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Screening for dysphagia in dysphonic patients with non-neoplastic vocal fold lesions by Arabic EAT-10: cross-sectional study

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Abstract

Background: Dysphagia is described as any disruption in the normal swallowing starting from the preparatory transport of a bolus from the oral cavity through both pharynx and esophagus down to the stomach. The purpose of this study is to detect the different symptoms of Dysphagia in dysphonic patients with non-neoplastic vocal fold lesions to consider the potential benefit of swallowing therapy hand in hand with the voice intervention strategies.

Methods: The Arabic Eating Assessment Tool-10 (A-EAT-10) was applied on 50 patients with age ranging from 15 to 50 years diagnosed as being dysphonic secondary to non-neoplastic vocal fold lesions on objective and clinical measures. Patients with a score above three will be considered to have dysphagia.

Results: Application of Arabic EAT-10 on dysphonic patients with minimal associated pathological lesions revealed swallowing difficulties that are not due to their vocal pathological condition. In the current study, 12 patients from the studied sample (24% of the patients) complained of phonasthenic symptoms and these symptoms may be misinterpreted by the patients as dysphagia. Symptoms of comorbid phonasthenia may be misinterpreted by the patients as dysphagia.

Conclusions: Although non-neoplastic vocal fold lesions are not the etiological factor for dysphagia, these group of patients still complains on subjective screening tools like A-EAT-10. The dysphagic symptoms in this group of patients may be related to the comorbid phonasthenia, and treatment of phonasthenia by voice therapy could alleviate these symptoms.

Keywords: Non-neoplastic vocal fold lesions, Dysphonic, Dysphagia

Background

There are many causes of dysphagia classified into oropharyngeal or esophageal etiologies. Oropharyngeal dysphagia may arise from morphological abnormalities, neurologic diseases, and general ailments. Causes of esophageal dysphagia include esophageal dysmotility, inflammation and structural abnormalities [1].

Symptoms include difficulty in biting or chewing thus hindering the formation of a bolus. Inefficient oral preparation may be due to reduced range of motion of the tongue and/or weakness of the tongue requiring increased time to prepare the bolus for swallowing, drooling, and poor oral containment; pocketing of food in the lateral sulcus; or even aspiration before the swallow [2].

Benign non-neoplastic lesions make up the majority of vocal fold lesions, namely minimal associated pathological lesions (MAPLs). They are non-inflammatory non-neoplastic lesions (polyps, nodules, cysts, Reinke's

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edema, polypoid degeneration, and contact granuloma). Most of these lesions are associated with vibratory injury of the vocal folds but multiple factors can lead to the development of these lesions [3].

Proper history taking and a thorough diagnostic workup using imaging studies and endoscopic examination are used to determine the exact cause. Diagnostic tools of dysphagia are divided into subjective and objective tools. Subjective tools have been developed to assess the dysphagia-related problems perceived by the patient reflected on his/her quality of life, emotional, and psychosocial aspects. One of these tools is the Arabic version of the Eating Assessment Tool (A-EAT-10) [4].

Patients with dysphonia secondary to non-neoplastic vocal fold pathology may suffer from impaired swallowing that is often masked by the phonatory complaint and yet is of major concern. The etiology behind the dysphagia in patients with non-neoplastic vocal folds lesions has not been previously described and surely warrants further investigation. It is common knowledge that these patients invariably exhibit hyperfunctional laryngeal behavior, which in turn accelerates the stress at the mid-membranous portion of the vocal folds and results in the development and perpetuation of vocal fold lesions; this may disturb one or more of the kinematics of swallowing [4]. In this group of patients, dysphagia may be a common symptom that is often overlooked in patients presenting with the main complaint of dysphonia. Improved awareness regarding the prevalence of dysphagia in this group of patients may have an impact on the management strategy.

Methods

Study design

This study was a cross-sectional study, including patients diagnosed as being dysphonic secondary to non-neoplastic vocal fold lesions on objective and clinical measures, attending at the phoniatic outpatient clinic at the period from September 2018 to February 2019.

Subjects

This study was applied on 50 patients with dysphonia secondary to non-neoplastic vocal fold lesions (thirty-two of them with comorbid phonasthenia). These patients attended the phoniatic outpatient clinic.

