RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ
Journal of Advanced Research in Health Sciences / Sağlık Bilimlerinde İleri Araştırmalar Dergisi 2025
DOI: 10.26650/JARHS2025-1538644

EVALUATION OF SWALLOWING AND NUTRITION STATUS IN PARKINSON'S DISEASE

PARKİNSON HASTALIĞINDA YUTMA VE BESLENME DURUMUNUN DEĞERLENDİRİLMESİ

Erdi ŞAHİN[1], Büşra ZORLU ÜÇÜNCÜOĞLU[1], Bedia SAMANCI[1], Başar BİLGİÇ[1], Haşmet Ayhan HANAĞASI[1]

[1]İstanbul University, İstanbul Faculty of Medicine, Department of Neurology, Behavioral Neurology and Movement Disorders Unit, İstanbul, Türkiye

ORCID ID: E.Ş. 0000-0002-5792-2888; B.Z.Ü. 0009-0002-9851-3324; B.S. 0000-0003-0667-2329; B.B. 0000-0001-6032-0856; H.A.H. 0000-0002-4624-4428

Citation/Atıf: Şahin E, Zorlu Üçüncüoğlu B, Samancı B, Bilgiç B, Hanağası HA. Evaluation of swallowing and nutrition status in Parkinson's disease. Journal of Advanced Research in Health Sciences 2025;8(1):42-46. https://doi.org/10.26650/JARHS2025-1538644

ABSTRACT

Objective: One of the significant issues in Parkinson's disease (PD) is the risk of malnutrition due to taste and smell alterations at the early stages and the later onset of dysphagia. Dysphagia can cause complications like aspiration, which may accelerate the progression of the disease. Our study evaluates swallowing difficulties and nutritional status using objective questionnaires in PD patients who did not report any issues with swallowing or feeding.

Material and Methods: Forty patients had undergone swallowing and feeding-related tests during their outpatient visits.

Results: There was no significant relationship between the Gugging Swallow Screening (GUSS) score and body mass index (BMI), whereas there was a positive correlation between BMI and Mini Nutritional Assessment-Short Form (MNA-SF) scores (r=0.489, p=0.001). Additionally, there was a positive correlation between GUSS and MNA-SF scores (r=0.397, p=0.011).

Conclusion: In this study, various degrees of swallowing and feeding disorders were identified in most of our patients who did not complain of such issues. Therefore, it is considered crucial to conduct objective assessments of swallowing and feeding during each visit for PD patients, even if not mentioned by the patients or their caregivers. This early detection of dysphagia and malnutrition risk and taking necessary measures is believed to be important for ensuring proper management.

Keywords: Parkinson's disease, swallowing, nutrition, neurodegenerative disease

ÖZ

Amaç: Parkinson hastalığında, en önemli problemlerden biri tat ve koku değişikliğine bağlı malnütrisyon riski ve ilerleyen dönemde ortaya çıkan disfajidir. Disfaji aspirasyon gibi komplikasyonlara neden olabilmekte, hastalığın ilerleyişini hızlandırmaktadır. Bu çalışmanın amacı, kendisi ve bakım vereni, yutma ve beslenme bozukluğundan yakınmayan Parkinson hastalarında yutma güçlüğü ve beslenme durumunun değerlendirilmesidir.

Gereç ve Yöntemler: Poliklinik başvuruları esnasında yutma ve beslenme ile ilgili testleri yapılmış olan 40 hasta çalışmaya dâhil edilmiştir.

Bulgular: Hastaların BKİ ile GUSS skoru arasında anlamlı ilişki gözlenmezken, BKİ ile MNA-SF skorları arasında pozitif korelasyon gözlendi (r=0,489, p=0,001). Ayrıca GUSS ve MNA-SF skorlarının da pozitif korelasyon gösterdiği bulundu (r=0,397, p=0,011).

Sonuç: Bu çalışmada yakınması olmayan hastaların büyük kısmında çeşitli derecelerde yutma ve beslenme bozuklukları saptanmıştır. Bu nedenle hasta ve yakınları tarafından dile getirilmese de Parkinson hastalarında her başvuruda yutma ve beslenme ile ilgili objektif değerlendirmelerin yapılmasının disfajinin ve malnütrisyon riskinin erkenden saptanması ve gerekli önlemlerin alınmasını sağlayacağından önemli olduğu düşünülmektedir.

