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Overactive bladder and multiple sclerosis in the University Hospital of Oujda

Anouar El Moudane^{1*} , Kaoutar Chhita², Ahmed Jdaini¹, Abdessamad Motaouakil¹, Yassine Mebrouk² and Ali Barki¹

Abstract

Background Multiple sclerosis (MS) is the most frequent autoimmune neurological disease in the young population. Vesico-sphincter disorders are frequent in the course of the disease; it has been reported that 90% of MS patients will develop a lower urinary tract disorder within 18 years of the diagnosis.

Methods The aim of this study is to identify the frequency, severity, diagnosis, and treatment of overactive bladder (OAB) in MS patients at the Mohammed VI hospital university in Oujda-Morocco. It is a cross-sectional study. The population was collected in neurology department of Mohammed VI hospital university in Oujda-Morocco. The population cohort consisted of patients diagnosed with multiple sclerosis, which were invited to the urology department where they underwent urinary screening and completed a form of questions regarding the frequency and severity of OAB and its influence on quality of life.

Result In our study, the mean age of the patients was 43 years, and our sample was composed of 48% males and 52% females, and the most frequent lower urinary tract symptom was urgency (57%), followed by urinary frequency (29%) and urge incontinence (14%). The recurrent-remittent form was the most frequent (62%), followed by the primary progressive form (24%) and the secondary progressive recurrent form (14%). Among the patients, 33% presented a mild symptomatology, 48% moderate, and 19% severe. In this study, it was found that the intensity of urinary symptoms and the MS disability score were positively correlated with quality of life and disease duration.

Conclusion The urgency was the major symptom of the lower urinary tract, and the MS disability score and the severity of OAB were associated with the quality of life of the patients. The urological evaluation of patients with multiple sclerosis should be performed routinely to identify OAB and to treat this condition appropriately.

Keywords Neurogenic lower urinary tract dysfunction, Multiples sclerosis, Quality of life, OAB, Urodynamic

1 Background

Multiple sclerosis is the most frequent neurological disease in young people, with an average age of 30 years and a prevalence of 108 cases per 100,000 habitants in

Europe [6]. It frequently affects women, with a sex ratio of 3 women to 1 man [1]. Multiple sclerosis characterized by an autoimmune reaction mediated by T lymphocytes leading to a rupture of the myelin sheaths responsible for the appearance of demyelinating plaques in the white matter and then neurodegeneration [10].

The MS disease can be classified into 4 subtypes according to their evolution. The patients who present a relapse-remittent type are the most reported in the literature; 50% of these patients will develop a progressive course of the disease within a median period of 11 years. [9] In a smaller number of situations, patients may have

*Correspondence:

Anouar El Moudane

Anouar.elmoudane@gmail.com

¹ Department of Urology, Faculty of Medicine and Pharmacy Oujda, Mohammed I University, Mohamed VI University Hospital Center, 62000 Oujda, Morocco

² Neurology Department, University Hospital Mohammed VI, Oujda, Morocco, 62000 Oujda, Morocco

a primary progressive MS, with progressive symptoms from the beginning of the disease [25].

In the literature, several authors have evaluated the OAB in multiple sclerosis and its impact on quality of life and found that urinary disorders were undiagnosed or not well screened by neurologists [26].

2 Methods

The neurology and urology departments of the University Hospital Center Oujda participated in this joint study. This paper is a cross-sectional study. The population cohort was collected between January 2019 and January 2022 from the neurology department. Thereafter, they were invited to the urology department to pass several urinary tests and filling a survey form concerning the frequency and intensity of their overactive bladder complaints. These patients underwent several examinations including a clinical examination, an ultrasound of the urinary tract with post-void residual volume measurement, and a urodynamic assessment if necessary.

The data generated by these examinations and tests were organized into an Excel sheet including age, sex, medical and surgical history, recent history of urinary tract infection, type of multiple sclerosis, age of MS diagnosis, functional signs of the lower urinary tract. Further parameters were collected as follows:

- The overactive bladder score (OAB score) with 4 questions on urinary frequency, urgency, nocturia and urgency incontinence a total of 15 points divided into 3 degrees of severity: mild, moderate, and severe.
- The DITROVIE scale to evaluate patient quality of life.
- The expanded disability status scale (EDSS) score of each patient was collected.