A convenience sample was used to select the cases upon the following inclusion and exclusion criteria:

1. Inclusion criteria
 - (a) Age ranging from 15 to 50 years

- (b) Patients being diagnosed on clinical and objective tests as being dysphonic secondary to non-neoplastic vocal fold lesions
2. Exclusion criteria:
 - (a) Age below 15 years or above 50 years
 - (b) Patients with a recent history of respiratory tract infection, laryngeal surgery or manipulation neurologic disorders, head and neck tumors, history of chemotherapy/radiotherapy to head and neck, or any other proved cause of dysphagia

All patients were subjected to the following:

1. Elementary diagnostic procedures including patient interview and careful history taking
2. Clinical diagnostic aids:
 - (a) Augmentation and documentation of the glottic picture using telescopic rigid fiberoptic orolaryngoscopy or flexible nasolaryngoscopy which provides good methods for photographic or video-tape recording and useful for exposure of the whole length of vocal folds
 - (b) A-EAT-10 as a primary outcome measure for dysphagia. Patients with a score above three will be considered to have dysphagia.

The Arabic Eating Assessment Tool-10 (A-EAT-10)

The Arabic EAT-10 is a self-administered, symptom-specific outcome instrument for the subjective assessment of dysphagia in an Arabic speaking population. It is a rapidly administered questionnaire; it takes only 2 minutes to be completed and needs no training. It consists of 10 statements in which the patient rates his/her perceived level of swallowing difficulty [4].

Scoring and score interpretation

The patient rates the problem on a scale of 0–4 (0 = no problem, 4 = severe problem). There are no formulas required to calculate a raw score. The clinician only needs to add up the numbers. The normative data suggest that an EAT-10 score of higher than 3 is considered dysphagia. An elevated EAT-10 score indicates a higher self-perception of dysphagia.

Data management and analysis

The collected data was revised, coded, tabulated, and introduced to a PC using Statistical Package for Social Science (SPSS 27). Data was presented and suitable analysis was done according to the type of data obtained for each parameter.

Descriptive statistics are as follows:

1. Mean and standard deviation (\pm SD) for numerical data
2. Frequency and percentage of non-numerical data

Results

Demographic data for cases

Among the cases, the age of the patients ranged from 15 to 50 years with a mean of 35.74 ± 8.724 years as shown in Table 1. As regards the gender, there were 23 males (46%) and 27 females (54%) as shown in Table 2.

Etiology of dysphonia

In the current study, the most common vocal fold lesion in patients with dysphonia was vocal fold polyp; the frequency and percentage of all vocal fold lesions included are shown in Table 3.

Analysis of the questionnaire among patients and frequency of Dysphagia by Arabic EAT-10

Most of the patients had multiple complaints, so the distribution and the frequency of dysphagic symptoms throughout the questionnaire showed that the most frequent questions reported among the patients were 6 and 4, followed by 8, 5, 9, and 10, whereas the least frequent questions were questions 3, 7, 2, and 1 respectively, as shown in Table 4. Among the 50 patients with dysphonia, 12 patients (24.0 % of the studied sample) who were complaining of phonasthenia had dysphagia as evidenced by an Arabic EAT-10 score of above three as shown in Table 5.

Discussion

Dysphagia is an important symptom that could have a huge impact on different aspects of a patient’s life. Dysphagia is associated with increased morbidity and mortality and may lead to a variety of clinical complications including dehydration, malnutrition, and aspiration pneumonia. Quality of life is impaired in patients with dysphagia as malnutrition influences daily activities, especially mobility and feeding, and may be associated with tissue wasting and impaired organ function. Thus, early recognition of this problem is important to ensure the appropriate precautions and interventions [5].

Dysphagia assessment studies were broadly done in cases of organic voice disorders. However, studies are limited in case of non-organic voice disorders despite

Table 2 Demographic data for cases

		Frequency	Percent
Gender	Female	27	54.0
	Male	23	46.0
	Total	50	100.0

the patients’ complaints as sometimes the main symptom of dysphonia is more irritative to the patients and mask dysphagia.

The prevalence of dysphagia in patients with dysphonia secondary to non-neoplastic vocal fold lesions has not been previously reported in the literature except in only one study by Hamdan et al. [6] using Arabic EAT-10 only.

