

VOIDING DYSFUNCTION IN MULTIPLE SCLEROSIS

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ABSTRACT

Objective: To determine the relationships between urological features of multiple sclerosis (MS) and various disease parameters.

Material and Methods: Forty-three patients with MS were evaluated. Urinary complaints, disease duration, urologic symptom duration, time elapsed till urologic symptom, expanded disability status score (EDSS), and bladder functional score (BFS) for each patient were collected. Uroflowmetry, postvoiding residual urine (PVR) measurement, and cystometry was performed.

Results: Urinary symptoms frequently occurred in 4 years after diagnosis. Urgency was the most commonly seen symptom. Mean EDSS was 3.14 while mean BFS was 1.81. 50% and 56% of patients had abnormal Qmax and PVR respectively. Cystometric abnormality was present in 84% of patients, and the most frequent abnormality was hyperactivity. EDSS was well correlated with both BFS and PVR. There was also a positive relationship between BFS and disease duration. Correlations between EDSS and disease duration, and BFS and Qmax were not statistically significant.

Conclusion: Urinary complaints are bothersome symptoms of patients suffering from MS. Urodynamic studies and urologic counseling are therefore critical in evaluation and planning treatment in these patients.

Key words: voiding dysfunction, multiple sclerosis, urodynamics

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INTRODUCTION

Multiple sclerosis (MS) is a disease characterized by demyelinated plaques in the white matter of the brain and spinal cord. Lower urinary tract dysfunction is seen frequently during the course of the disease. As many as 90% of the patients with MS will have symptoms of voiding dysfunction at some time (1). Voiding dysfunction may be presenting symptom in 2-15% of patients (2). Oppenheim (3) was the first who described not only voiding dysfunction as a presenting symptom but also the high incidence of it in MS. After his study, till now several investigators have reached the same conclusion.

Some of the most distressing symptoms of MS are caused by urination disorders. We tried to determine the relationship between urological features

of MS and disease duration, Kurtzke expanded disability status score (4).

MATERIAL AND METHODS

Between October 1997 and December 1998, 43 patients from neurology department with a diagnosis of multiple sclerosis and some degree of voiding dysfunction were evaluated from a urologic point of view.

Disease duration, present urinary symptoms and their duration, time elapsed from initiation of the disease to the occurrence of urologic symptoms, expanded disability status score (EDSS), bladder functional score (BFS) were assessed after a thorough history and physical examination in neurology department. Disability rating scale proposed by Kurtzke for bladder function was used in determining

BFS (Table-1) (5). Four groups were formed for each parameter stated above (Table-2). Urination complaints were classified as; irritative (urgency, frequency, urgency incontinence, nocturia), and obstructive (hesitancy, sensation of incomplete emptying, and retention).

Table 1 – Functional systems for the expanded disability status scale (EDSS)

| Bowel and Bladder Functions |
|---|
| 0. Normal |
| 1. Mild urinary hesitancy, urgency or retention |
| 2. Moderate hesitancy, urgency, retention of bowel or bladder, or rare urinary incontinence |
| 3. Frequent urinary incontinence |
| 4. In need of almost constant catheterization |
| 5. Loss of bladder function |
| 6. Loss of bowel and bladder function |
| V. Unknown |

Urological evaluation started with laboratory tests including urine analysis and renal function tests. None of the male patients had findings of infravesical obstruction on physical examination.

Urodynamic evaluation included uroflowmetry and postvoiding residual (PVR) volume measurements, performed in 34 patients. Maximum flow rate (Qmax) was regarded as the most important uroflowmetric parameter. Residual urine was measured by in-and-out catheterization.

A total of 19 patients had cystometric studies. Criteria for cystometric abnormalities were as follows; involuntary detrusor contraction greater than 15 cm H₂O as hyperactivity, no rise in intravesical pressure although the capacity was reached or no rise in intravesical pressure with attempted voiding as hypoactivity, first desire to void with 50 ml or low as hypersensitivity, and first desire to void with 250 ml or higher with cystometric capacity more than 500 ml as hyposensitivity.

Investigation of the upper urinary tract was carried out by means of ultrasonography. Sphincteric function was evaluated by electromyography performed by needle electrode.