Our exclusion criteria were patients with a neurological pathology other than multiple sclerosis (diabetic neuropathy), spinal cord injury, patients with urinary tract infection, or other causes of overactive bladder.

2.1 Statistical analysis

The statistical analysis was performed using SPSS statistics software version 25. The quantitative variables were expressed as mean \pm standard deviation or median and percentiles, whereas qualitative variables were expressed as headcount and percentage. We used the correlation test for bi-variate testing.

3 Results

In our study, from 120 MS patients, 94 patients presented multiple sclerosis complicated by urinary disorders, 21 of whom had an overactive bladder.

The mean age of the patients was about 43 years with extremes of age ranging from 21 to 63 years, composed of 48% men and 52% women, the patients had a mean time of MS of 7 years \pm 5 years.

The most frequent lower urinary tract symptom was urgency (57%), followed by urinary frequency (29%) and urgency urinary incontinence (14%). There was no difference between the gender in the frequency of lower urinary tract symptoms.

The mean OAB score in our patients was 7 with a standard deviation of 4. Overall, 33% of patients had a mild overactive bladder, 48% had a moderate overactive bladder, and 19% of patients had severe symptomatology. The recurrent remittent form was the most frequent with 62%, followed by primary progressive 24% and secondary progressive recurrent 14%.

The mean quality of life score in MS patients with lower urinary tract problems was 2.6 \pm 0.96.

Seven patients underwent an urodynamic assessment, with the result that 6 patients showed detrusor overactivity and only one patient had an unremarkable urodynamic assessment.

In our study, after examining the patients who were followed in the neurology department, they received a first-line treatment based on anticholinergic drugs (promoting one-time use to optimize therapeutic observance) using solifenacin, with a daily single dose of 5–10 mg. Only one patient had a significant post-micturition residue, and thus, an intermittent catheterization was prescribed for him.

3.1 Analysis

A correlation study between different predictors of quality of life in MS patients with OAB yielded the following results (Table 1):

- A positive correlation between the quality of life and the severity of urinary symptoms ($r=0.751$) with $p=0.01$.
- A positive correlation between quality of life and MS disability score ($r=0.49$) with $p=0.05$.
- A positive correlation between the duration of MS and the disability score ($r=0.545$) with $p=0.05$.
- The correlation coefficient shows a positive correlation ($r=0.669$) between the severity of urinary symptomatology and the disability at 1% confidence level.

4 Discussion

Bladder dysfunction is almost inevitable during MS disease course; it has been reported that 90% of MS patients will have lower urinary tract signs within 18 years of disease diagnosis [25]. In 3–10% of cases,

Table 1 Correlation study between different predictors of quality of life in MS patients with OAB

		Quality of life score	Severity of OAB	Age of occurrence of MS	SCORE of the EDSS disability
Quality of life score	The Pearson correlation	1	0.751**	0.239	0.492*
	Sig. (bilateral)		0.000	0.296	0.023
	N	21	21	21	21
Severity of OAB	The Pearson correlation	0.751**	1	0.336	0.669**
	Sig. (bilateral)	0.000		0.136	0.001
	N	21	21	21	21
Age of occurrence of MS	The Pearson correlation	0.239	0.336	1	0.545*
	Sig. (bilateral)	0.296	0.136		0.011
	N	21	21	21	21
SCORE of the EDSS disability	The Pearson correlation	0.492*	0.669**	0.545*	1
	Sig. (bilateral)	0.023	0.001	0.011	
	N	21	21	21	21

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

urinary symptoms may be the first indicator of multiple sclerosis before the appearance of other neurological signs [1]. The commonly lower urinary tract symptoms (LUTS) reported in MS patient, interest the filing phase (urinary frequency, nocturia, urgency, urinary incontinence) [4].

In a cross-sectional study of 9702 MS patients, 65% of patients experienced at least one moderate to severe urinary symptom during their disease, mostly nocturia, urgency and urinary frequency [20]. Urgency was more frequent in men; women had more nocturia and urine leakage. In another study involving 309 MS patients with OAB, the urgency and the urinary frequency were the most common urinary symptoms followed by urge incontinence and nocturia. Kalsi and Fowler [15] found that the complaint of urine leakage is more common in women, and the prevalence of the storage disorders such as urgency, nocturnal and daytime polyuria and discomfort are comparable in both genders. However, no gender difference was found for other urinary symptoms [2].

