

REVIEW ARTICLE

DYSPHAGIA IN NEUROLOGICAL DISORDERS

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Amelia Śledzik¹, Paweł Szlendak²¹DEPARTMENT OF NEUROLOGY, MEDICAL UNIVERSITY OF LUBLIN, LUBLIN, POLAND²CHAIR AND DEPARTMENT OF REHABILITATION AND ORTHOPAEDICS, MEDICAL UNIVERSITY OF LUBLIN, LUBLIN, POLAND**ABSTRACT****Introduction:** Neurogenic dysphagia is a frequent disorder affecting people with neurological diseases. Many experts work together to diagnose and treat dysphagia.**The aim:** The article focuses on the specificity of neurogenic dysphagia, its symptoms and treatment possibilities. The speech pathologist can be included in the diagnostic process and can evaluate the intake of liquids and foods based on a variety of consistency tests. In clinical conditions, screening tests such as water swallowing test, multiple consistency tests: GUSS (Gugging Swallowing Screen), V-VST (Volume-Viscosity Swallow Test) and EAT-10 questionnaire can be used successfully. If you have limited ability to perform instrumental tests, they can help you to expand your diagnosis.**Review and Discussion:** Treatment of swallowing disorders is based on a daily modification of the patient's posture and consistency of the eaten meals. Nursing staff are involved in this adaptation activity, which plays an invaluable role in the diagnosis and treatment of patients in neurological and rehabilitation departments.**Conclusions:** Despite the knowledge of the problem, difficulty swallowing is still unnoticed. The effects of this neglect are felt both for patients and from the perspective of management within treatment units. For people suffering from neurological diseases, swallowing disorders should be diagnosed on a compulsory basis and their assessment should be a permanent part of the standard procedures for assessing patients with neurological deficits.**KEY WORDS:** deglutition, dysarthria, speech

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INTRODUCTION

Dysphagia is an disorder whose importance is still not sufficiently taken into account. The consequences of a poor diagnosis or complete failure to do so are marginal in terms of both individual patient and hospital department management.

Person with swallowing disorders have to face the health, social and psychological consequences of the disease. Experts in different areas should be involved in the diagnostic process. The neurogene dysphagia mentioned in the Article affects patients who have been subjected to vascular incidents, with active neurodegenerative diseases or other nervous system disorders.

THE AIM

The aim of the study is to highlight the problem of swallowing disorders as a common phenomenon in neurological patients. The indication of dysphagia as one of the signs of neurological diseases shows the extent of the problem and prompts for mandatory procedures. Here, it is proposed to include in the diagnostic process simple tools that will help to capture and clarify existing deficits. The Article also focuses on identifying the role of teamwork as an integral part of the examination and treatment of neurogenic dysphagia.

REVIEW AND DISSCUSION**MEDICAL DEFINITIONS OF DYSPHAGIA**

All the definitions of dysphagia are based on the anatomy and physiology of the swallowing process. Water and food consumption is a complexed activity that includes an oral preparatory phase, the bolus formation and eventually deglutition [1].

The swallowing process involves the precise, organized work of 31 pairs of skeletal muscle and 5 cranial nerves (V, VII, IX, X, XII) [2]. The swallowing act is one of the most complex processes in the human body. Includes activation of several areas of the brain; the brain stem, as well as peripheral structures, including head and neck muscles [3].

In the International Classification of Diseases and Health Problems ICD-10, dysphagia code R13 is a disorder that is characterized by difficulty in swallowing. According to the World Gastroenterological Organization, dysphagia may be associated with the initial stages of the deglutition and may involve the so-called oral and pharyngeal phases and/or the feeling that the foods or fluids cannot exceed the path from esophagus to stomach - we are talking about esophageal phase disturbances [4]. There are three phases of the swallowing:

- **The oral phase** - (preparatory and oral transit phase). In the first stage, the bite is crushed and mixed with saliva. The second part, in the uninterrupted swallowing

process, means the ability to hold food or fluid in the front of the bottom of the mouth. It stimulates receptors around the soft palate, palatal arches, the root of the tongue, and the palatal wells. The soft palate it's a natural barrier that protects against uncontrolled ingress of food into the throat.