Anahtar Kelimeler: Parkinson hastalığı, yutma, nütrisyon, nörodejeneratif hastalık

Corresponding Author/Sorumlu Yazar: Erdi ŞAHİN **E-mail:** erdi.sahin@istanbul.edu.tr; erdisahin@gmail.com

Submitted/Başvuru: 26.08.2024 • **Revision Requested/Revizyon Talebi:** 26.09.2024 • **Last Revision Received/Son Revizyon:** 13.11.2024 • **Accepted/Kabul:** 18.11.2024 • **Published Online/Online Yayın:** 28.01.2025

INTRODUCTION

The second most common neurodegenerative disease is Parkinson's disease (PD) following Alzheimer's disease, and the prevalence of the disease has been increasing in recent years (1). Early neurodegeneration of the substantia nigra pars compacta causes this disease, and it accounts for 80% of all parkinsonism cases. (2). Dopamine deficiency is the main neurobiochemical abnormality associated with this disease (3, 4). Accordingly, motor symptoms, including rigidity, tremor, and postural instability, especially bradykinesia, are the most common manifestations of PD (5). However, non-motor symptoms, including loss of smell, depression, anxiety, REM sleep behaviour disorder, constipation, bladder dysfunction, cognitive impairment, pain, and sensory complaints, may also occur as a result of the involvement of other brain regions during the earlier stages of the disease and during its progressive prognosis (6, 7).

Weight loss in patients with PD may occur due to different symptoms, which can start years before the diagnosis. (8-10). Affected individuals may experience a decrease in motor function and initial weight gain due to treatments, including levodopa and dopamine agonists, during the years following the onset of symptoms (11). Nevertheless, weight loss associated with an increase in the amount of energy consumption due to muscle hypertonia and dyskinesia occurs during the course of the disease with an increased risk of malnutrition. Reduced daily activities, including shopping and cooking, associated with disrupted motor symptoms are considered to play a role in decreased food and energy intake. Furthermore, alterations in stomach and bowel movements may cause bloating, discomfort, nausea, and early satiety. Decreased cognitive performance and sense of smell also affect eating behaviours, and individuals with cognitive impairment may forget whether they have eaten or not. It is well established that dysphagia, which may occur during the disease, also contributes to malnutrition. Dysphagia and malnutrition may worsen the existing clinical picture, cause complications such as aspiration, and accelerate disease progression in the affected patients. Early symptoms such as changes in appetite and nutrition, weight loss, and dysphagia, which can appear during the initial stages of the disease, may often be overlooked and not reported by the patient or their relatives. This contrasts with motor symptoms, which receive more clinical attention. Therefore, it is important to monitor these symptoms regularly for early recognition and to take the necessary precautions (11-13).

In this study, we evaluated dysphagia and nutritional status in patients with PD who did not present with complaints of dysphagia or malnutrition using objective questionnaires in an outpatient clinic.

MATERIAL AND METHODS

Selection of the participants

In this descriptive and cross-sectional study, 40 patients who were followed up at the Movement Disorders Outpatient Clinic of the Department of Neurology, Division of Behavioral Neurology and Movement Disorders, Department of Neurology, Istanbul Faculty of Medicine, Istanbul University were included. Patients who presented to the outpatient clinic between September 2022 and January 2023 and were diagnosed with possible PD based on the Parkinson's Disease Society Brain Bank diagnostic criteria were selected. (14). The patients underwent swallowing and feeding tests during their outpatient visits, and their demographic and clinical characteristics were captured. All patients were examined by neurologists specialised in Movement Disorders during outpatient clinic assessments, and their medical history, examination findings, neuroimaging results, and other investigations were noted in detail. The Gugging Swallow Screening (GUSS) test and Mini Nutritional Assessment-Short Form (MNA-SF) were used to analyse dysphagia and nutritional status during outpatient clinic visits. Patients were evaluated at outpatient clinic visits during which neither the patients themselves nor their relatives mentioned any swallowing complaints. Informed written consent was obtained from all patients. Ethical approval was obtained from İstanbul University Ethics Committee (Date: 22.02.2021, No: 94690).

Statistical analysis

Statistical analyses of the results were performed using the statistical software SPSS, Version 21.0 (IBM SPSS Corp., Armonk, NY, USA).

