



Rehabilitation Strategies of Dysphagia in a Patient with Multiple Sclerosis: A Case Study

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Abstract

Multiple sclerosis (MS) is an autoimmune debilitating disease affecting the central nervous system. Dysphagia can be seen in 58% of patients with MS. The present research investigates dysphagia rehabilitation strategies in a case study analyzing a 43-year old man suffering from MS. This individual was evaluated using a clinical bedside swallowing assessment (CBSA) test enduring multiple problems at swallowing phases. Rehabilitation interventions consisted of improvement of respiratory support and strengthening the oral musculoskeletal function. Therefore, rehabilitation services may provide an effective approach to improve dysphagia.

Keywords: Multiple Sclerosis, Rehabilitation, Dysphagia, Quality of Life

1. Introduction

Multiple sclerosis (MS) is a progressive chronic disease caused by a neurological failure at several zones of the central nervous system (CNS) (1). It gradually gets worse over time. The damage to the CNS disrupts the ability to communicate. One of the common problems of MS disease is a speech impediment (2). Speech impediments are attributed to the involvement of various parts of the CNS. Its level and severity in patients with MS depend on the anatomic area of the injury as well as the type and severity of the impairment (3). According to some reports, speech impediment may occur at various phases of MS (4). About 40 to 45% of patients with MS endure a common speech disorder referred to as dysarthria, which is often associated with brainstem and or cerebellum involvement (5). Dysarthria occurs due to neurological injury of the motor component of the motor-speech system. It also affects respiration, speech, pronunciation, prosody, resonance, and articulation in MS individuals. In other words, dysarthria is characterized by harshness, pitch impairment, dysphonia, and hypernasality. Respiratory malfunction is also a common impairment that is seen in up to 70% of individuals suffering from MS (6). Gradual progression and outbreak of neurological symptoms such as progressive dissonance, spasticity, myasthenia, dysarthria, and dysphonia result in reduced speech intelligibility. This typi-

cal dysarthria can be classified into spastic dysarthria and ataxic dysarthria (7). Ataxic dysarthria is characterized by scanning speech, with respiration, articulation, pronunciation, and prosodic abnormalities (8).

About 58% of patients with MS endure dysphagia. Brainstem injury in patients with MS often causes dysphasia, which may develop in the early or final disease phases. Dysphasia can affect all the four essential swallowing phases on the patient, including oral preparatory, oral, pharyngeal, and esophageal phases. Dysphasia may be grounds for asphyxia. It brings a high risk of pulmonary aspiration where food or liquids go the wrong way into the lungs and this aspiration may lead to pneumonia (7). It also decreases the quality of life; consequently, leads to death. Motor dysfunction such as decreased vital capacity, silent aspiration with no outward signs of aspiration, as well as maximal voluntary ventilation, can be observed in the patient because of the progressive nature of dysphagia (8). Since speech and swallowing employ a common anatomic structure and associatively operate in some paths and neural subsystems; therefore, any damages to speech physiological mechanisms in MS patient may impair swallowing. As the disease develops, it leads to communication impairment and cognitive disorders (8). In a study that was carried out on 168 patients with MS, It was revealed that 41% of the patients with MS endured speech disorder, 28% of them showed mild speech disorder, while

13% suffered from a severe speech difficulty. Furthermore, 23% of the research participants presented communication disorder. However, 59% of the individuals indicated no speech impairment and were normal (9). Accordingly, dysarthria and dysphagia are common difficulties that patients with MS have to cope with. Thus timely rehabilitation strategies are significantly important to the patients with multiple sclerosis.

2. Case Presentation

A 43-year-old man was diagnosed with MS from 10 years ago. The patient lacked any history of MS in his family. Initial symptoms were comprised of paresthesia in the right leg and balance disorder. Symptoms disappeared within 20 days following the corticosteroid injection. Five years ago, the disorder of equilibrium emerged on the right side of the body. However, the symptoms were resolved after two injections and physiotherapy. Again, last year, with recurrence symptoms of headache, dizziness, and nausea, the internist prescribed an endoscopy. Recently, due to the most severe balance lesion, the motor ability was lost and then was admitted to the ICU. He was intubated through a nasogastric (NG) tube for feeding. In addition to the paralysis of the left hand, limited right hand movement, and leg disability, the patient also showed symptoms of reduced speech intelligibility at low pitch.

2.1. Swallowing Assessments

According to the oral assessment using Persian version of Western Aphasia Battery (P-WAB-1), oral muscles, levators labial muscles, buccinators muscles, orbicularis oris, zygomatic muscles, masseter, and tongue movement functioned poorly. Vocal folds were seriously feeble. Moreover, the patient showed no gag reflex. The taste of the two-third anterior of the tongue was normal, while one-third posterior sensed poorly. The lesion also occurred in the throat and upper larynx. In general, the patient mainly suffered from the lips and tongue limited motion range and strengths, disability to move the tongue up and around, as well as a reduced sense of mouth.

Furthermore, the patient was also assessed by clinical bedside swallowing assessment (CBSA) and oral motor assessment scale (OMAS) (10). The patient' swallowing function was equal to 0 (passive or no reaction). He was disabled from the onset of oral preparatory and oral swallowing requiring lips, jaws, tongue, velum, as well as chewing and cheek muscles. He also exhibited poor function at the transfer phase due to lack of powerful glossopalatinus movement to push the hard palate. Swallowing was impaired at the pharyngeal phase because of low glottal

and oropharynx airflow pressure. Thus the food remained on the hard palate, tongue, and inside the jowls. The lung function was also adversely affected so that the patient maximum phonation time (MPT) was 2 seconds.

