Neurogenic bladder in progressive supranuclear palsy: A comparison with Parkinson's disease and multiple system atrophy

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ABSTRACT

• **Hypothesis / aims of study**
Progressive supranuclear palsy (PSP) is a neurodegenerative disorder manifest with parkinsonism, ocular motility disorder, and cognitive function. Like other parkinsonian disorders including idiopathic Parkinson's disease (IPD) and multiple system atrophy (MSA), PSP can manifest various non-motor features, and urinary symptom is one of the most common non-motor features. However, urinary symptoms and its corresponding bladder dysfunctions in PSP have not been well studied to date only with very limited population [1].

We investigated the urodynamic parameters in the patients with PSP, and compared them with those of IPD and MSA. To our knowledge, this is the first study to compare urodynamic features of patients with PSP with those from patients with other parkinsonian disorders.

• **Study design, materials and methods**
We conducted a retrospective analysis of urodynamic data in patients diagnosed of parkinsonian disorders (PSP, IPD, and MSA) and presented urinary symptoms. Clinical information including demographic factors, onset age, duration, severity, treatment of parkinsonism and urinary symptoms in each patient were collected.

• **Results**
A total of 131 patients (10 with PSP, 79 with IPD, and 42 with MSA) were included. The mean age and the age of disease onset of PSP patients were similar to those of IPD patients, and older than those of MSA patients. The duration of disease until the onset of urinary symptoms in PSP patients was similar to that of MSA patients, and shorter than that of IPD patients. In the urodynamic study, storage phase dysfunctions in patients with PSP were similar to those in patients with IPD or MSA. However, PSP patients showed the higher rates of voiding failure than IPD patients during a pressure-flow study and indicated the lower maximum flow rate, higher post-void residual volume, and higher proportions of impaired detrusor contraction than IPD patients, but rather similar to MSA patients.

• **Interpretation of results**
Our findings reveal that most of patients with PSP having urinary symptoms have not only storage phase dysfunctions, but also voiding phase dysfunctions. And patients with PSP have more severe voiding phase dysfunctions while they have similar degree of storage phase dysfunctions compared to those with IPD. Overall, urinary dysfunctions of individuals with PSP seem to be similar to those of patients with MSA.

• **Concluding message**
Patients with PSP have variable urinary dysfunctions as much as those with MSA do and have more severe voiding phase dysfunctions than those with IPD. This may reflect the extensive degenerative process of neural structure in patients with PSP.
Therefore, clinicians should be careful in initiating the empirical treatment with anticholinergics for overactive bladder symptoms in patients with PSP, and be aware of adverse events, such as voiding difficulty or urinary retention.

[1] Sakakibara et al, J Auton Nerv Syst 1993;45:101–106

INTRODUCTION

- Progressive supranuclear palsy (PSP) can manifest urinary symptoms, like idiopathic Parkinson's disease (IPD) and multiple system atrophy (MSA) do.
- However, urinary symptoms and its corresponding bladder dysfunctions in PSP have not been well studied to date.
- Mixture of dysfunctions in storage and voiding phase have been once reported with urodynamic profiles of 6 PSP patients about 20 years ago.

OBJECTIVES

- To investigate the urodynamic parameters in the patients with PSP, and compared them with those of IPD and MSA.

PATIENTS & METHODS

- We conducted a retrospective analysis of urodynamic data in patients diagnosed of parkinsonian disorders (PSP, IPD, and MSA) and presented urinary symptoms.
- Clinical information including demographic factors, onset age, duration, severity, treatment of parkinsonism and urinary symptoms in each patient were collected.

RESULTS

- A total of 131 patients (10 with PSP, 79 with IPD, and 42 with MSA) were included.
- The mean age and the age of disease onset of PSP patients were similar to those of IPD patients, and older than those of MSA patients.
- The duration of disease until the onset of urinary symptoms in PSP patients was similar to that of MSA patients, and shorter than that of IPD patients.

Table. Comparisons of urodynamic results among patients with PSP, IPD or MSA

		PSP	IPD	MSA	PSP vs. IPD	PSP vs. MSA	IPD vs. MSA
					p value		
Free uroflowmetry							
	Qmax (mL/sec)	6.7 ± 5.3	10.3 ± 8.2	9.0 ± 6.2	0.188	0.334	0.457
	PVR (mL)	49.8 ± 64.6	45.9 ± 66.1	157.2 ± 135.4	0.578	0.046	<0.001
Filling cystometry							
	First desire to void (mL)	213.9 ± 125.9	188.0 ± 110.8	250.0 ± 113.8	0.467	0.313	0.002
	Strong desire to void (mL)	233.6 ± 139.7	207.2 ± 116.4	290.8 ± 126.5	0.647	0.169	0.001
	Maximum capacity (mL)	270.3 ± 160.6	278.6 ± 125.5	350.7 ± 134.1	0.742	0.153	0.005
	Detrusor compliance (mL/cmH_2O)	55.0 ± 79.8	47.1 ± 73.5	44.9 ± 44.4	0.354	0.387	0.574
	Involuntary detrusor contraction	7/10 (70%)	49/79 (62.0%)	24/42 (57.1%)	0.739	0.721	0.697
Pressure-flow study							
	Voiding failure	3/10 (30%)	5/79 (6.3%)	12/42 (28.6%)	0.043	1.000	0.002
	Qmax (mL/sec)	7.4 ± 2.2	11.6 ± 7.7	9.1 ± 6.5	0.139	0.762	0.108
	Pdet open (cmH_2O)	40.9 ± 21.8	32.9 ± 22.7	32.9 ± 17.1	0.201	0.454	0.587
	PdetQmax (cmH_2O)	41.9 ± 24.6	35.4 ± 25.5	32.1 ± 13.9	0.355	0.373	0.960
	PVR (mL)	180.2 ± 219.5	90.0 ± 123.4	233.4 ± 192.0	0.193	0.342	<0.001
	AG number (in male)	20.3 ± 23.4	9.3 ± 29.7	11.6 ± 21.5	0.302	0.327	0.699
	Impaired detrusor contractility	9/10 (90.0%)	48/79 (60.8%)	37/42 (88.1%)	0.088	1.000	0.002

PSP, progressive supranuclear palsy; IPD, idiopathic Parkinson's disease; MSA, multiple system atrophy; Qmax, maximum flow rate; PVR, post-void residual; Pdet open, opening detrusor pressure; PdetQmax, detrusor pressure at maximum flow rate; AG number, Abrams-Griffith number.

- **In the urodynamic study, storage phase dysfunctions in patients with PSP were similar to those in patients with IPD or MSA.**
- **However, PSP patients showed the higher rates of voiding failure than IPD patients during a PFS and indicated the lower Qmax, higher PVR volume, and higher proportions of impaired detrusor contraction than IPD patients, but rather similar to MSA patients (Table).**

CONCLUSIONS

⊙ Patients with PSP have variable urinary dysfunctions as much as those with MSA do.
⊙ Patients with PSP have more severe voiding phase dysfunctions than those with IPD.
⊙ This may reflect the extensive degenerative process of neural structure in patients with PSP.

⊙ **Therefore, clinicians should be careful in initiating the empirical treatment with anticholinergics for OAB symptoms in patients with PSP, and be aware of adverse events, such as voiding difficulty or urinary retention.**

Disclosures Statement: none