



Examination of Dysphagia Status in Multiple Sclerosis Patients

Multipl Skleroz Hastalarında Disfaji Durumunun Değerlendirilmesi

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Abstract

Aim: Dysphagia is a life-threatening symptom. The present study aims to evaluate the swallowing function and dysphagia status of MS patients and to find factors that may cause dysphagia. Also, to bring attention to the importance of the early dysphagia examination in MS patients.

Material and Method: A total of 30 MS patients who applied to the neurology clinic of Mustafa Kemal University were included in the study. Dysphagia was evaluated using GUSS (Gugging Swallowing Screen) test for quantitative evaluation of swallowing function. Demographic data (age, gender) of all patients were recorded. Disease duration, if present dysphagia duration, MS type, and Kurtzke's Expanded Disability Status Scale (EDSS) indicating the patient's level of disability was all recorded.

Results: According to the GUSS test classification; while 14 patients had mild dysphagia, the remaining 16 patients did not reveal any dysphagia or aspiration risk. We found a weak correlation between EDSS and GUSS ($r=-0.227$), and between EDSS and Subjective Duration of Dysphagia ($r=-0.227$). There was a moderate and negative correlation between GUSS and duration of disease (-0.543), GUSS, and teeth status ($r=-0.535$) but a weak correlation between GUSS and age; GUSS and duration of dysphagia. There was a significant difference in teeth status and GUSS score

Conclusion: As a result, individuals with MS may have swallowing dysfunction due to different conditions, so these patients should be evaluated closely in terms of swallowing function from the early stages of the disease immediately upon diagnosis. Thus, serious problems related to aspiration can be prevented.

Keywords: Multiple sclerosis, dysphagia, evaluation

Öz

Amaç: Disfaji hayati risk oluşturabilen bir semptomdur. Bu çalışma, MS hastalarının yutma fonksiyonu ve disfaji durumunu değerlendirmeyi ve disfajiye neden olabilecek faktörleri bulmayı amaçlamaktadır. Ayrıca MS hastalarında erken disfaji muayenesinin önemine dikkat çekmek amaçlanmaktadır.

Gereç ve Yöntem: Çalışmaya Mustafa Kemal Üniversitesi nöroloji kliniğine başvuran toplam 30 MS hastası dahil edildi. Yutma fonksiyonunun nicel değerlendirmesi için GUSS (Gugging Swallowing Screen) testi kullanılarak hastaların disfaji durumu değerlendirildi. Tüm hastaların demografik verileri (yaş, cinsiyet) kaydedildi. Hastalık süresi, varsa disfaji süresi, MS tipi ve hastanın özürüllük düzeyini gösteren Kurtzke'nin Genişletilmiş Özürüllük Durum Skalası (EDSS) kaydedildi.

Bulgular: GUSS test sınıflamasına göre; 14 hastada hafif disfaji varken, kalan 16 hastada disfaji veya aspirasyon riski saptanmadı. EDSS ile GUSS ($r=-0,227$) arasında ve EDSS ile Öznel Disfaji Süresi ($r=-0,227$) arasında zayıf bir ilişki saptandı. GUSS ile hastalık süresi ($-0,543$) ve GUSS ve dişlerin durumu ($r=-0,535$) arasında orta ve negatif bir korelasyon saptandı ancak GUSS ile yaş ve GUSS ile disfaji süresi arasında zayıf bir korelasyon vardı. Diş durumu ve GUSS skoru arasında ise anlamlı bir fark vardı.

Sonuç: MS'li bireylerde farklı koşullara bağlı olarak yutma güçlüğü görülebilmektedir, bu nedenle bu hastalar tanı konulduktan hemen sonra hastalığın erken evrelerinden itibaren yutma fonksiyonu açısından yakından değerlendirilmelidir. Böylece aspirasyonla ilgili ciddi sorunların önüne geçilebilir.

