

A Prospective Study to Assess the Relative Frequencies of Different Urological Dysfunctions in Patients with Multiple Sclerosis

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Abstract

Background: Multiple sclerosis (MS) is a relatively common autoimmune neurological disease. One of the commonly affected organs in MS is the urinary bladder leading to disturbances in bladder function and control of micturition. **Objective:** The aim of this study was to evaluate the benefits and convenience of using physiological tests in assessing the bladder function and their efficiency in identifying the exact cause of bladder dysfunction in MS. **Materials and Methods:** Sixty-three patients (41 females and 22 males) with urinary manifestations associated with MS were selected for the study, in whom 5 urodynamic studies to assess their bladder functioning were performed. All patients visited the Neuromedical Clinic in Basrah General Hospital. **Results:** Results found that after applying the UDS, 46 (73.01%) of patients were found to have DO, 14 (22.22%) of patients had detrusor areflexia, and 3 (4.7%) had detrusor sphincter dyssynergia. **Conclusion:** Urgency, with or without incontinence, and frequency are the most common urological problems that face MS patients; therefore, these complaints should be considered seriously by health-care professionals in addition urodynamic studies can be used as an efficient diagnostic test when MS is diagnosed to determine the exact type of the bladder dysfunction; thus, can plan appropriate treatment.

Keywords: A reflexia, detrusor hyporeflexia, detrusor over-activity, multiple sclerosis, urodynamic study

INTRODUCTION

Multiple sclerosis (MS) is an overwhelming autoimmune chronic inflammatory neurologic disease that attacks young adults and affects and altering many aspects of their lives.^[1] MS is a disease of young ladies with female affection 2- to 3-fold more than males.^[2] Genitourinary dysfunction is a prominent problem affecting the majority of MS sufferers with significant impact on the quality of patients' lives.^[3] Urinary dysfunction in MS can present with a bladder that fails to store urine normally, or one that fails to empty urine adequately.^[2] There are no formally established volumes that define normal postvoid residual (PVR), value <50 mL signifies adequate emptying and PVR >200 mL represents inadequate emptying.^[4]

Disturbances of micturition are important in MS because of their high incidence rate, the discomfort and embarrassment they cause, their contribution to the mortality of the diseases, and on the other side, their amenability to therapy. Signs of bladder

involvement in this disease may manifest as the complaints of urgency (24%–86%) of all those with bladder dysfunction, urinary frequency (17%–65%), incontinence (35%–72%), and obstructive symptoms (2%–52%).^[5,6]

There are three well-recognized types of lower urinary tract (LUT) dysfunctions that may occur in association with MS. Bladder dysfunction and odd urodynamic findings occur in 50% of disseminated sclerosis patients even in the absence of clinically obvious voiding complaints. Bladder involvement may thus exist subclinically and for a long time before patients develop urinary symptoms including neurogenic detrusor overactivity (DO) 62%, DO with detrusor sphincter dyssynergia (DSD) 25%, and 8 areflexia 12%–38%.^[3,7-9]

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Determination of the exact type of urological dysfunction is important for two reasons: First, if the aim for subsequent treatment is considered, and second, to evaluate possible risk factors and parameters predispose to deterioration of the upper urinary tract or any urologic complications such as urinary tract infection (UTI), pyelonephritis, sepsis, stone disease, diverticulae, reflux, hydronephrosis, and uremia.^[3,10,11]

The most important risk factors that can be recognized through urodynamic tests are DSD in men and high intravesical pressure more than 40 cm H₂O (other factor is the presence of indwelling catheter). Although interestingly, the upper tract damage is rare in MS for unknown explanation.^[6,10]

Classically, urodynamics are commenced in patients of MS with refractory urinary urgency and incontinence that are not responding to the appropriate measures or to patients who are bothered by their symptoms and wish to undergo further interventions. Without urodynamic evaluation, it is difficult to determine the failure of the initial treatment or whether another treatment would be more appropriate. The use of urodynamics is appropriate also in certain conditions where surgical or intravesical treatments are being planned.^[10-13]

Urodynamic examination is the only means that can objectively assess the dysfunction of the LUT and classify the types of this dysfunction, especially when it is crucial to define the LUT status in patients with neurourological symptoms because the symptoms alone are not good predictor for the urodynamic findings and not an indication of threatening urological disease, for example, retention could be the result of areflexia or dyssnergic external sphincter.^[14-16]

The aim of the study was to determine the prevalence of different urological manifestations in MS with bladder involvement and to determine the relative frequency of different types of bladder dysfunctions associated with MS.