Table 2 – Groups of patients

| | No. of Patients (%) |
|--|---------------------|
| Disease Duration (Years) | |
| < 2 | 7 (16) |
| 2 - 5 | 14 (33) |
| 6 - 10 | 10 (23) |
| > 10 | 12 (28) |
| Urologic Symptom Duration (Years) | |
| < 1 | 13 (30) |
| 1 - 3 | 17 (40) |
| 4 - 8 | 9 (21) |
| > 8 | 4 (9) |
| Time Elapsed from Initiation to Occurrence of Urologic Symptom (Months) | |
| 0 - 12 | 18 (42) |
| 13 - 48 | 11 (26) |
| 49 - 84 | 6 (14) |
| > 84 | 8 (18) |
| EDSS | |
| 0 - 1.5 | 12 (28) |
| 2 - 3 | 13 (30) |
| 3.5 - 5.5 | 12 (28) |
| > 6 | 6 (14) |
| BFS | |
| 1 | 14 (33) |
| 2 | 24 (56) |
| 3 | 4 (9) |
| 4 | 1 (2) |

EDSS = expanded disability status score, BFS = bladder functional score

Fisher’s exact test, Mann-Whitney U test, and Spearman’s rho test were used for statistical analyses to find out significant difference and correlation among different groups. p values lower than or equal to 0.05 were considered significant.

RESULTS

Of the patients 30 were female and 13 were male. The mean age was 35 years with a range 18-58 years. The mean age for the female

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patients was 34 years while it was 37 years for male patients.

The mean duration of the disease was 6.7 years with a range 6 months to 18 years, and the mean duration of urological symptoms was 3.2 years with a range 2 months to 17 years. The mean time elapsed from the initiation of the disease to the occurrence of urological symptoms was 41 months with a range 0 to 141 months. In 8 patients urinary symptoms started with the onset of MS, however only in 3 of them urinary dysfunction was the presenting symptom. Patients' demographics are listed in details in Table-3.

Voiding complaints occur generally in the first year after diagnosis (42%), and in majority of patients (68%) time needed for urologic symptoms to start is 4 years (Figure-1).

Table 3 – Patients' demographics

| | Total Mean (Range) | Female Mean (Range) | Male Mean (Range) |
|-------------------------------|-----------------------------------|------------------------------------|----------------------------------|
| Age (y) | 35 (18 - 58) | 34 (18 - 58) | 37 (24 - 52) |
| Disease duration (y) | 6.7 (0.5 - 18) | 6.9 (0.5 - 18) | 6.2 (1 - 14) |
| Urologic symptom duration (y) | 3.2 (0.15 - 17) | 3.3 (0.15 - 17) | 3 (0.25 - 14) |
| Time to urologic symptom (m) | 41 (0 - 141) | 42.4 (0 - 141) | 38.3 (0 - 132) |

y = years, m = months

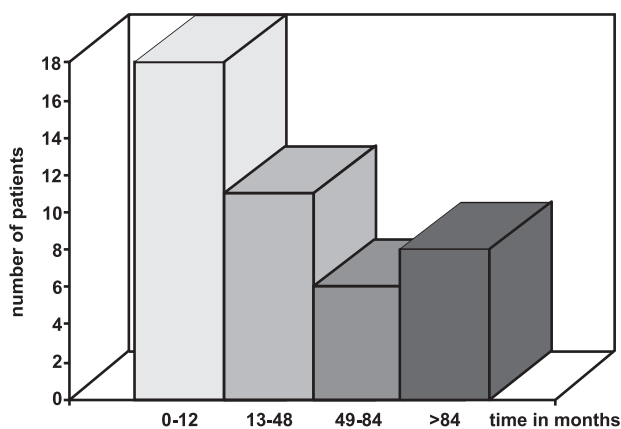


Figure 1 – Time elapsed from initiation of disease to the occurrence of urinary symptoms

Irritative symptoms were present in 42 patients (98%, 30 female, 12 male), while obstructive symptoms were present in 33 patients (74%, 21 female, 12 male) (Table-4). The most common symptom was urgency, which occurred in 33 patients (77%). Frequency in women (present in 24 patients, 80%) and urgency and hesitancy in men (both present in 10 patients, 77%) were the most common symptoms. At least one irritative symptom was present in female patients, and obstructive symptoms were more common in males (92%) than females (70%). Not surprisingly urinary retention was the least commonly seen urinary symptom, occurring in only 12% of patients. Naturally it is dominant in males (7% to 23%), however if the male patients' ages are taken into account (29, 33, 52) it is evident that this dominance is not due to prostatic enlargement.