Anahtar Kelimeler: Multipl skleroz, disfaji, değerlendirme



INTRODUCTION

Multiple sclerosis (MS) is a chronic inflammatory demyelinating disease of the central nervous system. The etiology is still unknown, both genetic and environmental factors play a role in the development of the disease.^[1,2] MS is more common in women and young adults. The prevalence is very variable in different geographical regions.^[3] According to the localization of the lesions in the central nervous system, a variety of symptoms are seen. The most common symptoms are vision problems, imbalance, weakness, urinary incontinence, loss of sensation, speech and swallowing problems.^[2]

Swallowing is a complex function realized through voluntary and involuntary movements with oral, pharynx, larynx, esophagus and respiratory muscles and other anatomical structures.^[4] Swallowing disorder is defined as dysphagia. Lesions of the cerebral cortex associated with swallowing function and problems due to neuromuscular transmission can cause dysphagia.^[5] Dysphagia is a life-threatening symptom in patients with MS.^[6] Incidence varies between 33% and 43% in MS patients.^[7] Aspiration pneumonia due to dysphagia is the leading cause of mortality in MS patients.^[8] Malnutrition and dehydration due to dysphagia also contribute to mortality.^[7,9] If dysphagia can be determined by a quick and easy applicable screening method, these complications can be prevented. Therefore, for dysphagia in the subclinical period, early diagnosis is critical.^[9] However, dysphagia in MS usually receives limited attention. Therefore, it is important for neurologists to recognise minor symptoms of dysphagia and to be aware of the new methods of evaluation.^[8,10] If swallowing disorders in MS patients, are detected early and treated appropriately in early term of the disease, many of the complications caused by dysphagia, including aspiration pneumonia, can be avoided. The present study aims to evaluate the swallowing function and dysphagia status of MS patients and to find factors may cause dysphagia. Also, to bring attention to importance of the early dysphagia examination in MS patients.

MATERIAL AND METHOD

This study was approved by the Clinical Study Ethics Committee of Mustafa Kemal University Tayfur Ata Sökmen Medical Faculty (Date: 26.09.2019, Decision No: 02). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Thirty MS patients who applied to the neurology clinic of Mustafa Kemal University between 15th September 2019-15th October 2019 were included in the study. All of the patients included in the study were diagnosed as MS according to the Mc Donald diagnostic criteria. Patients were informed about the study procedure and consent forms were obtained. Demographic data of all patients were recorded. The disease duration and if present, dysphagia duration is recorded.

The patients were asked to evaluate their swallowing status subjectively and they were asked to give a score between 1 and 10 to their swallowing status and, high scores mean healthy swallowing status. Patients were asked about the condition of their teeth and were asked whether they used dental prosthesis or not. Patients were evaluated for weight loss over the last 1 year. Patients were asked which way they are currently feeding; oral, nasogastric tube or percutaneous endoscopic gastrostomy. Patients questioned in terms of diet types; solid, semisolid, or liquid. The neurological examination of all patients was performed and MS type determined by the neurologist conducting the study. Kurtzke's Expanded Disability Status Scale (EDSS) was used to quantify the disability of the patients. Facial muscle weakness was evaluated by Manuel Muscle Test.

To determine the risk of dysphagia and aspiration in MS patients, easy and fast applicable tests are needed at the bedside of the patient. Gugging Swallowing Screen test (GUSS) is an easy and fast applicable test and helps to evaluate the degree of dysphagia gradually, allows the patient to make dietary recommendations after assessment. Dysphagia was evaluated using GUSS test for quantitative evaluation of swallowing function.^[11] This test consists of two main parts. The first section includes a preliminary assessment (indirect swallowing test) and evaluates saliva swallowing. The second part is the direct swallowing test and it consists of 3 subgroups that evaluate the ingestion of food firstly semi-solid, then liquid and finally solid consistency. The most successful performance is noted when applying subgroups. A maximum of 5 points can be reached in each subgroup. If 5 points are reached, switch to the other subgroup, if not, the test is terminated and further investigation by videofluoroscopy or fiberoptic endoscopy is recommended. A maximum of 20 points can be obtained from the test. The patient with a score of 20 is considered to have normal swallowing ability without aspiration risk and dysphagia. 0-9 points considered as severe, 10-14 points as moderate and 15-19 points as mild dysphagia. A score of 14 or fewer points carries a risk of aspiration.

RESULTS

The demographic characteristics of the patients are presented in **Table 1**. A total of 30 patients with MS were included in the study. 22 (73.3%) of the participants were female, 8 (26.7%) were male. The mean±SD age of the participants was 41.16±12.58 years (range 20-63 years). Thirteen of them had tooth bridge and 9 had a dental filling. All of them have oral feeding and can eat semisolid, liquid, and solid. The duration of the MS disease was 95.13±70.56 months and subjective dysphagia duration was 5.56±22.62 months. The mean±SD EDSS was 2.83±2.19 (range 1-7). All of the patients had relapse-remitting MS: 30 (100 %).

