

Evaluation of dysphagia among patients with chronic cough

Ocena występowania zaburzeń połykania u chorych z przewlekłym kaszlem

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Article history: Received: 27.06.2017 Accepted: 28.03.2018 Published: 30.06.2018

ABSTRACT:

Aim: The aim of the study was to determine the prevalence of dysphagia in patients with chronic cough. Material and methods: Thirty four consecutive patients. All patients underwent physical examination, ENT assessment, functional phoniatric assessment at rest and speech, Water-Swallow Test (WST), and Fiberoptic Endoscopic Evaluation of Swallowing disorders (FEES) Reflux Symptom Index (RSI) questionnaire and Eating Assessment Tool 10 (EAT 10) questionnaire were performed.

Results: The results of the RSI and EAT 10 questionnaires showed the risk of reflux and dysphagia in participating patients. WST positive results increase with water volume. The patients presented episodes of spillage, double swallows, penetration, aspiration and residue of food at the hypopharynx. Functional examination showed decrease of laryngeal elevation (33%) and hypertension of external larynx muscles.

Conclusions: The results of the study showed prevalence of dysphagia in most patients with chronic cough. It seems that phoniatric assessment in those cases should be expanded and the FEES examination should be their important part.

KEYWORDS:

dysphagia, FEES, chronic cough, water swallowing test, aspiration, penetration

STRESZCZENIE:

Wprowadzenie: Pacjenci uskarżający się na przewlekły kaszel wymagają diagnostyki zaburzeń połykania. Cel pacy: Ocena występowania zaburzeń połykania (niosących za sobą ryzyko penetracji lub aspiracji pokarmu) w grupie chorych z przewlekłym kaszlem. Materiał i metoda: 34 kolejnych pacjentów hospitalizowanych z powodu przewlekłego kaszlu. Pacjenci wypełniali kwestionariusze Reflux Symptom Index (RSI) oraz Eating Assessment Tool 10 (EAT-10), przechodzili badanie przedmiotowe z zakresu głowy i szyi, ocenę palpacyjną mięśni zewnętrznych krtani, przesiewowy test połykania wody oraz ocenę endoskopową zaburzeń połykania.

Wyniki: Analiza wyników kwestionariuszy EAT-10 oraz RSI wskazuje na ryzyko występowania refluku oraz dysfagii. W przesiewowym teście połykania wody odsetek wyników pozytywnych zwiększał się wraz ze wzrostem objętości podawanego płynu. W badaniu endoskopowym stwierdzono m.in.: przedwczesne połykanie, podwójne połykanie, penetracje, aspiracje, zalegania na poziomie gardła i krtani. W badaniu przedmiotowym u 33% chorych stwierdzono obniżoną elewację krtani. Większość pacjentów cechowała się zwiększonym napięciem mięśni zewnątrzkrtańowych.

Wnioski: Dysfagia stanowi częsty problem chorych z przewlekłym kaszlem, u których diagnostyka foniatryczna powinna być rozszerzona o badanie FEES. Badanie wymaga kontynuacji na większej grupie pacjentów oraz porównania wyników z grupą kontrolną.

SŁOWA KLUCZOWE: połykanie, zaburzenia połykania, kwestionariusze, dysfagia, badania przesiewowe

INTRODUCTION

Chronic cough is one of the most common reasons for patients to report to family doctors, internists, pulmonologists, laryngologists or allergologists. It comprises a large financial burden for the public healthcare system [1]. It is estimated that around 40% of the overall population has experienced chronic cough [2].

At the same time it is one of the most common symptoms of the respiratory system [3].

Due to duration of symptoms, three types of cough are distinguished:

- severe (duration up to 3 weeks);
- persistent (duration from 3 to 8 weeks; in 90% of cases, it is post-infectious cough);
- chronic (duration of over 8 weeks) [1].

The above classification is applied for adults and adolescents over 15 years of age. On the other hand, in younger children, a cough is recognized as chronic when over 4 weeks [4].