- **Pharyngeal phase.** The stage of reflex bite or fluid movement from the oropharynx to the esophagus. In this phase, the laryngeal lumen is protected by displacement of the hyoid-laryngeal complex, which prevents aspiration of the digestive tract into the respiratory tract.
- **Esophageal phase.** This last stage of swallowing is a reflex reaction which consists of passing peristaltic movement of the digestive content through the esophagus toward the stomach [1, 5].

Due to its location, an upper dysphagia is distinguished from the oral-pharyngeal phase and the lower dysphagia associated with esophageal phase disorders. The diagnosis of oral-throat disorders is usually performed by an otolaryngologist, phoniatrician and neurologist. The difficulties arising in the esophageal phase are a problem which should be diagnosed by a gastroenterologist or/ or a neurologist, as this type of dysphagia often co-exists with neurological diseases [1, 5].

NEUROGENIC DYSPHAGIA

Neurogenic dysphagia is a neuromuscular etiology disorder. It includes difficulties in maintaining adequate muscle tension in cheeks, lips, limited tongue and jaw movement, and concerns the lack of coordination of tongue work, poor soft palate movement, oral and throat feeling disorders and ring-throat muscle failure. Neurological conditions in which neurogenic dysphagia occurs include stroke, brain tumors, demyelinating outbreaks, motoneuron diseases, neurodegenerative diseases, neuropathy and myasthenia gravis [6].

In addition to the facial nerve disorders resulting from brain stem damage, dysphagia may be caused by cerebellum damage, pyramidal disorders (in vascular parkinsonism) and damage to the upper motor neurone. There is also a correlation between the laterality of damage and the type of dysphagia (left-sided damage leads to disturbances in the oral phase, while right hemisphere localization is most often in the pharyngeal phase) [7].

According to World Gastroenterology Organization data, between 42% and 67% of patients develop dysphagia symptoms within three days of stroke and one third of patients experience complications in the form of aspiration pneumonia. Statistically 50% of people with Parkinson's disease suffer from dysphagia with oropharyngeal phase disorders [4].

Equally often, dysphagia is related to neurological diseases such as Alzheimer's disease (32%) Frontotemporal dementia (30%) Progressive supranuclear palsy (initial stage 6%, later stages: 83%), Olive-cerebellar atrophy (44-75%), Huntington's disease 85%, Multiple sclerosis (34%),

Amyotrophic lateral sclerosis. Dysphagia also develops in the first stage of the disease in more than 30% of patients with SLA and is common in later stages. Swallowing disorders occur also in 60% of patients with inflammatory myopathy [8].

Based on the above statistical data, it can be said with certainty that the problem is large and that the likelihood of contact with a patient who has developed swallowing disorders is very high. Although dysphagia is a problem that is understood and increasingly recognized in clinical practice, it has a number of nonspecific symptoms. In rehabilitation centers, medical and therapeutic staff can encounter with varying degrees of swallowing disorders: from discreet to severe symptoms. This means that they frequently remain unrecognized.

SYMPTOMS OF SWALLOWING DISORDERS

Dysphagia may be affected by oral and pharyngeal disturbances which manifest themselves:

- difficulty in feeding and swallowing food,
 - inability to eat certain types of food,
 - inability to keep fluids and food inside the mouth (e.g. liquid leakage),
 - keeping the food residue in the mouth long after eating [9].
- In swallowing disorders, symptoms can also be observed after eating in the form of:
- initial reflex reactions such as cough, dyspnea or vomiting,
 - changes in the tone of the voice: wet, hoarse,
 - wheezing,
 - the feelings of food backings in the throat [9].

Difficulties of a dysphagic nature may also concern the last stage of swallowing, named as esophageal phase and manifested by:

- feeling of withdrawal and heartburn after eating a meal,
 - feeling of food being stucked in throat or chest,
 - the sensation of pain when swallowing (odynophagia) [9].
- Other symptoms that may indicate dysphagia include:

- dehydration,
- malnutrition,
- feverish states of unclear origin,
- recurrent respiratory infections,
- increased secretions from the respiratory tract [10].