Table 4 – Micturition symptoms

| | No. of Pat. (%) | Female (%) | Male (%) |
|--|----------------------------|-----------------------|---------------------|
| Irritative | 42 (98) | 30 (100) | 12 (92) |
| Urgency | 33 (77) | 23 (77) | 10 (77) |
| Frequency | 29 (67) | 24 (80) | 5 (38) |
| Urgency incontinence | 28 (65) | 20 (67) | 8 (62) |
| Nocturia | 28 (65) | 20 (67) | 8 (62) |
| Obstructive | 33 (77) | 21 (70) | 12 (92) |
| Hesitancy | 29 (67) | 19 (63) | 10 (77) |
| Sensation of incomplete emptying | 25 (58) | 17 (57) | 8 (62) |
| Retention | 5 (12) | 2 (7) | 3 (23) |

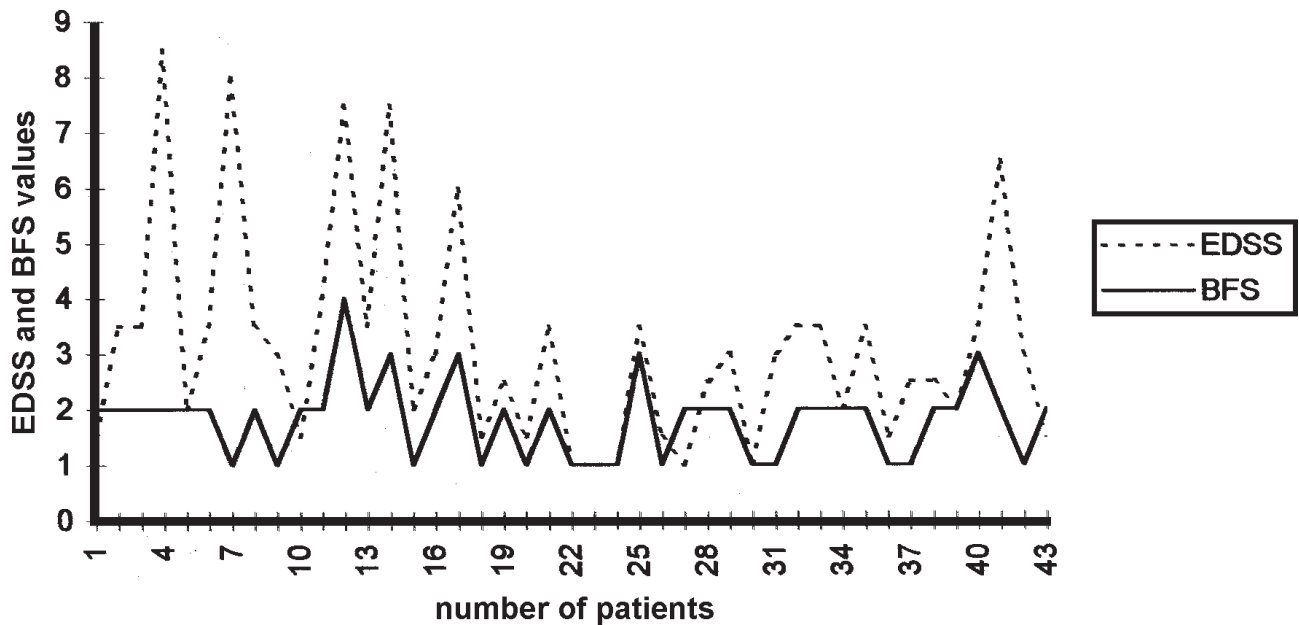


Figure 2 – Correlation between expanded disability status score (EDSS) and bladder functional score (BFS)

Mean EDSS and BFS were 3.14 and 1.81 respectively. Mean EDSS was 3.22 for women and 2.96 for men, while mean BFS was 1.82 for women and 1.77 for men.

Uroflowmetry and PVR measurements were available in 34 patients. Mean Qmax and mean PVR were 15.51 ml/sec and 117.9 ml respectively. These values were 16.28 ml/sec and 96.46 ml for female, and 13.65 ml/sec and 169.2 ml for male patients consecutively. 56% of patients (19) had PVR more than 50 ml. The number of patients having Qmax below and above 15 ml/sec were equal. The mean PVR in patients with and without sensation of incomplete emptying were 129 ml and 104 ml respectively and the difference was not found statistically significant ($p = 0.622$).