Patients with relapsing–remitting multiple sclerosis form have reported higher intensity of lower urinary tract symptoms, versus patients with secondary progressive multiple sclerosis [27]. However, no association between lower urinary tract dysfunction and disease characteristics was found in the study of Nakipoglu et al. [22].

In our study, urinary urgency was the most frequent symptom (57%), followed by urinary frequency (29%) and incontinence by urinary urgency (14%). No gender difference was found for urinary symptoms, and no correlation was found between lower urinary tract disorders and MS forms.

Multiple studies have illustrated that patients may perceive lower urinary tract disorders as a manifestation of neurological disease [23]. The knowledge of the characteristics of lower urinary tract disorders in MS can be a helpful component to the differential diagnosis of other conditions that are known to affect bladder outlet and sexual function [23]. This highlights the need to ask MS patients about their urinary symptoms, as most patients with urinary disorders simply had tolerated the symptoms and did not seek medical advice.

The overactive bladder symptom score was higher in patients who seek urological advice. In a large study, Akkoç et al. [2] also confirmed that patients with high OAB symptoms were more likely to be assessed by an urologist than those with less complaints of urinary disorders. The expanded disability status scale (EDSS) is a helpful tool to quantify progression of neurological disability. It is largely used for clinical trials and in the assessment of people suffering from MS [2, 19]. The prevalence of severe urinary signs in MS patients with severe disability was higher than in patients with moderate to mild disability [23].

Mahajan et al. [20] have found an association between aggravation of OAB symptoms and increased disease time; the intensity of OAB symptoms was more important in patients with disease that had lasted more than 18 years compared to those with disease duration less than 5 years. A paper was published by Khalaf et al. [17], indicating that the severity of urinary symptoms was not associated with the duration of disease progression, in spite of the fact that the incidence of urinary signs increased with disease progression.

In our study, there was a positive correlation between the severity of lower urinary tract symptoms and the worsening of the disease, also a correlation between the duration of the disease and the worsening of the disability. It has been found also that there was a significant correlation between the severity of urinary symptoms and quality of life.

The European Association of Urology (EAU) recommends a cytobacteriological exam of urine, blood work-up, voiding calendar, urinary tract imaging with post-void residual measurement, as an initial and routine assessment [5]. The systematic literature review conducted by Çetinel et al. [7] showed that there is insufficient evidence supporting the use of urodynamic testing in the initial assessment of patients with MS. Nevertheless, EAU recommends a urodynamic workup in all patients with neurogenic bladder to document vesico-sphincter disorders.

In our study, all patients underwent a cytobacteriological examination of urine (CBEU), a blood test to assess renal function, avoiding calendar, a clinical examination, and ultrasonography of the upper tract and the bladder with post-void residue measurement; only 30% of the patients underwent a urodynamic assessment. This limited patient number was due to the socio-economic conditions of the patients and the lack of healthcare insurance, and 85% of them presented a detrusor overactivity. In the first place we start with life-advised measures and rehabilitation, it is not recommended to reduce water intake in patients with MS. In addition, it has been shown that reducing caffeine consumption below 100 mg per day reduces symptoms of the storage phase. The benefit of perineal and pelvic rehabilitation on the progression of MS has been demonstrated in the literature [12]. The validity of the neural pathways leading to the pelvic floor and the ability to contract the pelvic floor muscles determine the effectiveness of perineal rehabilitation [3].