The current study was done aiming at assessment of dysphagia symptoms in this group of patients on subjective measures. Among the different tools that detect dysphagia subjectively, the Arabic EAT-10 was chosen to be used in this study being a valid, reliable, and rapidly administered questionnaire. Patients with a score above 3 were considered dysphagic.

The results obtained in this study showed that 24% of the participating patients are dysphagic by A-EAT-10 (all the 12 patients were complaining of phonasthenic symptoms), while Hamdan et al. [6] showed that 37.7% of the patients are dysphagic by A-EAT-10.

The most frequent complaints among these patients evidenced by the Arabic EAT-10 were pain during swallowing; swallowing solid consistencies takes extra effort. Whereas the least symptoms were losing weight due to swallowing difficulties. The results of the current study are reinforced by the fact that the minimal associated pathological lesions (MAPLs) are benign, minimal, non-neoplastic, and non-inflammatory lesions that have no threat to life, no associated pain, and no serious loss of function. Their main impact is the affection of optimal

Table 3 The frequency and percentage of each vocal fold lesion in participating patients

Vocal fold lesion	Frequency	Percent
Vocal fold polyp	17	34.0
Vocal fold cyst	6	12.0
Vocal fold nodules	14	28.0
Reinke’s edema	5	10.0
Polypoid degeneration	4	8.0
Contact granuloma	4	8.0
Total	50	100.0

Table 1 Mean age among studied group

	Minimum	Maximum	Mean	S.D
Age in years	15	50	35.74	8.724

Table 4 Analysis of the questionnaire among patients

Arabic EAT-10	Number of patients who reported this question	Percentage of patients who reported this question
Question 1, "My swallowing caused me to lose weight."	3	6
Question 2, "My swallowing problem interferes with my ability to go out for meals."	4	8
Question 3, "Swallowing liquids takes extra effort."	10	20
Question 4, "Swallowing solids takes extra effort."	16	32
Question 5, "Swallowing pills takes extra effort."	14	28
Question 6, "Swallowing is painful"	16	32
Question 7, "The pleasure of eating is affected by my swallowing."	9	8
Question 8, "When I swallow food Sticks to my Throat."	15	30
Question 9, "I cough when I eat."	13	26
Question 10, "Swallowing is stressful."	12	24

use of voice in communication due to the presence of dysphonia [7].

Also, the intricacy in the neuromuscular supply of the pharynx and larynx cannot explain dysphagia to be caused by MAPLs which are superficial lesions limited to the mucosa of the vocal folds and never extend beyond the mucosal level to affect the muscles or deeper structures of the larynx.

Hamdan et al. [6] assumed that the pathophysiology of dysphagia in patients with dysphonia lies heavily on the intersection in the neuromuscular innervation of the upper airway and digestive system. In the pharyngeal phase of swallowing, there is anterior movement and elevation of the larynx, epiglottic closure, pharyngeal muscle contraction, and upper esophageal sphincter release, so a dysfunction in any of these stages may result in swallowing disorder. Other possible mechanisms were listed including restricted movement of the laryngeal framework, restricted pharyngeal constriction during swallowing, or alteration in the upper esophageal sphincter pressure during phonation.

On the highlight of the results of the current study, when a dysphonic patient secondary to MAPLs is complaining of dysphagia symptoms, it is mostly not related to his vocal fold lesions and the clinician should search thoroughly for another etiology.

Table 5 The frequency and percentage of dysphagia by Arabic EAT-10 in all participating patients

		Frequency	Percent
Dysphagia by A-EAT-10	Positive (score > 3)	12	24.0
	Negative (score ≤ 3)	38	76.0
	Total	50	100.0

It should be mentioned that patients with MAPLs have a functional element and may be suffering from associated phonasthenic symptoms that include symptoms related to throat as dryness, soreness, frequent clearance of the throat, sticky secretions of the throat difficult to be swallowed down, feeling of tightness or lump in the throat, and rarely a feeling of ball in the throat "Globus" [7]. In the current study, 12 patients from the studied sample (24% of the patients) complained of phonasthenic symptoms and these symptoms may be misinterpreted by the patients as dysphagia.

Jin et al. [8], Karkos et al. [9], Lee et al. [10], and Kobayashi et al. [11] have reported gastric acid reflux with laryngo-pharyngeal reflux disease (LPRD) to cause laryngeal contact granuloma. So in the patients with contact granulomas complaining from dysphagia symptoms, we can suspect LPRD to be the underlying etiology.