The diagnostic process in cough can be difficult and long-lasting. It often becomes a challenge for an interdisciplinary team of physicians. To begin the most effective causative treatment, the patient must usually undergo a series of complicated and time-consuming examinations.

The most common reasons for chronic cough that should be taken into account in differential diagnostics are: asthma, gastroesophageal reflux disease, inflammation of the nasal mucosa and sinuses, nonasthmatic eosinophilic bronchitis, and use of angiotensin-converting-enzyme inhibitors [5].

Chronic cough has been discussed in literature and scientific works multiple times, however, its affiliation with dysphagia is a new subject. The main aim of this work is to demonstrate the dependence between dysphagia and prevalence of chronic cough.

MATERIAL AND METHODS

The researched group comprised of 34 consecutive patients hospitalized from January 2015 to December 2016 in the Chair and Clinic of Pulmonology at SPCSK of the Medical University of Warsaw. Table I presents a detailed characteristic of the researched group.

All patients who participated in the research completed screening

Tab I. Characteristics of studied group.

F:M	26 : 8 (76% : 24%)
Mean age	54 years (SD=16 years)
Mean body weight	75 kg (SD = 15)
BMI	30% norm (18.5-24.9 kg/m ²) 42.5% excessive weight (25-29.9 kg/m ²) 27.5% obesity (≥ 30 kg/m ²)
Co-morbidities	Hypertension (n=10) Gastroesophageal reflux (n=8) Coronary artery disease (n=6) Hypothyroidism (n=4) Allergies (n=3) Bronchial asthma (n=2) Irritable bowel syndrome (n=2) Eosinophilic fasciitis (n=1) COPD (n=1) Peptic ulcer (n=1) No co-morbidities (n=3)
Pneumonias in interview	n = 2
Unintentional weight loss	n=3 (6kg/5years, 2kg/2months, 3kg/3months)

questionnaires directed at discovery of possible dysphagia - EAT-10 (Eating Assessment Tool 10) and laryngopharyngeal reflux - RSI (Reflux Syndrome Index). The patients then underwent physical examination according to a unified protocol: assessment of throat and laryngeal anatomy and physiology, water-swallowing test, endoscopic assessment of swallowing disorders (FEES) and palpation of extrinsic laryngeal muscles.

RESULTS

Analysis of EAT-10 questionnaire results shows that 16 of 34 patients exceeded the admissible norm (result ≥ 3 points), which comprise almost half (47%) of the researched group and points towards the need to perform instrumental diagnostics of dysphagia. On the other hand, dysphagia was observed in a further endoscopic examination (66%) in 12 patients from those who obtained a negative result (0-2 points).

The following results were obtained in the swallowing screening test (Figure 1):

- 2x5ml – 91% negative, 9% positive;
- 2x10ml – 79% negative, 21% positive;
- 2x20ml – 68% negative, 32% positive;
- 90ml – 53% negative, 47% positive

Based on the results of endoscopic evaluation of swallowing, the following were found:

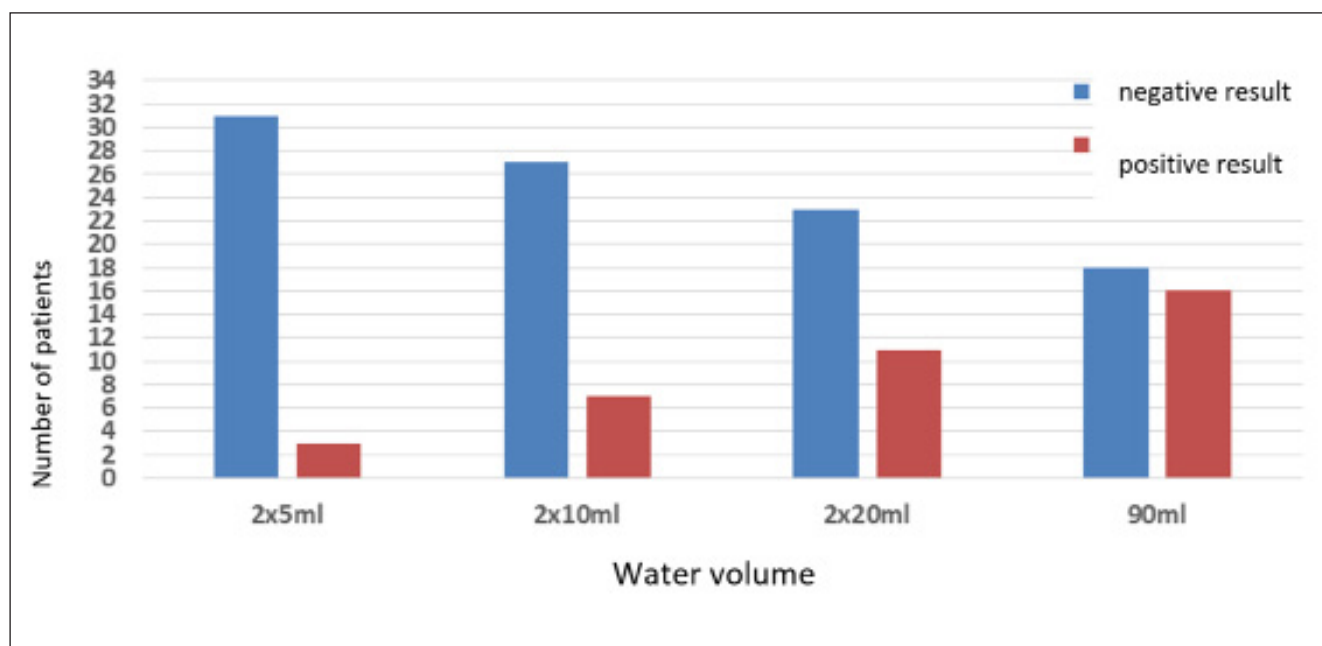


Fig. 1. Results of swallowing screening test. Negative result – no intermediate penetration/aspiration symptoms. Positive result – occurrence of indirect penetration/aspiration symptoms, such as cough after ingestion, change of voice quality, discontinuation of test.