MATERIALS AND METHODS

A prospective survey of 170 patients with MS who were randomly recruited through the Outpatient Clinic of Neurological Diseases in Basrah General Hospital in the period of October 2014 to November 2015. Sixty-three of those participants with MS have urinary manifestation. Direct interview for those patients was done individually. Participants responded to questionnaire pertaining to gender, age, disease history, urinary symptoms, and medical history.

Inclusion criteria of participants include clinically and radiologically definite MS diagnosis with a urological complaint. Exclusion criteria included any urological disorder such as renal stone disease, UTI, congenital renal disease, and renal failure. Any patient with diabetes mellitus, heart failure, or neurological disease that may affect the urinary system was excluded. Patients taking medications that might affect the renal function were also excluded from this study. Informed consent was taken from all patients who will participate in the

study after being aware of the aims and the consequences of participating in the study.

A urinalysis, urine for culture and sensitivity, blood samples for serum creatinine and blood urea, and abdominal ultrasound were all done for all of the participants. Before applying the urodynamic tests, a prophylactic single dose of ciprofloxacin antibiotic was given to all patients.

Urodynamic tests

The test was then performed using Mediwatch urodynamic system. Two catheters were used; one is a two lumen, 8 French urethral catheter, and the other is rectal balloon catheter. Postvoid residual volume was first calculated and recorded through the urethral catheter. Normal saline fluid at room temperature was then infused through the urethral catheter with infusion rate of 20–30 ml/min. Concurrent cystometry and sphincter electromyography (EMG) performed with the patient in supine position. EMG was done using patch surface electrodes around the perineal muscle.

RESULTS

Sixty-three patients were selected in the study; 22 males and 41 females. Majority of patients (72.9%) were in the age group of 20–40 years, as represented in Table 1.

Table 2 shows the relative frequency of different urological complains of both, male and female, patients. Herewith, 41.2% of patients were complaining from urgency with or without urge incontinence; this was followed by frequency and straining with 28.57% and 22.22%, respectively. Few patients, about 7.9%, were complaining of straining associated with urgency.

The survey showed that urgency with urge incontinence was the most common clinical manifestation in all age groups with an overall frequency of 41.2% [Table 3]. Frequency of micturition was the second most common manifestation.

Urodynamic study showed that the most common pathophysiological defect, in both males and females, is detrusor overactivity that presents in about 73% of all patients [Table 3]. According to the urodynamic tests, the second most common cause of urological symptoms was areflexia, which presents in about 22.22% of both males and females. Few patients (about 4.7% of all patients) had DSD.

DISCUSSION

Although MS considers not a common disease, the disease still underestimated in our locality and its true incidence is not well

Table 1: Age and gender distribution of all patients

	10-20	20-30	30-40	40-50	Total
Males, n (%)	1 (1.58)	5 (7.9)	10 (15.8)	6 (9.5)	22 (34.93)
Females, n (%)	3 (4.7)	15 (23.8)	19 (25.3)	7 (11.11)	41 (65.07)
Total, n (%)	4 (6.3)	20 (31.7)	26 (41.2)	13 (20.6)	63 (100)

documented yet. The diagnosis of multiple sclerosis needs high degree of suspicion in addition cooperated team of urologists and neurologists required for treatment of urological problems.

Most of the patients selected were female, with a female-to-male ratio of about 2:1 as in Table 1, confirming the fact that the prevalence of MS disease is higher in females, which is agreed on in most studies as in Aaron and Patricia who showed that female predominance in MS.^[2] Statistical analysis of the appearance of different urological manifestations showed no difference in both sexes, with similar distribution of symptoms among all age groups.

Urgency, with or without incontinence, and frequency (irritative symptoms), as shown in Table 2, being the most frequently faced urologic complaint in this study with 41.2% and 28.5%, respectively; this finding is also consistent with other studies like the study done by Betts *et al.*,^[7] which is true for both sexes and in all age groups. Symptom of strain was seen in this study in 22.22%, while retention of urine (one or more attacks) was seen in 7.9%, and this result is comparable to other studies like Betts *et al.*^[7] Urinary retention can be detected in MS patients, hypoactive detrusor can be one of the mechanisms, but in fact, the exact cause was not diagnosed unless UDS is done because the detrusor external sphincter dyssynergia can also precipitate retention.^[17]

