

HIGH PREVALENCE OF DETRUSOR OVERACTIVITY WITH IMPAIRED CONTRACTILE FUNCTION IN PATIENTS WITH IDIOPATHIC NORMAL PRESSURE HYDROCEPHALUS

Hypothesis / aims of study

Idiopathic normal pressure hydrocephalus (iNPH) is a chronic disorder affecting the elderly. iNPH is defined by Adams and Hakim's triad (gait impairment, cognitive disturbance, and urinary incontinence) in addition to ventricular dilation visible by brain imaging and normal cerebrospinal fluid pressure during lumbar puncture. Previous reports using urodynamic tests showed that patients with iNPH exhibit both storage and voiding symptoms with high prevalence (71 - 95%) of detrusor overactivity (DO)^{1), 2)}. However, precise determination of lower 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; 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% in males; and maximum flow rate (Qmax) < 15 mL/s, detrusor pressure at Qmax (Pdet Qmax) < 20 cmH₂O, and BVE < 90% in females³⁾. Data are expressed as mean ± standard error.

Results

Maximum cystometric capacity, post-void residual, Qmax, Pdet at Qmax, and BCI (males) were 195 ± 14.4 mL, 49 ± 10 mL, 9.7 ± 0.7 mL/s, 36 ± 2.3 cmH₂O, and 91 ± 4.9, respectively. DO was seen in 38 (69%). DU was observed in 27 (71%) male patients and 6 (35%) female patients. Totally, 22 (40%) patients (17 males, 5 females) exhibited both DO and DU (Table 1).

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. As cerebrospinal fluid shunt surgery is highly effective in improving clinical symptoms including lower urinary tract symptoms^{1), 2)}, suspecting iNPH in elderly with LUTD would be important.

Concluding message

Patients with iNPH have high prevalence of detrusor overactivity and/or detrusor underactivity. Concomitant presence of both dysfunctions is also common among those patients.

Table 1

	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%)

References

1. Sakakibara R, Kanda T, Sekido T, Uchiyama T, Awa Y, Ito T, Liu Z, Yamamoto T, Yamanishi T, Yuasa T, Shirai K, Hattori T. Mechanism of bladder dysfunction in idiopathic normal pressure hydrocephalus. *Neurourol Urodyn*. 2008;27(6):507-10.
2. Campos-Juanatey F, Gutiérrez-Baños JL, Portillo-Martín JA, Zubillaga-Guerrero S. Assessment of the urodynamic diagnosis in patients with urinary incontinence associated with normal pressure hydrocephalus. *Neurourol Urodyn*. 2015;34(5):465-8.
3. Gammie A, Kaper M, Dorrepaal C, Kos T, Abrams P. Signs and symptoms of detrusor underactivity: An analysis of clinical presentation and urodynamic tests from a large group of patients undergoing pressure flow studies. *Eur Urol*. 2016;69(2):361-9.

Disclosures

Funding: No funding nor grant. **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Institutional review boards of Tokyo Kyosai Hospital **Helsinki:** Yes **Informed Consent:** Yes