Hugging Swallow Screening Test

The GUSS test consists of two stages: the first stage is the indirect swallowing test, which is a preliminary assessment, followed by the second stage, the direct swallowing test, which includes three sub-tests. The first stage comprises the ability to maintain wakefulness for 15 min, to cough and/or clear the throat voluntarily at least twice, and to swallow saliva successfully without a change in voice or salivation. Patients who pass this first part of the GUSS with a full score of 5 continue on the second stage, which is a direct swallowing test with foods of variable fluidity. During the direct swallowing test, signs of aspiration were observed, including delayed swallowing (<2 s for liquids and semi-solids, >10 s for solids), involuntary cough (Before, during, 3 min after swallowing), drooling, and changes in voice. Assessment was performed after 5 teaspoons of semi-solid food intake. Those who were successful were then assessed with liquid (Starting with 3 mL, followed by increasing amounts of 5, 10, 20 and 50 mL). Patients who successfully scored full points at this stage were then tested with solid food (15).

Direct swallowing assessment was performed using yogurt for semi-solid foods, water for liquid foods, and biscuits for solid foods in our outpatient clinic. A total of 20 points can be scored with 5 points from the first section and a maximum of 5 points from each consistency thereafter.

The test scores were evaluated as follows for dysphagia and aspiration (15).

0-9 points: Severe

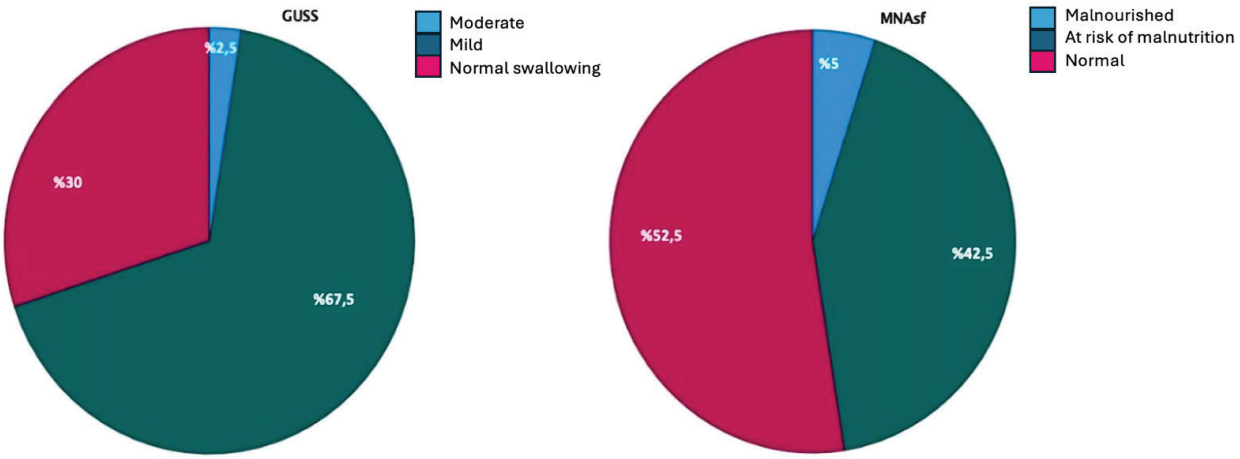

Figure 1: The Gugging Swallow Screening (GUSS) test and Mini Nutritional Assessment-Short Form (MNA-SF) results of the patients

10-14 points: Moderate

15-19 points: Mild

20 points: Normal swallowing

Mini nutritional assessment-short form

The Mini Nutritional Assessment (MNA) was conducted using six survey items (questions A-F1/F2), which are the MNA-SF with a maximum score of 14 points. These items cover the patient's weight loss, food intake, mobility, body mass index (BMI), psychological stress or acute illness, and depression or memory problems. Calf circumference may be appropriate in cases in which BMI measurement is not possible (16).

The test score is evaluated as follows for malnutrition:

12–14 points: Normal

8–11 points: At risk

0–7 points: Malnourished

RESULTS

Clinical characteristics and demographics of the patients

The present study included 40 patients [19 females (47.5%), 21 males (52.5%)] who presented to our outpatient clinic between September 2022 and January 2023 and were followed up with a diagnosis of PD. The mean age of the patients was 64.7±11.9 years, mean disease duration was 10.7±6.2 years, and mean follow-up duration was 10.2±5.9 years. Hoehn and Yahr staging scale of 7 patients were Stage 1, 17 were Stage 1.5, 10 were Stage 2, 2 were Stage 2.5, and 4 were Stage 3. The mean BMI of the patients was 27±7.66 kg/m^2. The mean levodopa equivalent dose administered to the patients was 1200.8±1152.70.