Table 1. Demographic characteristics of the patients

Characteristics		n	%
Sex	Male	8	26.7
	Female	22	73.3
Working Condition	Employed	13	43.3
	Unemployed	17	56.7
Feeding Type	Semisolid	0	0
	Liquid	0	0
	Solid	30	100
Teeth Status	Tooth filling	9	30
	Prosthesis	10	33.33
	Bridge	3	13.6
	Nothing	8	26.7
		X±SD	
Age(Years)		41.16±12.58	
Disease duration (Months)		95.13±70.56	
Subjective dysphagia duration (Months)		5.56±22.62	
Subjective swallowing status (0-10)		9.25±1.05	

There was a significant difference in teeth status and GUSS score ($p=0.043$, $\chi^2=6.284$).

According to muscle test results, most of them have 5 degrees of muscle test. We realized that smiling muscles were weaker than other muscles, this may be caused because they do not smile so much and do not use these muscles very much. Also, most of their tongue muscle strength is not in the best degree. There was a weak correlation between GUSS and muscle test (**Table 2**).

Table 2. Muscle test results

Muscle	Muscle Test Degree						GUSS	
	5		4		3		r	p
Orbicularis oculi	28	93.3	2	6.7	0	0	-0.236	0.210
Zygomaticus major	10	33.3	15	50	5	16.7	0.218	0.474
Buccinator	26	86.7	4	13.3	0	0	-0.33	0.916
Risorius	17	56.7	10	33.3	3	10	0.040	0.832
Masseter	29	96.7	1	3.3	0	0	0.082	0.667
Suprahyoid	30	100	0	0	0	0	-	-
Tongue protrusion	24	80	5	16.7	1	3.3	0.249	0.184
Tongue Down	20	66.7	8	26.7	2	6.7	0.157	0.408
Tongue Up	23	76.7	2	6.7	5	16.7	0.311	0.095
Tongue Right	17	56.7	7	23.3	6	20	0.097	0.751
Tongue Left	16	53.3	7	23.3	7	23.3	0.002	0.996

According to GUSS test results, no dysphagia was detected in 16 (53.3%) patients and mild dysphagia was detected in 14 (46.7%) patients. All the patients' scores were over 14 so none of them have aspiration risk (**Table 3**).

We found a weak correlation between EDSS and GUSS ($r=-0.227$), and between EDSS and Subjective Duration of Dysphagia ($r=-0.227$). There was a moderate and negative correlation between GUSS and duration of disease (-0.543), GUSS, and teeth status ($r=-0.535$) but a weak correlation between GUSS and age; GUSS and duration of dysphagia (**Table 4**).

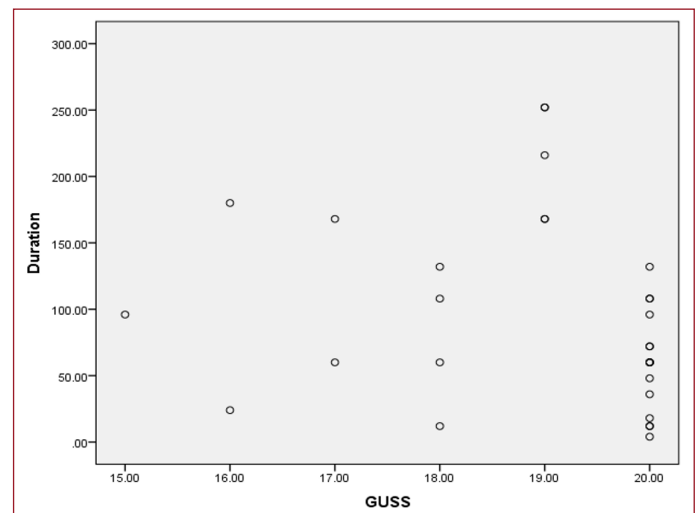
Table 3. Swallowing tests results

Gugging Swallowing Screen (GUSS)	n	%
20 (Semisolid / liquid and solid textures successful)	16 ($x=20$)	53.3
15-19 (Semisolid and liquid texture successful and solid unsuccessful)	14 ($x=17.71\pm 1.32$)	46.7
10-14 (Semisolid swallow successful and liquids unsuccessful)	0	0
0-9 (Preliminary investigation unsuccessful or semisolid swallow unsuccessful)	0	0

Table 4. Correlation between GUSS and characteristics

	GUSS	
	r	p
EDSS	-0.227	0.228
Age	-0.349	0.028
Duration of the disease	-0.543	0.002
Duration of dysphagia	0.163	0.389

There was a weak and negative correlation between GUSS and age ($r=-0.349$), a moderate and negative correlation between GUSS and duration of the disease ($r=-0.543$), (**Graph 1**). Also, there was a moderate and negative correlation between subjective swallowing status- duration of the disease ($r=-0.44$) and subjective swallowing status-duration of the dysphagia ($r=-0.40$).

