Pelvic Floor Dysfunctions

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Urinary, bowel, and sexual dysfunctions are the most frequent and disabling pelvic floor (PF) disorders in patients with multiple sclerosis (MS). PF dysfunction negatively impacts the performance of daily living activities, walking, and the physical dimension of quality of life (QoL) in people with MS. Patient-reported outcomes on sphincteric functioning could be useful to detect PF disorders and their impact on patients' lives. PF rehabilitation proposed by Kegel is based on a series of regularly repeated exercises for "the functional restoration of the perineal muscles". Over time, various therapeutic modalities have been added to PF muscles exercises, through the application of physical or instrumental techniques, such as intravaginal neuromuscular electrical stimulation, electromyographic biofeedback, transcutaneous tibial nerve stimulation. PF rehabilitation has been applied in MS treatment, with improvements of lower urinary tract symptoms severity, QoL, level of anxiety and depression, and sexual dysfunction.

Keywords: multiple sclerosis ; pelvic floor ; rehabilitation

1. Introduction

Multiple sclerosis (MS) is a multifactorial demyelinating disease characterized by a large spectrum of symptoms and signs, due to the involvement of the central nervous system (CNS) [1]. The sphincter functions are included in the functional systems (FS) of the Expanded Disability Status Scale (EDSS) [2]. Sphincter dysfunctions include both urination and defecation disorders; sexual function can be documented as well, but it does not impact the FS score, because of assessment difficulties by the examining physician [3].

Urinary, bowel, and sexual dysfunctions are included in the pelvic floor (PF) disorders of MS. Urinary dysfunctions in MS include urgency, increased urinary frequency, and urge incontinence (linked to an overactive bladder), urinary retention, voiding dysfunction with post-void residue (linked to obstructive symptoms). Bowel dysfunctions include constipation or fecal incontinence. Sexual disorders include reduced libido, erectile and ejaculatory dysfunctions, decreased vaginal lubrication and clitoral erection.

A North American Research Committee on Multiple Sclerosis (NARCOMS) survey, conducted on 14,268 patients, demonstrated that moderate-to-severe PF symptoms were reported by one-third of people with MS (pwMS) (bladder, 41%; bowel, 30%; sexual, 42%) [4], negatively impacting on the performance of daily living activities, walking, and the physical dimension of quality of life (QoL) of pwMS [5].

Both in the general population and in pwMS, patient-reported outcomes about sphincteric function could be useful to describe the presence and the impact of PF disorders on patients' lives.

PF rehabilitation may involve several rehabilitation approaches such as pelvic floor muscle training, biofeedback, and electrical stimulation of the PF and of the functionally associated musculature. In MS, PF rehabilitation-integrated programs have been demonstrated to play a significant role in patients' management [6].

2. Pelvic Floor Dysfunctions in MS

2.1. Urinary Dysfunctions in MS

Urinary symptoms in MS are linked to hyperreflexia, hypo contractility, and dyssynergia of the detrusor–sphincter [7]. Bladder dysfunctions in MS depend on spinal cord lesions disconnecting the frontal and pontine micturition centers from the sacral center of the spinal cord [8].

Lesions above the pontine micturition center reduce inhibition and, consequently, lead to detrusor overactivity. Cervical and thoracic spinal cord lesions reduce the central inhibition via damage to the sensory afferent pathways and the

pyramidal tract, resulting not only in detrusor hyperactivity but also in a dyssynergia between detrusor contraction and sphincter relaxation. Moreover, pyramidal tracts damage leads to spasticity of the striated sphincters [9].

As Ghezzi et al. pointed out, pwMS with signs of pyramidal dysfunction, long disease duration, and higher EDSS, even if asymptomatic for sphincter dysfunctions, should be considered at risk for lower urinary tract symptoms (LUTS), therefore needing further evaluation work-up or, at least, deserving a rigorous follow-up [10].

Urgency, urinary frequency, and urge incontinence are symptoms of overactive bladder and are reported in 37 to 99% of pwMS. Urinary retention and voiding dysfunction with post-void residue are obstructive symptoms, afflicting 34% to 79% of pwMS. A mixed urinary disorder, characterized by the coexistence of an overactive bladder and voiding dysfunction, is present in 50–60% of pwMS [11].