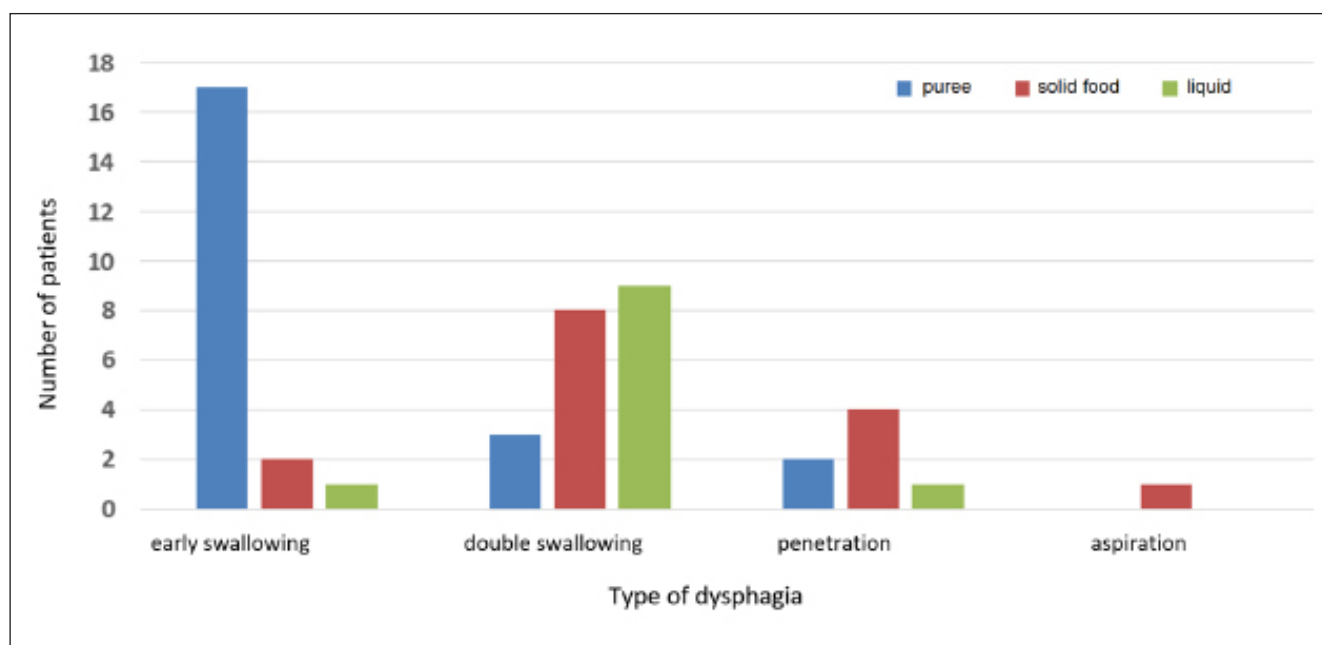


Fig. 2. Assessment of swallowing disorder in FEES study for foods of different consistencies.

- trace palatopharyngeal insufficiency (n=4);
- enlargement of the lingual tonsil (n=34);
- cyst of the mesopharynx (n=3);
- LPR properties within the larynx (n=34);
- proper larynx constriction functions (n=33);
- Normal squeeze maneuver (assessment of mobility of the pharyngeal sidewalls during phonation) (n=32).
- Swallowing difficulty for foods of varying consistency - early swallowing, double swallowing, penetration, aspiration, retention (Figure 2-6).

Tab II. Results of physical examination.

EVALUATION OF ANATOMICAL STRUCTURES	RESEARCH RESULT
Evaluation of face and oral motor skills (n. VII, IX, X, XII)	Norm (n = 34)
Evaluation of sensation in the face (n. V)	Norm (n = 34)
Difficulty breathing through the nose	n = 3
Presence of palatal reflexes	Norm (n=28) Weakened (n=2) Exorbitant (n=4)
Presence of pharyngeal reflexes	Norm (n=29) Weakened (n=1) Exorbitant (n=4)
Weakened laryngeal elevation	n = 11
Dysphonia	n = 32

Tab. III. Palpation of external laryngeal muscles in 31 patients (3 patients did not agree to participate in the study).

	OCENA W SPOCZYNKU	OCENA W TRAKCIE FONACJI
Excessive tension in submandibular area	n = 20	n = 29
Excessive tension of side walls of the throat	n = 20	n = 25
Excessive tension of sternocleidomastoid muscle	n = 26	n = 28
Size of thyrohyoideal space	Limited (n = 17) Correct (n = 14)	Limited (n = 22) Correct (n = 9)
Size of cricothyroideal space	Limited (n = 19) Correct (n = 12)	Limited (n = 24) Correct (n = 7)
Airway	thoracoabdominal (n = 12) thoraco-apical (n = 19)	thoracoabdominal (n = 11) thoraco-apical (n = 20)

Analysis of RSI questionnaire results [17] showed that 23 of 34 patients (68%) exceeded the permissible standard of 13 points, which may indicate symptoms of laryngopharyngeal reflux.

Table II and III show results of physical examination in all patients and palpation of external laryngeal muscles in 31 patients.

DISCUSSION

The main group of patients with dysphagia includes neurological patients as well as patients with head and neck tumors. However, our previous studies [6] show, that patients complaining of chronic cough also suffer from dysphagia. There are only individual reports on this issue in literature [6,7].

**Fig. 3.** Opening of upper esophageal sphincter.**Fig. 4.** Retention of solid food on the right side of vallecula.**Fig. 5.** Strong centripetal motions of side walls of the throat during coughing.

