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OVERACTIVE BLADDER IN DIABETES MELLITUS PATIENTS: A QUESTIONNAIRE BASED OBSERVATIONAL INVESTIGATION

Hypothesis / aims of study:
Diabetic bladder dysfunction is mainly characterized by poor bladder emptying and overflow incontinence. However, recent evidence also indicates that storage symptoms, such as urinary urgency with/without urinary incontinence, which are usually associated with urinary frequency and nocturia, are significantly represented. The aim of this study was to assess the prevalence of these storage symptoms, more typical of overactive bladder (OAB) disorder, in diabetic people compared to non-diabetics. Correlation of the symptoms with the patient's sex, age, type of therapy, disease duration and disease severity, as indicated by patient HbA1c (glycosylated hemoglobin) levels, were also evaluated.

Study design, materials and methods
A total of 400 subjects (200 males and 200 females) with type 2 diabetes mellitus (DM) were recruited. Diagnosis of diabetes was considered the inclusion criteria and based on standard assessments. All the patients signed an informed consent and were evaluated by physical examination, urinalysis, urine culture, free uroflowmetry with ultrasound evaluation of post-void residue, 24-hour urine volume, and a Mini-Mental State Examination (MMSE). The exclusion criteria included urinary tract infection (UTI), post voiding residue ≥ 100 mL and urinary flow indices ≤ 12 mL/s (both suggestive of bladder outlet obstruction - BOO), 24-hour urine volume ≥ 3000 mL (suggestive of polyuria), previous urological or gynecological surgery, previous or concomitant neoplastic conditions, cognitive impairment (MMSE ≤ 26/30), and significant neurological history. As a result, the initial cohort of patients, considered for this study were 167males and 161 females. Considering the same criteria, 333 control subjects without DM were also recruited. OAB diagnoses and severity determinations were obtained using the short form of Overactive Bladder Questionnaire (OAB-q) and were supported by the recording of a 3-day voiding diary (in fact, OAB is consistent with at least 8 episodes of micturition per day or
more, presence of urgency, and a strong and sudden desire to void). HbA1c level was also measured in all patients. Preliminary statistical considerations were undertaken to compare sex, age, and weight distributions within the study populations ($\chi 2$ test and odds ratios for categorical variables, and Student's *t*-test to evaluate differences of continuous measurements). A multiple linear regression model was used to evaluate the correlation between OAB-q scores and other study variables (age, disease duration, HbA1c).

Results
Sex distribution ($\chi 2$, $P = 0.1$), mean age, and weight distributions (*t*-test, $P = 0.3$) were similar for all subjects with/without diabetes. Amongst the diabetic patients, the mean disease duration was slightly longer for subjects who were treated with injectable insulin (8.4 ± 5.8 years, range ± SD) compared to those who received only oral therapy (6.9 ± 4.9 years, range ± SD).The OAB-q and voiding diaries indicated that 35.7% of the DM group and 4.8% of the control group were diagnosed with OAB disorder, which is a statistically significant difference. Mean OAB-q scores were significantly higher in the diabetic patients compared to the control group, without significant differences depending on sex and type of therapy (Table 2). A multiple linear regression analysis showed that in diabetic patients, the resulting OAB-q scores were significantly influenced by age and disease duration ($R2 = 0.136$; age, $P = 0.002$; disease duration, $P = 0.005$). No significant difference was observed between the two therapeutic groups of people with diabetes with respect to their mean HbA1c values (people treated with injectable insulin: 6.47 ± 1.21 g/dL *vs* people under oral therapy 6.91 ± 2.01 g/dL, *t*-test $P = 0.51$). However, Pearson's analysis showed no statistical correlation between the OAB-q scores and HbA1c measurements in people with diabetes treated with injectable insulin (Pearson's coefficient $P = 0.24$; $r = 0.68$; $\chi 2 = 0.2$) and in subjects under oral therapeutic regimen (Pearson's coefficient $P = 0.24$; $r = 0.68$; $\chi 2 = 0.2$).

Interpretation of results
The present study shows that OAB symptoms are common in diabetics. The results also confirm that in diabetic patients, the age and the disease duration represent risk factors for developing OAB symptoms, as already demonstrated for general population and in other pathological conditions such as Parkinson's disease. These results agree with other investigations that describe diabetes as a risk factor for developing LUTS, including OAB symptoms. In the present study, people with diabetes and OAB did not suffer from polyuria (which represented an exclusion criteria), indicating that storage and emptying symptoms, bothersome in people with diabetes, are not simply the consequence of increased urine production, as previously reported. As a further consideration, there is clear evidence that diabetes and OAB have a negative impact on quality of life. Data obtained from this investigation are
particularly remarkable considering that more than 142 million people worldwide are estimated to suffer from diabetes, and that a significant proportion of them could be vulnerable to OAB symptoms during the course of their disease. These epidemiological data, supported by evidence from the present study, reflect the possible socio-economic burden of this association, especially when combined with the aging of the global population and the established relationships between age, diabetes, and OAB symptoms.

Concluding message
This study showed that OAB symptoms are more prevalent in people with diabetes than in healthy people. Age and disease duration measurements showed a statistical correlation to the OAB-q scores. Various experimental and clinical findings supported a possible neurogenic origin of OAB symptoms in people with diabetes, suggesting that further research is required to determine whether the OAB symptoms represent markers of diabetic neuropathy.

References
1. Pannek J. Diagnosis and therapy of functional disorders of the bladder in persons with diabetes mellitus. What do we actually know? Urologe A 2010;49(3):381-6.

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