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TIME-DEPENDENT CHANGES AND GENDER DIFFERENCES IN URINARY DYSFUNCTION IN PATIENTS WITH MULTIPLE SYSTEM ATROPHY

Hypothesis / aims of study
Multiple system atrophy (MSA) is a neurodegenerative disease clinically characterised by any combination of autonomic, cerebellar and extra-pyramidal symptoms [1]. Autonomic symptoms in MSA appear as orthostatic hypotension and pelvic organ dysfunction [2]. It is well known that urinary symptoms are cardinal features of autonomic symptoms in MSA [3]. However, we do not yet know the relationship between urinary symptoms and urodynamic findings with respect to time-dependent changes. Furthermore, we also do not know the detailed gender differences with regard to urinary dysfunction in patients with MSA.
We aimed to determine these parameters through a combination of urodynamic examination and the results of a questionnaire on urinary symptoms.

Study design, materials and methods
We retrospectively reviewed 66 patients (males, n = 39; females, n = 27) with MSA who responded to a urinary symptoms questionnaire and underwent urodynamic examination more than twice. The participants' mean age was 62.3 years (male 62.3 years; female 62.5 years) and mean disease duration at the first urodynamic examination was 3.2 years. Mean duration between the first and second urodynamic examination was 441 days. The MSA phenotype was as follows: cerebellar type, n = 41; Parkinsonian type, n = 15; and mixed type, n = 10. All patients with MSA satisfied the second consensus criteria for the diagnosis of possible or probable MSA [3]. We compared overall (both genders) differences in questionnaires and urodynamic examination findings between the first and second examinations. Moreover, we examined gender differences with respect to urinary symptoms and urodynamic examination between the first and second examinations.

Results
With regard to overall (both genders) time-dependent change, none of the urinary symptoms showed significant differences. In the urodynamic examination, there were significant differences in decreased maximum urinary flow (11ml/s to 6.60ms), increased post-void residuals (103ml to 130ml) and increased occurrence of acontractile bladder(26% to 38%) and decreased occurrence of detrusor overactivity (73% to 63%) at the second examination (Figure 1).
With regard to gender differences, at the first examination, night-time urinary frequency and all voiding symptoms were significantly more severe in male than in female patients; however, at the second examination, except for urinary urgency, gender differences were not observed for any other symptoms. In urodynamic examination, the occurrence of acontractile bladder was significantly higher and maximum urinary flow rate was significantly lower in male patients at the first examination (Figure 2). However, no significant differences were found in urodynamic examination at the second examination.

Interpretation of results
The present study revealed that overall urinary voiding dysfunction as evaluated by urodynamic examination progressed considerably without significant deterioration of urinary symptoms. Voiding dysfunction in patients with MSA is mainly caused by detrusor underactivity. The decrease in maximum urinary flow and increase in post-void residuals might be attributable to the progression of bladder underactivity. With regard to storage dysfunction, although the occurrence of detrusor overactivity significantly decreased at the second examination, this probably does not represent improvement in storage dysfunction; instead, progression of the degeneration in the parasympathetic neuron in sacral cord might contribute to decreased occurrence of detrusor overactivity. Gender differences were more remarkable in case of urinary symptoms and urodynamic findings at the first examination as compared with the second examination. All voiding symptoms were significantly milder in female patients at the first examination, whereas urodynamic examination results revealed that detrusor preservation of contraction was significantly better in female patients, which may have resulted in higher urinary flow rates at the first examination. However, gender differences were less pronounced at the second examination. Because mean age was not significantly different between male and female patients, the present findings suggest that the progression of urinary dysfunction, as evaluated by the questionnaire and urodynamic examination, was significantly more severe in male than in female patients, at least in the early stages of MSA. We believe that it is preferable to include the presence of urinary voiding dysfunction in the diagnostic criteria of MSA, and gender differences with respect to urinary dysfunction need to be taken into account for accurate diagnosis of MSA.

Concluding message
The present study indicates that voiding dysfunction progressed without significant worsening of voiding symptoms. In addition, gender differences are important in evaluating urinary dysfunction being basically less severe in female than in male patients, at least during the early stage

Figure1 Changes in overall (both genders) urodynamic findings between the first and second examination

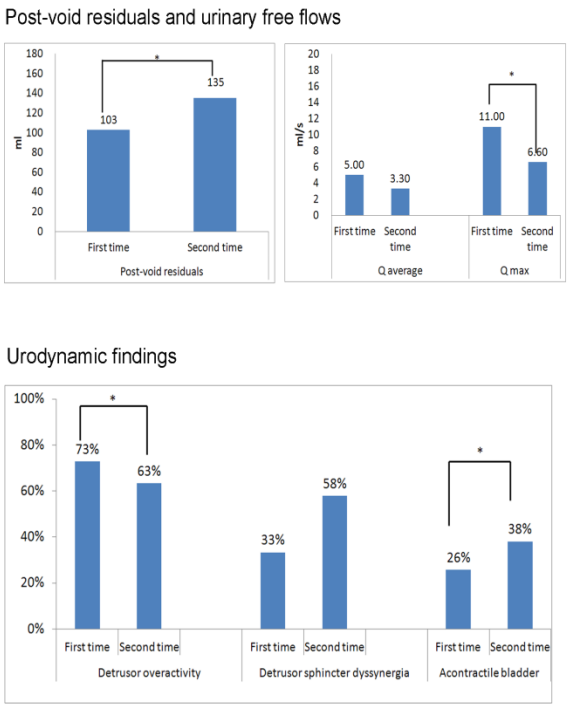
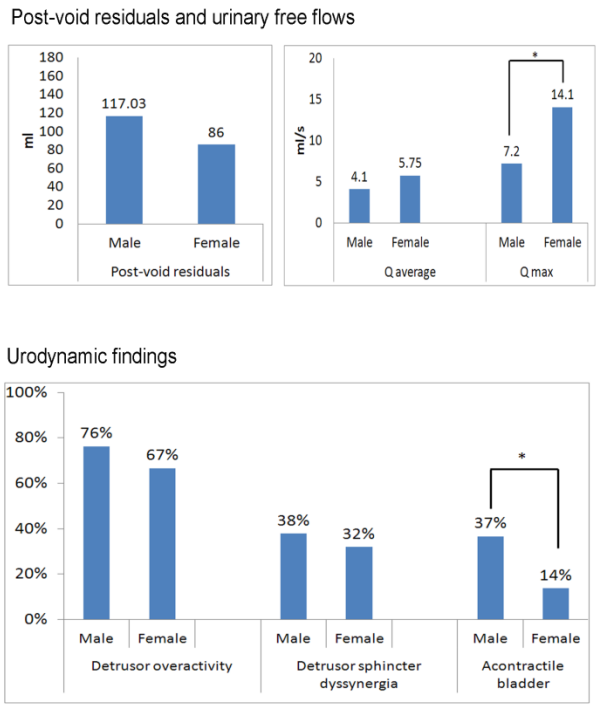


Figure 2 Gender differences in urodynamic findings at the first examination



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