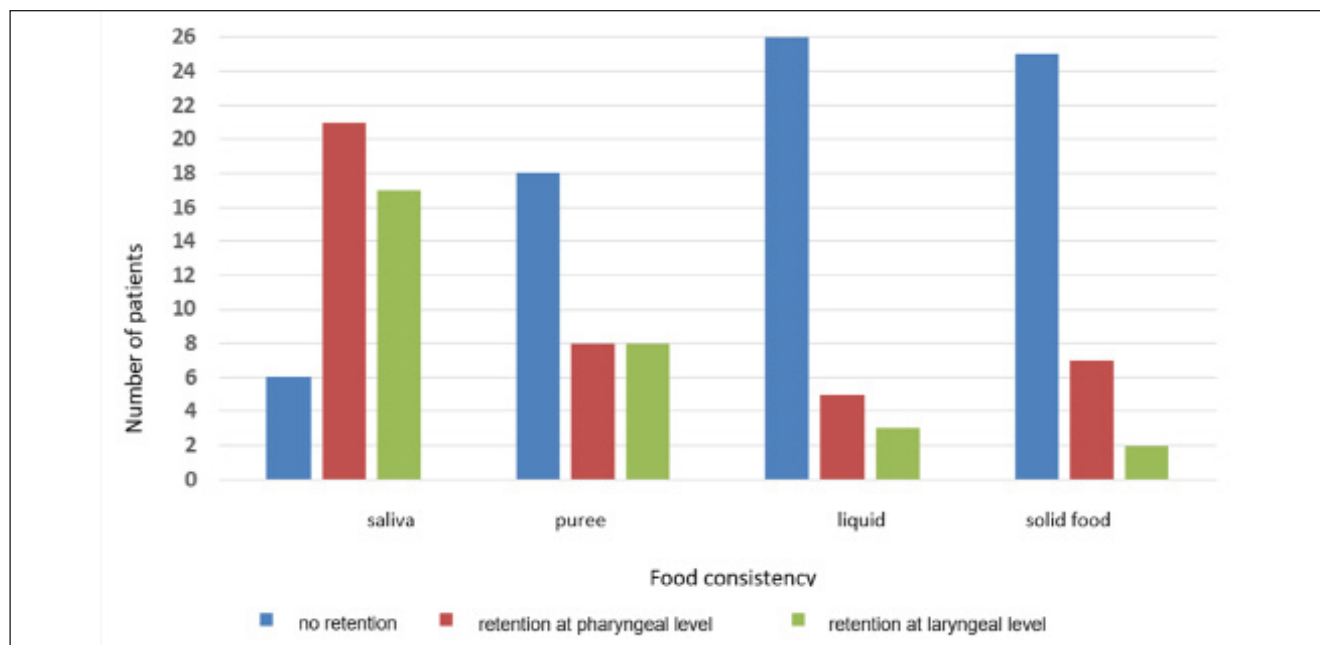


Fig. 6. Assessment of retention for foods of different consistencies in FEES study.

According to the commonly adopted algorithms in the diagnostic process of chronic cough, exclusion of reasons firstly begins with pulmonological (asthma, EB - eosinophilic bronchitis, COPD - chronic obstructive pulmonary disease, lung cancer), then iatrogenic (posttreatment cough), gastrological (laryngopharyngeal reflux - LPR) and finally, laryngological and phoniatric. Such a diagnostics stage should, in our opinion, be expanded with instrumental methods for assessment of dysphagia.

Based on the analysis of results of research conducted under this work, prevalence of dysphagia in over half of the patients (82%) was concluded. This comprises the majority of the researched group. Patients were diagnosed with episodes of aspiration, penetration, double and early swallowing, as well as food retention at laryngopharynx and larynx level. This indirectly indicates towards disorders of the oral phase and directly towards the pharyngeal phase of swallowing.