**Graph 1.** Correlation between GUSS and duration of the disease. $r=-0.543$, $p=0.002$

DISCUSSION

MS is a chronic, progressive and neurodegenerative disease that can affect swallowing functions. In this study, we aimed to examine swallowing status in MS patients. We found that 16 of the patients had healthy swallowing function and 14 of them had mild dysphagia. It was concluded that duration of the disease affect swallowing function negatively, so clinicians should consider dysphagia in MS patients and routine swallowing function examining should be included to the neurological examination of the MS patients.

In a meta-analysis evaluating the frequency of dysphagia in MS patients, the frequency of dysphagia was 43.33% and this rate was similar to our study results.^[12] The prevalence of dysphagia in MS patients varies between 10% and 90%.^[13,14] This result showed that dysphagia is a common problem in MS patients. As the reason for this variability in dysphagia prevalence of MS patients, it might be because of evaluation methods, data collection procedures, and different sample sizes. In our study, according to GUSS test results, no dysphagia was detected in 16 of the (53.3%) patients and mild dysphagia was detected in 14 of the (46.7%) patients. This rate is substantial. Especially considering the patient's life is in question, it appears that dysphagia is one of the important problems of MS patients.

Poorjavad et al. found a significant relationship between disease duration and the frequency of dysphagia.^[9] In our study patients' disease duration is not long as much as it may cause severe dysphagia. But the correlation that we found between dysphagia and disease duration shows us that MS patients have a risk of swallowing problems in the future and they are a candidate for dysphagia.

In our study, we found a weak correlation between EDSS and dysphagia and this was not consistent with the literature.^[4,7,13,15] This may be probably due to low EDSS scores of our patients and a low number of patients.

Chewing ability is dependent on teeth status. Thus, the presence of prosthetic teeth, filled teeth, or tooth loss is expected to indirectly disturb the coordinated execution of pre-swallow and swallowing behaviors. In our study, we revealed that there was a significant difference in teeth status and GUSS score. Revealing that significant difference between dental status and swallowing functions of patients may show that dental problems can trigger dysphagia in individuals with MS.

In this study, there were no patients with moderate or severe dysphagia, patients' dysphagia status were mild (46.7%) and this was consistent with the literature found by Fernandes et al (40.8%).^[13] However, we think that there may be changes in the results by increasing the number of participants with future studies. The limited number of samples can be considered as one of the limitations of our study. Another limitation is that the GUSS test results could be checked with further examinations such as videofluoroscopy or fiberoptic endoscopy to make fewer mistakes. And the last limitation of the study is that a control group could have been included in the study to evaluate the significance of the test results. Further studies are needed to reveal the relationship between MS and dysphagia more clearly.

We did not find a significant correlation between muscle test degree and dysphagia. Patients have mild dysphagia or healthy swallowing so, muscle test degree did not affect significantly. Also, muscle test degree was in good status except for zygomaticus major and tongue muscles. The zygomaticus major and Risorius muscles are muscle of facial expression which draws the angle of the mouth superiorly

and posteriorly to allow one to smile.^[14] Their muscle test degree was not 5, this means that MS patients are not smiling so much and this caused weakness in smiling muscles. So MS patients should have support from a psychologist.

CONCLUSION

As a result, individuals with MS may have swallowing dysfunction due to different conditions, so these patients should be evaluated closely in terms of swallowing function from the early stages of the disease immediately upon diagnosis. Thus, serious problems related to aspiration can be prevented.

ETHICAL DECLARATIONS

Ethics Committee Approval: This study was approved by the Clinical Study Ethics Committee of Mustafa Kemal University Tayfur Ata Sökmen Medical Faculty (Date: 26.09.2019, Decision No: 02).

Informed Consent: Patients were informed about the study procedure and consent forms were obtained.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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