GUSS and MNA-SF test results

Upon review of the patients by swallowing using the GUSS test, 27 of 40 patients had mild dysphagia (67.5%) and 1 patient had moderate dysphagia (2.5%). Twelve patients had normal swallowing (30%). Upon review of the patients according to malnutrition using the MNA-SF test, 17 of 40 patients (42.5%) were at risk and 2 were malnourished (5%). The remaining 21 patients (52.5%) were normal (Figure 1).

There was no significant correlation between BMI and GUSS scores, whereas a positive correlation was observed between BMI and MNA-SF scores (r=0.489, p=0.001). There was a positive correlation between GUSS and MNA-SF scores (r=0.397, p=0.011). There was no significant correlation between the clinical parameters, levodopa equivalent dose, GUSS score, and MNA-SF test score.

All patients who were at risk in the swallowing test were referred to the Ear, Nose, and Throat (ENT) outpatient clinic for instrumental evaluation. Recommendations were made for swallowing safety and therapy. Patients at risk were interviewed by a dietitian, and oral nutritional supplements (ONS) were started based on their daily caloric needs and comorbidities.

DISCUSSION

Dysphagia and malnutrition may occur at various stages of PD. Recent studies have highlighted varying rates of malnutrition and dysphagia across different stages of PD and how these conditions evolve with disease progression. Coelho et al. revealed that patients in the late stages of PD exhibited significantly higher rates of dysphagia, often reaching critical levels that necessitate advanced interventions (17). Similarly, a meta-analysis by Kalf et al. showed that the prevalence of oropharyngeal dysphagia increased from the early to the advanced stages of PD, reaching nearly 100% in some advanced cases (18). These studies highlight a crucial link between disease progression and increased risk of malnutrition due to dysphagia. In this study, dysphagia was detected at various levels in a large proportion of patients, and malnutrition risk or malnutrition was observed in nearly half of the patients. These results are significant because patients who did not have swallowing or feeding difficulties according to either self-report or their caregivers' observations were evaluated, and swallowing dysfunction was observed in most patients.

Increased basal metabolism and energy expenditure due to motor symptoms play a pivotal role in the aetiology of weight loss in patients with PD. A reduction in body weight was reported in the advanced and early stages. Drug-related side effects, including nausea/vomiting, gastrointestinal problems (delayed gastric emptying, constipation), anorexia, insomnia, fatigue, irritability, and anxiety, may lead to malnutrition due to increased energy need associated with tremor, dyskinesia and rigidity, decreased energy intake and/or dry mouth due to conditions, including olfactory dysfunction, cognitive impairment, dysphagia and impaired manual dexterity (inability to prepare meals) (11). Many studies that compared patients with PD and healthy controls reported that PD patients had a lower BMI. Beyer et al. compared 51 PD patients with 49 healthy controls and reported that their patients lost an average of 3.3 kg more weight (10). Malnutrition may result in a higher risk of infection, delayed wound healing, reduced muscle strength and mobility, and an increased tendency towards depression. The number of hospital admissions and hospitalisations is higher, systemic infections have a much more severe course, durations of hospital stay are longer, and complication rates are higher in malnourished patients (19). Although malnutrition was mentioned neither by the patient nor the caregivers, 17 (42.5%) patients were at risk and 2 (5%) patients were malnourished in our cohort of 40 patients in this study. These results indicate the importance of evaluation via objective questionnaires in patients who did not raise relevant complaints.

Dysphagia is one of the most prevalent and significant causes of malnutrition in patients with PD. The main cause of dysphagia is considered to be the reduced rate of swallowing and slowed mastication, consistent with the nature of the disease, a hypokinetic movement disorder. Dysphagia may be subjectively reported by patients or caregivers or detected objectively using instrumental tools (20, 21). The rate of subjectively reported dysphagia was 68% among patients with late-stage PD in a cross-sectional study involving the Barcelona and Lisbon cohorts (22). Dysphagia was detected in more than 50% of participants with PD who did not report dysphagia among studies using instrumental tools, such as fiberoptic endoscopic swallowing or videofluoroscopic swallowing assessment (23, 24). The prevalence of oropharyngeal dysphagia was 35% in subjective reports and 82% in objective evaluations, and the rate of dysphagia in advanced stages was reported as 95%–100% in a meta-analysis, which reviewed the prevalence of dysphagia in all PD stages (17, 25). More than 20%–40% of individuals with PD were not aware of swallowing disorders, and only >10% personally reported symptoms of dysphagia (25, 26). Although subjective dysphagia was not reported, the rates of mild and moderate dysphagia were 67.5% and 2.5%, respectively, in the patients included in our study. In our study, there was no significant correlation between the Hoehn and Yahr stages and the levodopa equivalent dose level and test scores, which are considered to correlate with the motor symptoms of the disease. This finding indicates the fact that dysphagia may occur at any stage of the disease, not only when motor symptoms progress.

