and BVE < 90% . Data are expressed as mean ± standard error.

[Results]

[Table 1]

	Total (N=55)	Males (N=38)	Females (N=17)
Maximum cystometric capacity (mL)	195 ± 14.4 (11-506)	199 ± 17.3 (11-433)	185 ± 22 (45-506)
Post-void residual (mL)	49 ± 10 (0-421)	43 ± 13 (0-421)	64 ± 20 (0-232)
Qmax (mL/s)	9.7 ± 0.7 (0.9-24)	9.79 ± 0.9 (0.9-24)	9.2 ± 1.3 (0.9-22)
Pdet at Qmax (cmH ₂ O)	36 ± 2.3 (8-80)	41 ± 2.9 (8-80)	25 ± 2.4 (12-45)
BVE (%)	79 ± 3.8 (8-100)	83 ± 4.0 (15-100)	72 ± 8.0 (8-100)
BCI		91 ± 4.9 (25-167)	
BOOI		25 ± 2.9 (0.8-71.2)	

[Table 2]

	Males (N = 38)	Females (N = 17)	Total (N = 55)
Detrusor overactivity (DO)	27 (71%)	11 (65%)	38 (69%)
Detrusor underactivity (DU)	27 (71%)	6 (35%)	33 (60%)
DO with DU	17 (45%)	5 (29%)	22 (40%)

[Interpretation of results]

The present urodynamic evaluations demonstrated that patients with iNPH commonly had both storage and voiding dysfunctions characterized as DO and DU. Moreover, 40% of them concomitantly had DO with DU, suggesting high prevalence of detrusor hyperactivity with impaired contractile function (DHIC) in iNPH patients. DHIC was first demonstrated by Resnick and Yalla [1987] that a group of elderly women with urgency incontinence had PVR due to an underactive detrusor during voiding. PVR due to DHIC are clinically relevant since such patients may easily develop urinary retention from using anti-cholinergic or medication. As cerebrospinal fluid shunt surgery is highly effective in improving clinical symptoms including lower urinary tract symptoms^{1, 2}, iNPH should be examined in elderly with LUTD.

[Concluding message]

Patients with iNPH have high prevalence of detrusor overactivity, as well as detrusor underactivity. Concomitant presence of both dysfunctions is also common among those patients.

[References]

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