Filling cystometry was performed in 19 patients. It was abnormal in 16 of them (84%). The most common abnormality was hyperactivity (47%), followed by hypersensitivity (26%), hyposensitivity (21%), and hypoactivity (10.5%). One of the patients with normal cystometry had EDSS 2 and BFS 2, while the remaining two patients' both scores were 1. The mean EDSS and mean BFS were 2.3 and 1.7 respectively for the

patients with abnormal cystometry while both mean EDSS and mean BFS was 1.3 for patients having normal cystometry.

All laboratory tests were in normal limits. Upper urinary tracts were ultrasonographically normal in all patients.

DISCUSSION

Multiple sclerosis is a disease of young adults. In our series, which included only MS patients suffering also from voiding dysfunction, mean age was 35 years. However, in most reported series the mean age is higher than this (6-11).

As many as 90% of MS patients have voiding dysfunction and this number increases to 96% as the duration of disease overlaps 10 years (1,12-14). Generally voiding complaints are not the initial symptoms of MS, these complaints occur as the years pass after diagnosis. Although Betts and associates reported that none of their patients presented with bladder dysfunction, percentage given in other studies varies from 2% to 15% (2,8). 7% of our specific group of patients presented initially with voiding complaints. This neurological disease is generally diagnosed by neurologists due to low incidence of initial sole voi-

ding dysfunction, but increasing percentage of micturition complaints with increasing disease duration gives an important role to urologist in MS.

Similar to other reports (8,14,15), except Porru's study (11) in which he stated the vice versa, irritative symptoms were common than obstructive ones, however there is no statistically significant difference between the frequency of 2 symptom groups. According to Koldewijn et al. (14) obstructive symptoms are more common than irritative ones in men, but in our series the occurrence of symptoms in male patients were equal. On the other hand, irritative symptoms were significantly more common in female patients ($p < 0.001$). Frequency was the main voiding symptom of women (80%), while urgency and hesitancy were the most commonly seen symptoms in men (both 77%). The difference between the presence of frequency in both sexes was statistically significant ($p < 0.01$). The occurrence of other symptoms were not different.

BFS increased in concordance with expanded disability status score. As in all reported series, a strong relationship was present between EDSS and BFS ($p = 0.000$) (Figure-2). A positive relationship was also found between BFS and disease duration ($p = 0.039$). There are both cons and pros of this statement. Koldewijn et al. (14) and Miller et al. (16) stated that voiding complaints were not statistically related to disease duration, while Awad et al. (6) found a positive relationship between these parameters. However, there was no correlation between BFS and urologic symptom duration.

Correlation between uroflowmetric parameters, PVR and EDSS, BFS was also searched. A positive relationship was present only between PVR and EDSS ($p = 0.02$). No correlations were found between Qmax and EDSS, Qmax and BFS, and PVR and BFS. When we regarded Qmax below 15 ml/sec and PVR more than 50 ml as abnormal, 50% and 56% of patients consecutively had abnormal values. Totally 25 patients (73.5%) had abnormal Qmax or PVR or both. 63% of patients with a sensation of incomplete emptying had high PVR, and similarly 63% of patients with a high PVR had sensation of incomplete emptying. These numbers were 83% and 47% respectively in Betts' series (8). Difference between

PVR values in patients with and without incomplete bladder emptying sensation was not statistically significant, therefore sensation of incomplete emptying does not always mean high PVR.

Cystometric evaluation proved to be abnormal in 84% of patients. Commonly seen finding was hyperactivity and was present in 47% of patients. Our results are comparable with other reports (1,6,7,9,12-15,17,18). EDSS and BFS values were higher in patients having abnormal cystometric findings than normal ones.

None of the patients in our series had upper urinary tract changes due to this disease, therefore it can be stated, as in Koldewijn's study (14), that multiple sclerosis results in urological morbidity that influences the quality of life, rather than causes life threatening upper urinary tract conditions.

CONCLUSIONS

Patients with multiple sclerosis frequently experience urinary symptoms. Some important points should be emphasized. Occurrence of voiding dysfunction is directly proportional to disease duration. In the majority of patients urinary symptoms occur in the first 4 years, and in female patients mainly seen symptoms are irritative. There is a positive relationship between EDSS and BFS. PVR is well correlated with EDSS, and sensation of incomplete emptying does not always mean high PVR. Detrusor hyperactivity is the most common cystometric abnormality.

MS is a disease of young patients and voiding dysfunction can be severely distressing. Therefore, urodynamic studies are required for proper evaluation and treatment based on urodynamic findings is mandatory.

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