All participants in the study, who have urological symptoms, demonstrated urodynamic findings during the tests, which confirm the usefulness of the test in the diagnosis of bladder dysfunction in MS. As shown in Table 4, the study demonstrates that overactivity is the most common type of voiding dysfunction (73%), which agrees with most of

the studies done by other researchers like Wein *et al.*^[3] and Fowler.^[18] This might be explained by the fact that the disease affects the central nervous system giving rise to features of upper motor neuron lesions.^[1] The urodynamic finding of hyperreflexia also correlated well with the symptoms of urgency, frequency, and urge incontinence which is the most common urological manifestation as seen earlier. Detrusor areflexia is the second most common type of dysfunction in this study (22.22%), which is comparable to incidence in other studies like Wyndaele *et al.*,^[6] who reported its incidence as 12%–38% and Tadayyon *et al.* who reported its incidence as 19%.^[9] This study revealed low incidence of DSD in MS sufferers (4.7%) in contrary to most other studies that report higher incidence as in Tadayyon *et al.* who reported the incidence as 26%,^[9] and Litwiller *et al.* who reported DSD as 25%.^[19] This might be attributed to the long period of follow-up done in these studies and/or the larger sample size.

Although this study did not aim to compare the MRI findings to the urological manifestations or to the UDS findings, the study noticed that all the patients with strain (14 patients) have spinal cord lesions. Hence, it is important to conduct further studies to find any correlations between site of the lesion and the symptoms and/or the urodynamic findings.

It is important to mention that the study did not find signs of upper urinary tract deterioration which can be detected by ultrasound examination such as hydronephrosis, or a small kidney with decrease corticomedullary differentiation, despite that seven patients in the study had progressive MS with severe neurological manifestations. This corresponds to most studies like Wyndaele *et al.*^[6] that found that upper urinary

Table 2: Frequency of different urological symptoms in correlation with the gender of patients

	Urgency±urge incontinence	Frequency	Straining	Retention	Total
Males, n (%)	8 (12.6)	8 (12.6)	3 (4.7)	3 (4.7)	22 (34.9)
Females, n (%)	18 (28.57)	10 (15.87)	11 (17.46)	2 (3.17)	41 (65.07)
Total, n (%)	26 (41.2)	18 (28.57)	14 (22.22)	5 (7.9)	63 (100)

Table 3: Urological manifestations of multiple sclerosis in association with age

	10-20	20-30	30-40	40-50	Total
Urgency±urge incontinence, n (%)	3 (4.76)	7 (11.11)	11 (17.46)	5 (7.9)	26 (41.2)
Frequency, n (%)	0 (0.00)	4 (6.34)	10 (15.8)	4 (6.34)	18 (28.57)
Straining, n (%)	1 (1.58)	7 (11.11)	3 (4.76)	3 (4.76)	14 (22.22)
Retention, n (%)	0 (0.00)	2 (3.17)	2 (3.17)	1 (1.58)	5 (7.9)
Total, n (%)	4 (6.34)	20 (31.7)	26 (41.2)	13 (20.63)	63 (100)

Table 4: Urodynamic study findings of different pathophysiological defects responsible for the appearance of urological symptoms in patients with multiple sclerosis

	Detrusor overactivity	Hyporeflexia (areflexia)	Detrusor sphincter dyssynergia	Total
Males, n (%)	17 (26.98)	3 (4.76)	2 (3.17)	22 (34.9)
Females, n (%)	29 (46.03)	11 (17.46)	1 (1.58)	41 (65.07)
Total, n (%)	46 (73.01)	14 (22.22)	3 (4.7)	63 (100)

tract deterioration is surprisingly rare in MS, <1% in contrary to other neurological disease that affects the urinary system. It has been suggested that the likelihood of poorly sustained detrusor contractions and less severe degree of DSD in MS could be responsible for this distinction,^[19] despite the high incidence of detrusor overactivity and DSD in MS. The aim of management should be directed toward improving quality of life by treating of storage symptoms and bladder emptying and preventing of development urological complication.^[20]

CONCLUSION

Urgency, with or without incontinence, and frequency are the most common urological problems that face MS patients; therefore, these complaints should be considered seriously by health-care professionals dealing with MS patients and should not be overlooked as nonsignificant manifestations.

There is a considerable proportion of patients with MS with urological complaints; therefore, it seems that urodynamic studies can be used as an efficient diagnostic test when MS is diagnosed to determine the exact type of the bladder dysfunction; thus, can plan appropriate treatment and/or follow-up accordingly.

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Conflicts of interest

There are no conflicts of interest.

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