

Screening tests as a part of diagnostic process of dysphagia

Testy przesiewowe w diagnostyce zaburzeń połykania

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SUBSTRACT: Many patients treated at hospital have difficulty with swallowing, which poses an interdisciplinary problem. We describe basic screening tests for dysphagia, which can be carried out by physicians, speech therapists, and nurses, and show how to use these tests.

KEYWORDS: dysphagia, aspiration, water swallow screening test, GUSS, V-VST

TRESCZENIE: Zaburzenia połykania należą do problemów interdyscyplinarnych i dotyczą dużej grupy pacjentów przebywających w szpitalach. Celem pracy było przedstawienie podstawowych testów przesiewowych wykorzystywanych w diagnostyce dysfagii, które mogą być przeprowadzane zarówno przez lekarzy, jak i pracujących na oddziale logopedów lub personel pielęgniarski. Praca zawiera protokoły wykorzystywane w czasie testów przesiewowych oraz opis ich przeprowadzenia.

SŁOWA KLUCZOWE: dysfagia, aspiracja, test przesiewowy połykania wody, GUSS, V-VST

INTRODUCTION

Difficulty with swallowing, i.e., dysphagia, means difficulty in forming food boluses and moving them from the mouth down the alimentary tract. Dysphagia can be classified as oral-pharyngeal (pre-esophageal) and pharyngeal, depending on the cause [1].

Dysphagia is an interdisciplinary problem because it affects patients with different conditions, including conditions of the ears, nose, and throat, gastrointestinal tract, nervous system, lungs, or conditions that require surgery; some of these conditions are due to cancer. Dysphagia can cause malnutrition, dehydration, and aspiration pneumonia, and it can impede treatment of other conditions. These problems can have serious consequences. For instance, about half of patients with aspiration pneumonia die [2,7].

Dysphagia affects about 30% of patients with previous cer-

ebrovascular events, 52% to 82% of patients with neurodegenerative diseases, over 35% of patients with diseases of the head and neck, and over 60% of people in nursing homes [7].

DIAGNOSIS OF DYSPHAGIA

Taking detailed medical history is the first step in diagnosing dysphagia. In daily practice, screening questionnaires, such as the Eating Assessment Tool 10 (EAT 10) and the Dysphagia Handicap Index (DHI), can help identify patients at risk for dysphagia.

Patients suspected of having dysphagia should undergo screening tests and then, when the screening tests confirm dysphagia, fiberoptic endoscopic evaluation of swallowing (FEES) or videofluoroscopy (VFS).

Water swallow screening test. First, the patient drinks about 5 ml of water (1 teaspoon). If no worrying symptoms appear,

the patient drinks 90 ml of water from a cup, keeping the cup in contact with the lips at all times. For up to 1 minute after the patient has drunk the water, the examiner looks for indirect signs of aspiration, such as coughing, grunting, or changes in voice quality. The test is positive when these signs appear or when the patient cannot drink the whole volume of water. Other volumes of water can also be used (2 x 5 ml, 2 x 10 ml, 2 x 20 ml, 90 ml; see appendix 1) [3,4].

Gugging swallowing screen (GUSS). The test is useful in patients with neurological diseases, particularly in those after stroke. If the patient is lying in bed, the bedhead should be moved to 60 degrees before the test. First, the examiner asks the patient about her/his activity, ability to cough or grunt voluntarily, and difficulty in swallowing saliva. Answers to these questions are scored, and, if the maximum score is reached (5/5 points), the examiner proceeds to the second part of the test; if the score is lower, instrumental workup is advised. Secondly, the patient swallows the three following test substances differing in texture and bolus volume:

- water condensed to a custard-like texture. First, half a teaspoon and then another five portions.
- still water in increasing volumes (3 ml, 5 ml, 10 ml, 20 ml, and 50 ml)
- five pieces of dry bread (10 seconds for chewing)

The examiner records whether the patient can swallow the test substance; moreover, the examiner records the time needed to swallow and the occurrence of coughing, excessive salivation, and changes in voice quality; the changes in voice quality are assessed when the patient pronounces a prolonged “a”. When any abnormalities occur, the examiner must stop the test. Swallowing of each of the test substances is scored on a scale from 0 to 5 points (the maximum score is 15 points). The maximum score of the whole test is 20 points (5 points for the first part and 15 points for the second part). Depending on the total score, patients should receive only food with particular textures and/or undergo further workup (see appendix 2) [3,5].

Daniels test. In addition to swallowing, the test assesses dysphonia, dysarthria, gag reflex, and voluntary coughing. The patient swallows increasing volumes of water, each volume twice (5 ml, 10 ml, and 20 ml). After each swallow, the examiner looks for changes in voice quality when the patient pronounces a prolonged “a”. When coughing or changes in voice quality appear, the examiner records their occurrence and must stop the test. The test is positive and thus indicates a high risk for aspiration when two of the six assessed abnormalities are recorded (dysphonia, dysarthria, abnormal palatal reflex, abnormal gag reflex, weak or absent voluntary

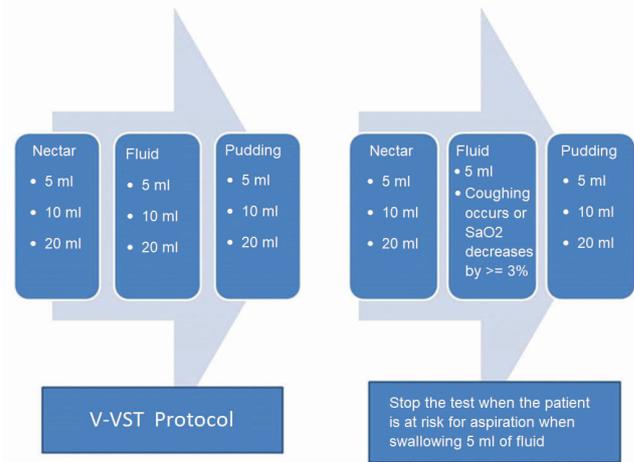


Fig. 1. Complete protocol for volume-viscosity swallow test and an example modification of the test for patients at risk for aspiration. Based on: Clavé P et al. Accuracy of the volume-viscosity swallow test for clinical screening of oropharyngeal dysphagia and aspiration. *Clinical Nutrition* (2008) 27, 806–815.