Conclusions

The present study showed that non-neoplastic vocal fold lesions are not an etiological factor for dysphagia despite the intricacy in the neuromuscular supply of pharynx and larynx. The dysphagic symptoms in this group of patients may be related to the comorbid phonasthenia, and treatment of phonasthenia by voice therapy could alleviate these symptoms. Diagnosis of Dysphagia cannot be confirmed depending only on subjective screening tools like A-EAT-10.

Abbreviations

A-EAT-10: Arabic EAT-10; LPRD: Laryngo-pharyngeal reflux disease; MAPLs: Minimal associated pathological lesions

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Authors' contributions

H.G. made the design of the work and analysis and interpretation of the study. Y.H.H. collected and tabulated the data. Y.H.E.I. wrote the manuscript and shared in analyzing the results. All authors read, revised, and approved the final manuscript. We declare that this manuscript is original, has not been published before, and is not currently being considered for publication elsewhere. We know of no conflicts of interest associated with this publication, and there has been no significant financial support for this work that could have influenced its outcome. As corresponding author, I confirm that the manuscript has been read and approved for submission by all the named authors. The requirements for authorship as stated have been met, and that each author believes that the manuscript represents honest work.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Informed consent was obtained from all participants before enrolment in the study. A written consent has been obtained from the parents of all children included in the study. Patient privacy and confidentiality were protected. Deceptive practices were avoided during designing the research. The participants had the right to withdraw from the study at any time they wished. The study protocol has been approved by Ain Shams institute's ethical committee of human research in August 2018. The committee's reference number is not available.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interest.

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References

1. Cho SY, Choung RS, Saito YA, Schleck CD, Zinsmeister AR, Locke GR III, Talley NJ (2015) Prevalence and risk factors for dysphagia: a USA community study. *Neurogastroenterol Motil* 27(2):212–219
2. Abou-Elsaad T (2007) Assessment and management of oropharyngeal dysphagia in adults: a workshop presented in the 27th congress of International Association of Logopedics and Phoniatrics, Copenhagen, Denmark
3. Cipriani NA, Martin DE, Corey JP, Portugal L, Caballero N, Lester R, Anthony B, Taxy JB (2011) The clinicopathologic spectrum of benign mass lesions of the vocal fold due to vocal abuse. *Int J Surg Pathol* 19(5):583–587
4. Farahat M, Mesallam TA (2015) Validation and cultural adaptation of the Arabic version of the Eating Assessment Tool (EAT-10). *Folia Phoniatr Logop* 67:231–237
5. Etges CL, Schreeren B, Gomes E, Barbosa LD (2014) Screening tools for dysphagia: a systematic review. *Commun Disord, Audiol Swallowing J* 26(5):343–349
6. Hamdan AL, Khalifee E, Jaffal H, Ghanem A, Rizk SA, El Hage A (2019) Prevalence of dysphagia in patients with non-neoplastic vocal fold pathology. *J Voice* 33(5):708–711
7. Kotby MN, Abou Ras Y, Saleh M, Khidr A, Hegazi M, El Adawy A, Shadi M (2016) Non-organic voice disorders and the syndrome of vocal fatigue. *Clin Vocol* 1:92–123
8. Jin YJ, Lee SJ, Lee WY, Jeong WJ, Ahn SH (2014) Prognostic factors for prediction of follow-up outcome of contact granuloma. *Eur Arch Otorhinolaryngol* 271(7):1981–1985
9. Karkos PD, George M, Van Der Veen J, Atkinson H, Dwivedi RC, Kim D, Repanos C (2014) Vocal process granulomas: a systematic review of treatment. *Ann Otol Rhinol Laryngol* 123(5):314–320
10. Lee SW, Hong HJ, Choi SH, Sun DI, Park YH, Lee BJ, Kwon SK, Park IS, Lee SH, Son YI (2014) Comparison of treatment modalities for contact granuloma: a nationwide multicenter study. *Laryngoscope* 124(5):1187–1191
11. Kobayashi R, Tsunoda K, Ueha R, Fujimaki Y, Nito T, Yamasoba T (2017) Role of lifestyle modifications for patients with laryngeal granuloma caused by gastro-esophageal reflux: comparison between conservative treatment and the surgical approach. *Acta Otolaryngol* 137(3):306–309

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