For the medical treatment, we start in the first place, with anticholinergic drugs which act on the detrusor muscle, improving storage urinary disorders and considerably enhancing the quality of life of patients with neurological diseases [4]. Because of the high incidence of anticholinergic side effects like xerostomia or constipation, more than one out of five participants in a trial had to discontinue the treatment [24]. For this reason, patients should be well educated concerning the possibility of long-term adverse effects, including the risk of increased post-void residual volume, which might necessitate intermittent urinary catheterization. Also used as a first-line procedure, posterior tibial nerve stimulation (PTNS) is a minimally invasive technique based on electrical stimulation of the posterior tibial nerve through

a small gauge needle or self-adhesive electrodes placed near the medial malleolus. The efficacy of transcutaneous tibial nerve stimulation was demonstrated in a multicenter cohort study of 70 patients with MS and OAB symptoms. All patients received 20 min of PTNS daily for 3 months; significant improvements in lower urinary tract symptoms, as well as improvement in quality of life, were observed between day 0 and day 90 of the study, without any side effects [11].

As a second-line treatment, intermittent catheterization, botulinum toxin (BTX) injections, and sacral neuromodulation may also help to improve the quality of life and safety of MS patients [4].

Botox injections into the detrusor have shown efficacy in refractory OAB in MS patients, by improving symptoms and quality of life, which was confirmed by Khan et al. [18], however, 95% of the patients have required intermittent catheterization after Botox treatment. The EAU guidelines recommend botulinum toxin injection into the detrusor muscle to decrease the OAB in patients with multiple sclerosis or spinal cord injuries and not responding to antimuscarinic therapy [5].

Sacral nerve stimulation is indicated for refractory overactive bladder, dysuria and encopresis. The results of a meta-analysis [16] indicate that sacral neuromodulation may be safe and effective for patients with lower urinary tract disorders due to neurological causes. In a retrospective study, 31 out of 33 patients expressed satisfaction with their treatment [28]. However, it has been demonstrated that the level of underlying neurological disease can adversely affect the long-term effectiveness of sacral neuromodulation [8, 21]. Some authors have suggested that it might be appropriate to offer neuromodulation to patients with relapsing–remitting MS who have remained relapse-free for at least two years [8].

Ultimately, the surgical treatment of patients with a neurological bladder is indicated after failure of conservative treatment, or in patients with severe complications, such as infection, chronic renal failure, or severe urinary incontinence. Cystectomy associated with a urinary diversion by trans-ileal ureterostomy of the Bricker type can be considered. It has been proved that this procedure can be done by laparoscopic approach providing perioperative morbidity compared to open surgery, as well as a decrease in the risk of complications and an improvement in the quality of life [13, 14].

In our study, after examining the patients who were followed in the neurology department, they benefited from a first-line drug treatment based on solifenacin 10 mg single dose per day for 3 months, with a good evolution objectified by the control calendar-mictional, only one

patient had a significant post-mictional residue, and an intermittent catheterization was prescribed for him.

The limitation of this study was the small number of MS patients, and the unavailability of urodynamic testing for patients; thus, our results might not represent the totality of patients with multiple sclerosis. Nevertheless, our series of patients with MS is similar to other populations described in the literature.

5 Conclusion

In this study, disease score and severity of overactive bladder are associated with impaired quality of life in MS patients, and urgency was the most common lower urinary tract symptom. Urological evaluation of these patients must be systematic in order to diagnose bladder overactivity and to detect patients who are at risk of developing complicated forms involving the functional renal prognosis and to treat this pathology correctly, starting by medical treatment with anticholinergics, neuromodulation and Botox injection to surgical treatment.

Abbreviations

MS	Multiple sclerosis
OAB	Overactive bladder
EDSS	Expanded Disability Status Scale
EAU	The European Association of Urology
CBEU	Cytobacteriological examination of urine
PTNS	Posterior tibial nerve stimulation
BTX	Botulinum toxin

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Author contributions

AE developed the original idea of the study and wrote the protocol and draft the work. KC analyzed part of the data. AJ and AM contributed to acquisition of the data. YM facilitated the access of patients records and edited the final manuscript. AB edited, developed the initial protocol, and jointly participated in the writing of the final manuscript. All authors have read and approved the manuscript.

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Declarations

Ethics approval and consent to participate

Ethical approval to undertake the study was granted by the University Hospital Mohammed VI, Oujda, Morocco, Oujda 62000, Morocco. Consent from the patients had been taken for this article.

Consent for publication

Not applicable.

Competing interests

All the authors hereby declare that no conflict of interest exists and there are no financial or personal relationships or affiliations that could influence (or bias) the author's decisions, work or manuscript.

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