It is well established that dysphagia and weight loss are closely related in patients with PD. In a previous study that investigated the aforementioned relationship, 31% of the participants had dysphagia, and the BMI of the dysphagic group was considerably lower than that of the non-dysphagic group (13). Another study reported the rate of dysphagia as 43% in elderly participants, where 59% were malnourished and 35% were at risk (14). In this study, there was a positive correlation between dysphagia and BMI and malnutrition scores.

The major limitation of this study is that due to the retrospective design of the study and the absence of a relationship between dysphagia, malnutrition, and the Unified Parkinson's Disease Rating Scale, not all objective motor examination scores of the patients were available. The authors attempted to mitigate this limitation indirectly by using the Hoehn and Yahr staging and performing related analyses by considering that the levodopa equivalent dose increases as rigidity and bradykinesia increase. The retrospective design of this study may introduce selection bias, as patients who attend clinic visits could regularly differ in key characteristics from those who do not. Furthermore, the cross-sectional nature of the study limits our capacity to establish causal inferences regarding the relationship between clinical parameters, as the associations observed reflect correlations rather than causation. To better understand how dysphagia progression directly affects the nutritional status and clinical outcomes in PD patients over time, future longitudinal studies would be beneficial.

Patients with PD and their relatives are not aware that swallowing disorders may lead to certain complications like aspiration pneumonia, accelerating disease progression and causing increased mortality. Swallowing and feeding disorders of various degrees were found in most patients without complaints in this study. Therefore, although it is not mentioned by the patients or their relatives, it is important to perform objective evaluations in PD patients regarding swallowing and feeding at each admission, as this can enable early detection of dysphagia and malnutrition risk and take necessary precautions.

Ethics Committee Approval: This study was approved by İstanbul University (Date: 22.02.2021, No: 94690).

Informed Consent: Informed written consent was obtained from all patients.

Peer Review: Externally peer-reviewed.

Author Contributions: Conception/Design of Study- H.H., B.B., B.S., E.Ş., B.Ü.; Data Acquisition- H.H., B.S., E.Ş., B.Ü.; Data Analysis/Interpretation- H.H., B.B., B.S., E.Ş.; Drafting Manuscript- B.S., E.Ş., B.Ü.; Critical Revision of Manuscript- H.H., B.B., B.S., E.Ş.; Final Approval and Accountability- H.H., B.B., B.S., E.Ş., B.Ü.; Material and Technical Support- H.H., B.S., E.Ş., B.Ü.; Supervision- H.H., B.B., B.S.

Conflict of Interest: The authors declare that there is no conflict of interest.