Weakening of hyoid-larynx complex elevation is probably responsible for retention of food at throat level and its penetration into the larynx, as it is associated with delay in opening of the upper esophageal sphincter. Almost all patients with disturbed laryngeal elevation (10 of 11 patients) had various problems with swallowing of substances administered during research. They were diagnosed with: early swallowing (n = 10); double swallowing (n = 5); penetration (n = 7); retention at laryngopharynx or larynx level (n = 8).

This is confirmed by results of palpation of the external laryngeal muscles: most patients had increased muscle tension of the neck, submandibular and chin region, limitation of cricothyroideal and thyrohyoideal space as well as respiratory tract disturbances. Increased muscle tension is associated not only with voice abnormalities, but probably also with dysphagia. This is also shown in results of the water-swallowing test - increase in water volume (from 5ml to 90ml) was associated with an increased share of positive results, which indirectly attested to dysphagia.

Half of the patients additionally showed properties of laryngopharyngeal reflux. This is associated with the occurrence of increased saliva retention at laryngopharynx and larynx level, which causes decrease of sensation in this area (desensitization) and as a result, may lead to increased risk of dysphagia. In the case of decrease of sensation, the chance of a liquid or food reaching the respiratory tract increases, especially in the case of combining it with remaining saliva deposits; besides, it fosters multiswallows. Of course, there exists a necessity to continue research on a larger group of patients to confirm the results.

Drozd et al. [7] analyzed the results of 15 patients who reported respiratory ailments. Chronic cough was observed in 40%. All patients underwent videofluoroscopic examination where risk of dysphagia was assessed using the Penetration-Aspiration Scale according to Rosenbek. The authors found a correlation between the severity of dysphagia and occurrence of

penetration and aspiration, which they explain with discoordination between breathing and swallowing. Lowering larynx elevation and increasing tension of the neck and neck muscles found in studies carried out as part of the above work could confirm this hypothesis.

EAT-10 questionnaire used in the diagnostic process proved to be an effective method of initial assessment in dysphagia. Objective endoscopic examination confirmed a positive result in more than half of the cases (70%).

Reports from literature often emphasize that the introduction of effective treatment of chronic cough is as difficult as determining its immediate cause [8,9,10-14]. Studies conducted by Vertigan et al. as well as Ryan et al. prove the beneficial effect of speech and language therapy on the severity of chronic cough [15,16]. The results are relaxation of the neck muscles, which indirectly improves elevation of the hyoid-larynx complex. This could allow to decrease the risk of possible food retention, penetration and aspiration. Based on conducted research, it seems that logopedic and phoniatric rehabilitation can actually bring benefits to patients with chronic cough.

CONCLUSIONS:

The diagnostic process of chronic cough has been discussed many times in the scientific literature. However, like many other issues, it requires further deepening and improvement. So far no one has elaborated this topic in terms of dysphagia as its possible cause. Studies conducted for the needs of the above work show that these two diseases are interrelated and influence each other. It is worth ensuring that patients with chronic cough have routine tests done for possible dysphagia. Therefore, the developed algorithms and procedures for management of chronic cough require an update.

Determining the immediate cause of cough is necessary for introduction of effective therapy. It seems that this does not always have to be pharmacological treatment. Speech therapy may be effective in cough associated with excessive tension of the neck muscles.

Undoubtedly, it is necessary to conduct further research on this issue due to the fact that the above study is significantly limited by a small group of patients. It should therefore be extended to subsequent patients and combined with a comparison of obtained results with the control group.

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Word count: 1820 Tables: 3 Figures: 6 References: 17

Access the article online: DOI: 10.5604/01.3001.0012.0983 Table of content: <https://otorhinolaryngologypl.com/issue/11162>

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Competing interests: The authors declare that they have no competing interests.

Cite this article as: Jamróz B., Pabian M., Chmielewska J., Milewska M., Grabczak E., Dąbrowska M., Niemczyk K.: Evaluation of dysphagia among patients with chronic cough; Pol Otorhino Rev 2018; 7(2): 1-7