A common symptom that often accompanies swallowing disorders is dysarthria - a speech disorder involving difficulty in respiratory-phonation-articulatory coordination, manifesting itself in changes in speech delivery, including changed raspy voice, shortening of the phrase and change of speech intensity [5].

TEAMWORK IN THE DIAGNOSIS AND TREATMENT OF PATIENTS WITH DYSPHAGIA

THE ROLE OF THE DOCTOR IN DIAGNOSIS AND TREATMENT OF DYSPHAGIA

Usually the first link to care for a person affected by a neurologic background is the physician. In the first hos-

pitalization period, existing medical records, including current findings, are analyzed. The doctor is collecting an interview with the patient and often with his family. This is the moment when a short interview can reveal the difficulty of receiving fluids and foods. The model useful in clinical history was proposed by Dr. Anna Czarnuszenko. It consists of two parts, the first of which concerns general information on health status and history of previous disorders in the diet. The second part can be used independently and contains a number of specific questions that exclude questions relating to the appearance, consistency and consumption of meals, as well as other measurable symptoms (subfever) and individual patient feelings [11]. In a hospital environment, it can be a tool that will draw the attention of the medical team and family to the need for action.

In the next stage, you can perform one of two useful questionnaires or, if possible, ask the patient to do them yourself. Whatever the form, it will take a few minutes. Recommended screening questionnaires are EAT-10 and DY-MUS. The first is more widely used and can be useful for stroke and neurodegenerative diseases (e.g. SLA). The second focuses on self-assessment of dysphagia in the course of multiple sclerosis. Both self-assessment tools consist of questions related to physical symptoms such as weight loss, the feeling of intense exercise associated with swallowing, and other subjective feelings of the patient, which include odynophagia (pain during swallowing). Other symptoms that are considered is food deposition, cough after service, avoiding eating in the presence of others, stress on eating and unwillingness to eat [10, 11].

If the use of these tools confirms swallowing disorders, the attending physician may conduct a water swallowing test. It is very short and easy to carry out. The doctor initially gives small volumes of fluid (3X5ml) and administers them with a teaspoon. If the subject is unable to drink the entire volume (90 ml) at once choking, coughing or other previously described symptoms appear after drinking, then we deal with dysphagia. In addition to the Water Swallowing Test, the Daniels test and GUSS are the most commonly used screening tests performed in patients with neurological deficits. The doctor examining a patient with dysphagia of neurological origin may also perform videoendoscopy and videofluoroscopy procedures. Although they are still rarely used in Poland, it is recommended to improve the diagnosis using tests of many consistations, e.g. GUSS or V-VST. The clinical swallowing tests must first include a water swallowing test, and because it is short, it can be done by a nurse or doctor. A multi-consistency tests can be also included in the diagnostic and therapeutic part and performed by speech therapists [10].

THE ROLE OF THE NURSE IN MANAGEMENT OF DYSPHAGIA

Nursing staff supervise taking medications, eating meals, and takes routine temperature measurements. These activities provide an opportunity to recognize the symptoms associated with dysphagia. A qualified nurse should know

how to correct the position of the patient's body, how to safely feed him and be able to apply basic maneuvers to facilitate swallowing.

Undetected dysphagia is often manifested by a reluctance to eat, drink or refuse to take medication. Nursing staff helps to prevent one of the most serious complications, which is aspiration pneumonia - it is the nurse who most often watches over the patient's hygiene, and in the case of dysphagia oral hygiene is extremely important. It is equally important to take care of the position after eating a meal (30-degree position, up to 30 minutes after eating a meal) to prevent reflux. It is the nursing staff that monitors the amount and frequency of meals taken, which can prevent significant weight loss as well as malnutrition and dehydration of patients.