In MS, the most common urodynamic findings are detrusor overactivity (mean occurrence of 65%, range 34–99%) or underactivity (mean occurrence of 25%, range 0–40%) and poor bladder compliance (2–10%). Detrusor sphincter dyssynergia is observed in 35% of the patients [11].

2.2. Anorectal Dysfunctions in MS

Bowel and bladder dysfunctions are often linked; indeed, constipation and encopresis may also contribute to the development of overactive bladder symptoms and recurrent urinary tract infections (UTIs) that could be the consequence of both constipation and fecal incontinence. Indeed, a full rectum may displace the bladder, leading to its incomplete voiding and subsequent stagnation of urine; on the other hand, encopresis may favor urinary tract colonization. Moreover, UTIs could lead to the exacerbation of bladder instability and enuresis [12][13].

Anal manometry is one of the most important tools for the assessment of the anorectal function and allows studying the anomalies of the anal muscle in MS [14], so that, by understanding the physiopathology, appropriate treatments and targeted rehabilitation therapy could be planned.

Marola et al. found that pwMS with constipation have greater sphincter hypotonia at rest and during contraction compared with constipated non-MS controls, and pwMS with fecal incontinence have lower rectal sensitivity than incontinent controls without MS. The authors concluded that the decrease in the difference in resting anal pressure before and after maximum squeeze maneuvers suggests post-contraction sphincter spasticity, indicating impaired PF coordination in pwMS [15].

Moreover, maximal pressure is lower in progressive compared with relapsing–remitting forms of MS [16].

These studies confirmed previous results indicating a correlation between manometric anomalies and pudendal nerve motor latency in pwMS with constipation or fecal incontinence compared to constipated or incontinent non-MS controls; pwMS with fecal incontinence have lower resting anal pressure compared to non-MS controls, and all pwMS (with and without incontinence) have lower maximum squeeze pressure and higher external anal sphincter fiber densities compared to non-MS controls. Pudendal nerve latency is altered in non-MS controls with fecal incontinence but not in pwMS. These results provide indirect evidence that the anorectal disorders in MS are related to lesions in the CNS [17].

Preziosi et al. confirmed the involvement of the CNS in anorectal disorders in MS, since the rectal anomalies were secondary to spinal cord involvement with rectal compliance correlating with disability. The authors suggested that, in patients with neurologic impairment, rectal compliance is a surrogate of the reflex activity of the spinal cord regulating rectal function, a potential predictor of outcome, and a target for treatment [18].

In pwMS, the prevalence of constipation ranges from 17 to 94%, fecal incontinence from 1 to 69%, and a mixed anorectal dysfunction from 6 to 52% [19].

2.3. Sexual Dysfunctions in MS

Sexual dysfunctions (SD) in MS recognize multiple causes, i.e.,

- primary causes, related to direct neurological damage due to demyelinating lesions (i.e., impaired genital sensation), decreased sexual desire, and orgasmic dysfunctions;
- secondary causes, as a consequence of MS-related physical changes, such as spasticity, pain, fatigue.
- tertiary causes, linked to psychosocial and cultural aspects, which interfere with sexual satisfaction, such as mood disorders or impaired partner relationships [20].

SD have a prevalence of 40–80% in women and 50–90% in men with MS. The most frequent and gender-specific symptoms are erectile and ejaculatory dysfunctions for men, decreased vaginal lubrication, disturbed clitoral erection, and painful intercourse for women [20]. The most frequent SD in both genders is reduced libido.

The management of SD in MS is quite difficult; therefore, besides pharmaceutical intervention and psychological support programs, alternative forms of treatment have been suggested. Recently, a review by Bahmani and Motl [21] highlighted the positive effect of physical exercise on SD in pwMS. The authors suggested several possible mechanisms to explain this beneficial effect: for example, regular physical activity decreases depressive symptoms and fatigue severity, is associated with higher self-esteem, lower feelings of pain, and restorative sleep, and thus, it may positively impact the secondary and tertiary component of SD: Furthermore, neurophysiological changes due to exercise training may favor sexual drive and satisfaction.

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