Tab. 1. Water swallow screening test (90ml)

SWALLOWING OF WATER	RESULT
90 ml of water sensitivity 97%, specificity 49%	Positive: one or more factors present Negative: no factors present
coughing after swallow (at least for 1 min)	No / Yes
choking (at least for 1 min)	No / Yes
changes in voice quality (at least for 1 min; the patient pronounces „a”)	No / Yes
test finished (or could not be carried out)	No / Yes

coughing, coughing or changes in voice quality upon swallowing; see appendix 3) [3,6,9].

Volume-viscosity swallow test (V-VST). The patient swallows normal water, water of nectar viscosity, and water of pudding viscosity, each viscosity in increasing amounts (5 ml, 10 ml, 20 ml). During swallowing, oxygen saturation is measured by pulse oximetry, with a pulse oximeter placed on the right index finger. The patient swallows water in the following order: water of nectar viscosity, normal water (less safe), and water of pudding viscosity. When indirect signs of aspiration (cough) appear, or when oxygen saturation decreases by at least 3%, the test must be stopped for a given viscosity, and safer viscosity should be tried. The test has a high sensitivity for aspiration (100%) and for penetration (83.7%; see Fig. 1) [7].

Tab. II. Gugging Swallowing Screen (GUSS)**GUSS – PART 1**

	YES	NO
Patient must be awake and able to cooperate for at least 15 minutes	1 point	0
Coughing and/or grunting (twice spontaneously)	1 point	0
Swallowing of saliva: without problems	1 point	0
Swallowing of saliva: saliva or food get out of the mouth	0	1 point
Swallowing of saliva: change in voice quality (hoarseness, bubbling, weakening, forced)	0	1 point
Total: 1- 4 point: further workup (FEES, VFS); 5 – continue with GUSS	/5

GUSS – PART 2 – DIRECT ASSESSMENT OF SWALLOWING

FOOD TYPE	CONDENSED FLUID (OATMEAL-LIKE)	NON-CONDENSED FLUID	SOLID FOOD
Swallowing:			
Patient not able to swallow	0	0	0
Swallowing delayed	1	1	1
Normal swallowing	2	2	2
Coughing (involuntary) before, during, or up to 3 minutes after swallowing			
Yes	0	0	0
No	1	1	1
Salivation			
Yes	0	0	0
No	1	1	1
Changes in voice quality			
Yes	0	0	0
No	1	1	1
Total:	/15	

GUSS – INTERPRETATION (TOTAL SCORE FROM BOTH PARTS)

POINTS	RESULT	DISEASE SEVERITY	RECOMMENDATION
20	Normal swallowing of all food types	No dysphagia or minimal dysphagia: minimum risk for aspiration	Oral nutrition No food restrictions (care of a speech therapist or a nurse needed)
15–19	Abnormal swallowing of solid foods	Mild dysphagia: low risk for aspiration	Oral nutrition: purees or solid foods Condensed foods FEES or VFS should be carried out Therapy of swallowing
10–14	Abnormal swallowing of solid foods and fluids	Moderate dysphagia: intermediate risk for aspiration	Oral nutrition: foods of an oatmeal-like texture, additional parenteral nutrition, only condensed fluids. Medications: only crushed medications mixed with thick fluids; no syrups FEES or VFS should be carried out Therapy of swallowing Needs nutrition through a nasogastric tube or by parental nutrition in addition to oral nutrition
0–9	The test could not be carried out or abnormal swallowing of all types of foods and fluids	Severe dysphagia: high risk for aspiration	Nil per os, nutrition only through a nasogastric tube or a percutaneous endoscopic gastrostomy tube FEES or VFS should be carried out Therapy of swallowing

Modified Evans blue dye procedure. The test assesses swallowing in patients with tracheostomy tubes. Before the test, the tracheostomy tube must be removed, and the oral cavity and the trachea must be cleared from saliva and mucus.

The patient swallows a test substance (water or pulp) labeled with the Evans blue dye (3-5 drops). Aspiration is confirmed when the dye is found in the mucus taken from the trachea through the tracheostomy tube [8].

Tab. III. Daniels test

ASSESSMENT OF SWALLOWING	DIAGNOSTIC CRITERIA
2 x 5 ml, 2 x 10 ml, 2 x 20 ml	Positive: at least 2 positive answers Negative: no more than one positive answer
Dysarthria (before testing)	No / Yes
Dysphonia (before testing)	No / Yes
Weakened cough reflex (before testing)	No / Yes
Lack of or abnormal gag reflex (before testing)	No / Yes
Coughing (immediately after swallowing of water)	No / Yes
Changes in voice quality (for 1 min, pronunciation of prolonged „a”)	No / Yes

CONCLUSION

Herein, we described only some of the screening tests for dysphagia. Because many patients have difficulties with swallowing, such tests should be a part of daily practice in hospitals and nursing homes.

The European Society for Swallowing Disorders recommends the V-VST, which was developed by the team of Prof. Pere Clave.

In Poland, the regulation of the Minister of Health from 2011 requires that patients treated in hospital be screened for malnutrition either with the Nutritional Risk Screening 2002 questionnaire or the Subjective Global Assessment scale.

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