THE ROLE OF THE SPEECH-LANGUAGE PATHOLOGIST IN MANAGING DYSPHAGIA

Therapeutic exercises are selected depending on the pathomechanism of dysphagia. There are three basic strategies:

- **Adaptive**, tasked with implementing changes in the way and type of food served (feeding techniques and changing the consistency of food). A common method that is designed to thicken the liquid are special nutritional preparations. Adaptive techniques also include the use of special dishes and cutlery to facilitate the process of eating meals, and above all adjust the conditions so that the patient has the better oral control. Frequently, patients with dysphagia eat less, because due to fatigue they cannot maintain an elevated body position for a long time. Such patients should eat smaller meals, but eat them much more often.

- **Restitution**, which focuses on improving muscle work (myofunctional exercises) and preparation for the implementation of compensation techniques by breaking them down into smaller components and learning basic skills. Restorative techniques include muscle mobilization as well as strengthening and restoring coordination. Restitution therapy includes passive exercises (brushing, vibration, application of targeted pressure) as well as active exercises performed by the patient, which are aimed at improving the fluidity and range of movements performed. These include the Mosako maneuver (strengthening the back of the tongue) and Shaker exercise (strengthening the back of the throat). Restorative exercises also include thermal stimulus and taste stimulus techniques aimed at activating disturbed reflexes.

- **Compensation** includes learning maneuvers, rotation, various types of head position modification and improving swallowing by learning dedicated swallowing techniques. Although compensatory exercises do not bring lasting effects, they significantly increase the patient's sense of security. Their purpose is to compensate for deficits that cannot or may not yet be subject to other forms of rehabilitation. The maneuvers used in the mentioned above therapeutic strategy should be adapted to the patient's cognitive abilities [7, 10].

Postural modifications include (Fig. 1):

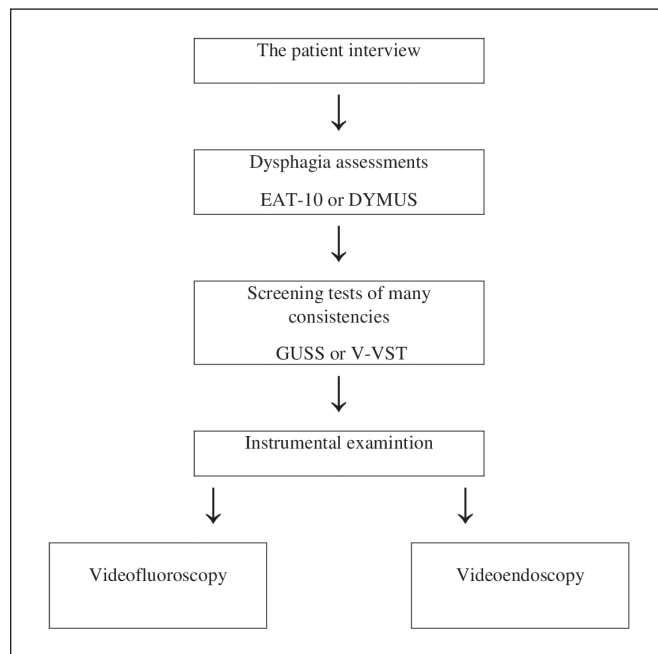


Fig. 1. General model of neurogenic dysphagia diagnosis [6].

1. changes in head position:
 - pulling the chin towards the sternum,
 - turning head in the right, healthy direction (not affected by paresis),
 - turning the head towards the paresis (in case of paralysis of the larynx and case of pharyngeal dysphagia).
2. Mendelson's maneuver modification of the swallowing process consisting in maintaining a high position of the larynx (the patient holds the larynx with his fingers),
3. Swallowing while holding air to close access to the glottis and prevent aspiration. After swallowing, there is expectoration,
4. Strength ingestion consisting in maximum tightening of the lips and swallowing water / food with closing the lips [7, 10, 12].

These modifications should be known to any specialist who is dealing with patients with neurogenic dysphagia. They are useful because they greatly improve the comfort of the lives of those affected by swallowing disorders. Moreover, and above all these modifications prevent dehydration and malnutrition of the patient [7, 12].

The presented activities take place with the participation of many specialists not mentioned above. The literature on the subject lists among them a dietitian implementing adaptation strategies, and physiotherapist caring for adequate muscular tension throughout the body. In the process of diagnosis and therapy of neurogenic dysphagia, a neurologist, family medicine doctor or any other specialist who deals with patients suffering from neurological diseases is usually involved.