2.2. Rehabilitation Exercises

From the very first day of the hospitalization at Ro-feideh Rehabilitation Hospital, speech-language pathology, physiotherapy, and occupational therapy have been launched too. Speech-language pathology sessions were provided two or three times a day. The treatment procedure based on the speech-system motor-sensory agitation is as follows:

2.2.1. Compensatory Swallow Therapy

It facilitated proper swallowing by head control and positioning during gulping. Following 14 days of initial admission, feeding has been started from 2.5 cc distilled water and gradually gets higher to 5, 15, and 20 cc distilled water. Then 20 cc juice per trial gradually reached 50 cc juice; 20 teaspoons of watery Kheer (phirni) to 40 teaspoons of watery Kheer; and finally, to 40 teaspoons of heavy Kheer. Over time, given the initial progress in drink swallowing, 40 teaspoons of rice pudding per trial gradually reached to 50 teaspoons of mixed soup, 50 tablespoons of regular soup, 70 teaspoons of regular soup, and 100 teaspoons of regular soup. Next, soft fruit puree, a small bowl of regular rice, some banana, and a medium-sized kiwi were included in the swallowing plan per trial.

2.2.2. Oral Motor Exercise

It was initially begun from passive exercises, including shallow touching on the face and neck muscles, outer larynx, and oropharyngeal simulations that required no activity. Then the patient's oral and facial muscles received massage and proprioceptive neuromuscular facilitation (PNF) in order to produce oral neuromuscular function, sensory stimulation, and less pathologic reflexes. For instance, to enhance sensory consciousness of lip motion and to increase lip muscular power, the patient was asked to tightly hold the lips; and then smile for 15 seconds. Considering the motion range and tongue strengthening, the patient was asked to get the tongue out and in and to move to the left and right in order to avoid food stuck on the hard palate and tongue. In addition, an abaisse-langue or a tongue depressor tool was used to depress the tongue and to apply slight shocks at the tip of the tongue to the left and right. Also, the patient was also asked to eject his tongue as much as possible; and then move it toward the pharynx to make a gurgling sound. To increase muscle tone and jowl

muscular simulation, the jowls were massaged using spiral forth and back slight movements of the tongue depressor.

2.2.3. Chin Down

It was used for more control on tongue base, mouthpiece, and preventing the food going to the pharynx. Therefore, the patient was required to sit straight at 90° and bend up to the chin comes down to the chest and swallow the mouthpiece with the greatest strength. Moreover, to decrease the risk of aspiration resulting from delayed swallowing disorder and food remaining, the patient companions were asked to make sure that his mouth was empty before the next mouthpiece.

2.2.4. Mandelson Method

It was applied for less pulmonary aspiration and food remaining in the piriform sinus and vallecula.

Ultimately, the patient swallowing returned to the normal status following the aforementioned rehabilitation exercises within three 30-day periods. Meanwhile, the right and left hands started to move. The score of swallowing function with OMAS was equal to 3 (functional or capable of opening and closing the mouth onto the utensil). Along with better swallowing, speech therapy exercises were also actively conducted based on the intensified respiratory capacity, articulation, and pronunciation, as well as increased intelligibility of speech. Communication skills in the patient were also improved along with higher intelligibility and the tendency to talk. His MPT ability was higher than 15 S. He was discharged after three 30-day periods.

3. Discussion

The purpose of the present research was to study the effect of timely rehabilitation strategies on dysphagia in patients suffering from multiple sclerosis (MS). As mentioned earlier, the studied patient suffered from both speech and swallowing impairments. Dysphonia, dysarthria, and dysphagia were abundantly reported in the literature. Speech impediment at the onset is uncommon; rather, it usually occurs in the course of the disease or in the late phases. In the beginning, dysphonia and dysphagia are gradually developed with disease progression and neurologic symptoms. It is remarkable in patients whose speech system and nervous system are highly involved with the disease (9).

The patient also presented dysphonia and dysphagia that occurred following the disease progression. Thus timely rehabilitation is recommended for patients with MS prior to disease progression, dysphonia, and dysphagia. In

some cases, swallowing is more critical to the patients as it influences the individual's quality of life and leads to the risk of fatality. That is why patients prefer to prioritize swallowing treatment (8, 9). Therefore, given the significance of this issue, dysphagia rehabilitation has been medically prioritized for the studied patient. On the other hand, dysphonia and dysphagia may lead to cognitive-communication disorders. In advanced stages, communication difficulties get worse and influence basic requirement demands and even emergency assistance. As the interaction weakens, any contact with relatives and feeling expressions will be limited. As a result, decreased social participation resulting from existing communication difficulties may endanger the MS patients' mental and emotional health (9). Most rehabilitation exercises and MS treatments demand the patient's collaboration, its cognitive ability, and exhaustion level. The patients' rehabilitation exercises often embrace various strategies, which are aligned to improve normal swallowing functions, increase the speech intelligibility, and communication skills.

3.1. Conclusions

Regarding the significance of communication and the effect of proper aspiration function and swallowing activities on individuals' quality of life and since these issues are impaired among individuals suffering from MS; it necessarily demands consideration so that patients with MS can enjoy proper and timely speech therapy services. Thus direct rehabilitation of speech-language pathology may facilitate and improve dysphonia and dysphagia difficulties in patients with MS. Dysphonia and dysphagia were improved in the patient following three 30-day periods of the rehabilitation exercises. Moreover, speech intelligibility, talkativeness, as well as social communication skills were also enhanced.

3.2. Limitations

The primary limitation to this study was altering the hospitalization condition. Also, the patient weakly cooperated at first session.

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Footnotes

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