

OVERACTIVE BLADDER IN DIABETES: A PERIPHERAL OR CENTRAL MECHANISM?

Hypothesis / aims of study

Diabetic bladder dysfunction (cystopathy) has been classically characterized as bladder paresis and reduced bladder sensation. However, recent surveys also suggested the presence of overactive bladder (OAB) syndrome, describing it as urinary urgency and frequency, in a significant number of diabetic patients. However, mechanism of OAB in diabetes is not fully understood, since OAB occurs in diabetic patients with normal osmolarity, and no clear relationship has been noted between OAB and post-void residual volume among patients with diabetes. The aim of the present study is to investigate diabetic cystopathy with particular reference to OAB.

Study design, materials and methods

We retrospectively analyzed diabetic cystopathy in our digitized database that comprised 2300 case records, including data from a lower urinary tract symptoms questionnaire; data from a urodynamic study including uroflowmetry, post-void residual measurement, electromyography-cystometry, pressure-flow analysis, and analysis of motor unit potential of the external sphincter muscles; and data from neurological examinations.

Results

Diabetic cystopathy was seen in 4% of cases (84 cases): 58 males, 26 females; mean age, 60.8 years; duration of diabetes, 143.5 months; HbA1C, 7.7 %. In addition to large post-void residual and decreased sensation, OAB, detrusor overactivity (DO), and increased bladder sensation were seen in 55%, 42%, and 14%, respectively (**Figure 1**). The frequency of DO in patients with increased bladder sensation was 58%. DO increased with age, but not with the duration of diabetes. A brain MRI was performed in 32 cases. The frequency of multiple cerebral infarction (MCI) in patients with DO was 76.5% (**Figure 2**). The remaining 23.5% of patients with DO had no MCI, and the remaining 42% with increased bladder sensation had no DO.

Interpretation of results

Since MCI was common in the patients with DO in diabetes, central etiology may significantly contribute to the occurrence of DO. The risk of MCI increases with age, particularly over the age of 65 years. In contrast, patients with DO but no MCI, and those with increased bladder sensation but no DO, may have peripheral aetiologies. They include irritation of the afferent fibers or ephaptic transmission, due in part to intra-neuronal polyol cascade changes and impaired axonal transport of nerve growth factors.

Concluding message

The results of the present study indicate that OAB commonly occurs in diabetic cystopathy. Both central and peripheral mechanisms are involved, e.g., MCI due to diabetic cerebral vasculopathy for the DO, and, to a lesser extent, peripheral nerve irritation for the DO and increased bladder sensation.

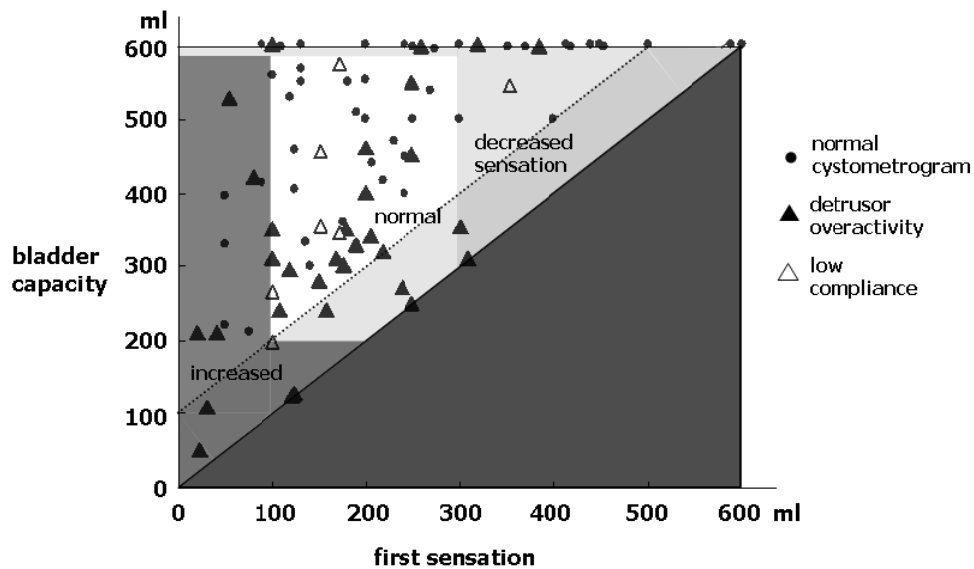


Figure 1. Relationship between bladder sensation and cystometrographic pattern.

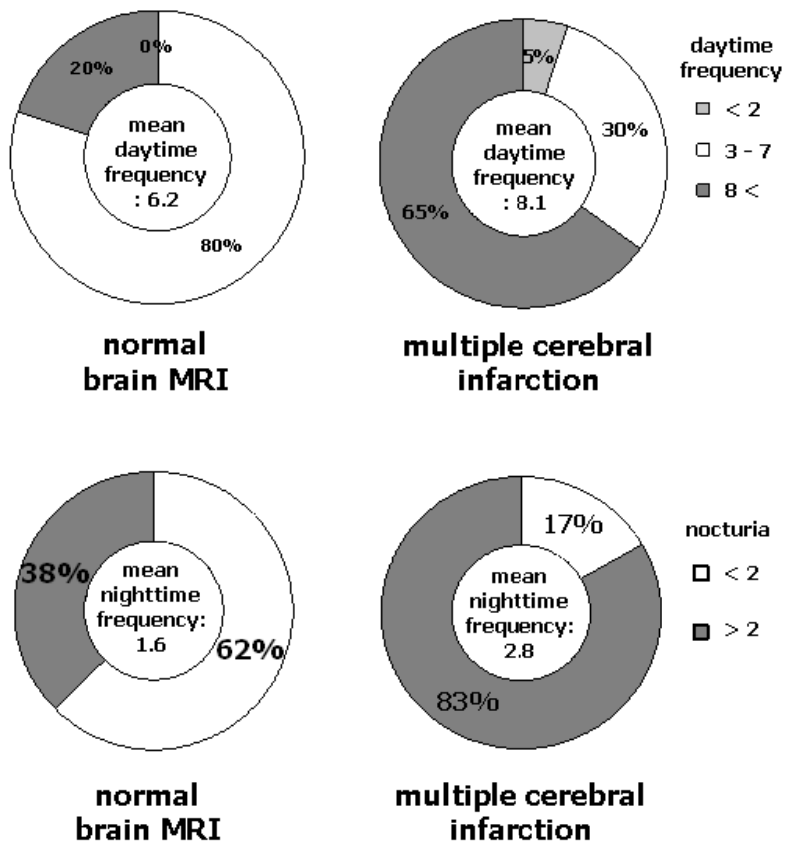


Figure 2 Relationship between multiple cerebral infarction and OAB.

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HUMAN SUBJECTS: This study was approved by the Ethics Committee in Chiba University and followed the Declaration of Helsinki Informed consent was obtained from the patients.