CONCLUSIONS

Both literature, studies, procedures and self-observation cited point to the complexity and the prevalence of the

issue. Dysphagia should be considered as an interdisciplinary problem and as such be covered by a multi-disciplinary care. Patients with neurological conditions should be considered for the possibility of swallowing disorders. The data provided show a high probability of their occurrence.

As indicated in the Article, diagnosis and treatment of dysphagia do not need to be time-consuming or costly when working with the team. The deficit can be found to reduce hospitalization time and to reduce or avoid complications associated with the described disorders. Despite the current technical possibilities, access to specialized instrumentation is limited and therefore, in certain cases, the speech therapists may be included in the diagnostic process. A multiple consistency test, such as GUSS or V-VST, allows you to broaden your assessment of the type and degree of disturbance.

REFERENCES

1. Obrębowski A, Wiskirska-Woźnica B, Obrębowska Z. Zaburzenia połykania w praktyce neurologopedycznej. In: Obrębowski A (ed.). Wprowadzenie do neurologopedii. Poznań: Termedia Wydawnictwo Medyczne; 2012, pp. 369–374.
2. McGowan SL, Rodriguez L, Laing C. Bulbar problems in multiple sclerosis. In: Kesselring J, Comi G, Thompson AJ (eds). Multiple sclerosis: recovery of function and neurorehabilitation. Cambridge: Cambridge University Press; 2010, p. 219.
3. Jestrovic I, Coyle JL, Perera S et al. Functional connectivity patterns of normal human swallowing: difference among various viscosity swallows in normal and chin-tuck head positions. *Brain Res.* 2016;1652:158–169.
4. Malagelada J, Bazzoli F, Boeckxstaens G et al. World Gastroenterology Organisation global guidelines: dysphagia global guidelines and cascades update september 2014. *J Clin Gastroenterol.* 2015;49(5):370–378.
5. Wiskirska-Woźnica B. Wprowadzenie do dysfagii jako problemu wielospecjalistycznego. *Otolaryngologia.* 2016;15(2):59–62.
6. Narożny W, Szmaj M. Zaburzenia mowy w dysfagii. In: Milewski S, Kuczkowski J, Kaczorowska-Bray K. Biomedyczne podstawy logopedii. Gdańsk: Harmonia Universalis; 2014, pp. 179–183.
7. Litwin M. Dysfagia poudarowa. *Forum Logopedy.* 2019;30:6
8. Daniels SK. Neurological disorders affecting oral, pharyngeal swallowing. *GI Motility online* 2006; [https://www.nature.com/gimo/contents/pt1/full/gimo34.html].
9. Palmer JB, Drennan JC, Baba M. Evaluation and Treatment of Swallowing Impairments. *Am Fam Physician.* 2000;61(8):2453–2462.
10. Czarnuszenko A. Postępowanie w dysfagii neurogennej. *Otolaryngologia.* 2016; 15(2):68–74.
11. Czarnuszenko A. Wywiad w kierunku zaburzeń połykania część 1, część 2 (online). 2020 [download 30.05.2020; http://polykanie.pl/index.php/pliki-do-pobrania].
12. Lewicka T, Stempel D, Boczarska-Jedynak M. Aspekty diagnozy i terapii zaburzeń połykania w schorzeniach pozapiramidowych na przykładzie choroby Parkinsona. *Logopedia Silesiana.* 2014;3:123.

ORCID and contributionship

Amelia Śledzik - 0000-0002-1321-8995 ^{A,B,C,D,E,F}
 Paweł Szlendak - 0000-0001-6520-3659 ^{A,B,C,D,E,F}

Conflict of interest

Authors declare no conflict of interest

CORRESPONDING AUTHOR

Paweł Szlendak

Klinika Ortopedii i Rehabilitacji, Oddział Rehabilitacji, Samodzielny

Publiczny Szpital Kliniczny nr 4 w Lublinie

8 Jaczewskiego str., 20-954 Lublin, Poland

tel: +48 792 852 276

e-mail: pawel.szlendak25@gmail.com

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