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

REFERENCES

1. Gökçal E, Gür VE, Selvitop R, Babacan Yıldız G, Asil T. Motor and non-motor symptoms in Parkinson's Disease: Effects on quality of life, Noro Pskiyatr Ars 2017;54(2):143-8.
2. Chaudhuri KR, Martinez-Martin P, Schapira HVA, Stochhi F, Sethi K, Odin P et al. International multicenter pilot study of the first comprehensive self-completed nonmotor symptoms questionnaire for Parkinson's disease: The NMSQuest study. Mov Disord 2006;21;7:916-23.
3. Emre M, Hanağası H, Şahin H. Yazıcı J. Istanbul Faculty of Medicine Neurology Book Movement Disorders Chapter. Istanbul;Murat Emre 2019.p.301-67.
4. Garcia-Ruiz PJ, Chaudhuri KR, Martinez-Martin P. Non-motor symptoms of Parkinson's disease a review from the past. J Neurol Sci 2014;338:30-3.
5. Turkish Neurology Society and Turkish Parkinson's Disease Association Parkinson's Disease and Movement Disorders Study Group. Ankara, Ayse Bora Tokcaer 2023.p.35-83.
6. Chaudhuri KR, Healy DG, Schapira AH. Non-motor symptoms of Parkinson's disease: Diagnosis and management. Lancet Neurol 2006;5:235-45.
7. Naidu Y, Chaudhuri KR. Early Parkinson's disease and non motor issues. J Neurol 2008;255:33-8.
8. Chen H, Zhang SM, Schwarzschild MA, Hernan MA, Willett WC, Ascherio A. Obesity and the risk of Parkinson's disease. Am J Epidemiol 2004;159(6);547-55.
9. Aiello M, Eleopra R, Rumiati RI. Body weight and food intake in Parkinson's disease. A review of the association to non-motor symptoms. 2015;84;04-211.
10. Beyer PL, Palarino M, Michalenk D, Busenbark K, Koller W. Weight change and body composition in patients with Parkinson's Disease. J Am Diet Assoc 1995;95;979-83.
11. Barichella, M, Cereda E, Pezzoli G. Major nutritional issues in the management of Parkinson's disease. Mov Disord 2009;24(13);1881-92.
12. Foley NC, Marti RE, Salter KL, Teasell RW. A review of the relationship between dysphagia and malnutrition following stroke. J Rehabil Med 2009;41(9);707-13.
13. Nozaki S, Saito T, Matsumura T, Miyai I, Kang J. Relationship between weight loss and dysphagia in patients with Parkinson's disease. Rinsho Shinkeigaku 1999;39(10);1010-14.
14. Hughes AJ, Daniel SE, Kilford L, Lees AJ. Accuracy of clinical daignosis of idiopathic Parkinson's disease. A clinico-pathological study of 100 cases. J Neurol Neurosurg Psychiatry 1992;55:181-4.
15. Trapl M, Enderle P, Nowotny M, Teuschl Y, Matz K, Dachenhausen A et al. Dysphagia bedside screening for acute-stroke patients: the Gugging Swallowing Screen. Stroke 2007;38(11);2948-52.
16. Bauer JM, Vogl T, Wicklein S, Trogner J, Muhlberg W, Sieber CC. Comparison of the mini nutritional assessment, subjective global assessment, and nutritional risk screening (NRS 2002) for nutritional screening and assessment in geriatric hospital patients. Z Gerontol Geriatr 2005;38(5);322-7.
17. Coelho M, Marti MJ, Tolosa E, Ferreira JJ, Valldeoriola F, Rosa M, et al. Late-stage Parkinson's disease: the Barcelona and Lisbon cohort. J Neurol 2010;257(9):1524-32.
18. Kalf JG, de Swart BJ, Bloem BR, Munneke M. Prevalence of oropharyngeal dysphagia in Parkinson's disease: a meta-analysis. Parkinsonism Relat Disorders 2012;18(4):311-5.
19. Burgos R, Breton I, Cereda E, Desport JC, Dziewas R, Genton L et al. ESPEN guideline clinical nutrition in neurology. Clin Nutr 2018;37:354-96.
20. Müller J, Wenning GK, Verny M, McKee A, Chaudhuri KR, Jellinger K et al. Progression of dysarthria and dysphagia in postmoertem confirmed parkinsonian disorders. Arrc Neurol 2001;58(2):259-64.
21. Umemoto G, Furuya H. Management of dysphagia in patients 994 with Parkinson's disease and related disorders. Intern Med 2020;59(1):7-14.
22. Coelho M, Marti MJ, Tolosa E, Ferreira JJ, Valldeoriola F, Rosa M et al. Late-stage 1000 Parkinson's disease: the Barcelona and Lisbon cohort. J Neurol 2010;257(9):1524–32.
23. Fuh J, Lee RC, Wang J, Lin CH, Wang PN, Chiang JH et al. Swallowing difficulty in Parkinson's disease. Clin Neurol Neurosurg 1997;99(2):106–12.
24. Pflug C, Bihler M, Emich K, Niessen A, Nienstedt JC, Flugel T et al. Critical dysphagia is common in Parkinson disease and occurs even in early stages: a prospective cohort study. Dysphagia 2018;33(1):41-50.
25. Kalf JG, Swart BJM, Bloem BR, Munneke M. Prevalence of oropharyngeal dysphagia in Parkinson's disease: a meta analysis. Parkinsonism Relat Disord 2012;18(4):311–5.
26. Rosenbek JC, Troche MS. Progressif neurologic disease and dysphagia (including Parkinson's disease, multiple sclerosis, amyotrophic lateral sclerosis, myasthenia gravis, post-polio syndrome) In: Shaker R, Belafsky PC, Postma GN, Easterling C, editors. Principles of deglutition: a multidisciplinary text for swallowing and its disorders. San Diego:Springer; 2013.p.395–409.