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Screening of the risk of dysphagia in inpatients at a university hospital

Rastreio do risco de disfagia em pacientes internados em um hospital universitário

Detección del riesgo de disfagia en pacientes hospitalizados en un hospital universitario

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Abstract

Introduction: The presence of dysphagia in hospital care increases costs to health and leads to increased hospital stay, overloading the health system. Hospitalized patients, by different underlying diseases, may present risk for dysphagia in need of rehabilitation. **Purpose:** To track the risk of dysphagia in patients admitted at a University Hospital. **Methods**: Descriptive cross-sectional study carried out from March 2016 to September 2018 in a University Hospital. The data were collected by means of chart analysis and application of the Eating Assessment Tool (EAT-10). Patients who scored 3 or more were classified with risk of dysphagia. For statistical analysis, the level of 5% of significance was considered. **Results:** The risk of dysphagia was identified in 191 (7.8%) patients. There was a prevalence of males, older than 60 years, and the prevalent baseline disease was cardiovascular. Dysphonia (4.2%), gastroesophageal reflux (3.8%), use of tracheostomy (1.1%) and alternative feeding tube (3.1%) were associated with the risk of dysphagia. **Conclusion:** The risk of dysphagia was observed in patients hospitalized mainly in the male, elderly and cardiac patients. Dysphonia, gastroesophageal reflux, use of tracheostomy and alternative tube of feeding were factors associated with the risk of dysphagia.

Keywords: Deglutition; Deglutition Disorders; Mass Screening.

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Authors' contributions:
CLMS: data collection and study outline
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Resumo

Introdução: A presença da disfagia no ambiente hospitalar aumenta os custos de cuidado com a saúde e leva a maior tempo de internação hospitalar sobrecarregando, portanto, o sistema de saúde. Pacientes internados, por diferentes doenças de base, podem apresentar risco para disfagia com necessidade de intervenção fonoaudiológica**. Objetivo:** Rastrear o risco de disfagia em pacientes internados em um Hospital Universitário. **Métodos:** Estudo do tipo transversal descritivo realizado no período de março de 2016 a setembro de 2018 em um Hospital Universitário. Os dados foram coletados por meio de análise de prontuário e aplicação do instrumento de rastreio - *Eating Assessment Tool* (EAT-10*)*. Os pacientes que pontuaram 3 ou mais foram classificados com risco de disfagia. Para análise estatística foi considerado o nível de 5% de significância. **Resultados:** O risco de disfagia foi identificado em 191 (7,8%) pacientes. Houve prevalência do sexo masculino, idade superior a 60 anos, e a doença de base prevalente foi cardiovascular. Observou-se que a Disfonia (4,2%), refluxo gastroesofágico (3,8%), uso de traqueostomia (1,1%) e via alternativa de alimentação (3,1%) foram fatores associados ao risco de disfagia. **Conclusão:** Observou-se risco de disfagia nos pacientes internados principalmente nos pacientes do sexo masculino, idosos e cardiopatas. Disfonia, refluxo gastroesofágico, uso de traquestomia e via alternativa de alimentação foram fatores associados ao risco de disfagia.

Palavras-chave: Deglutição; Transtornos de Deglutição; Programas de Rastreamento.

Resumen

Introducción: La presencia de disfagia en aumenta los costos de atención hospitalaria para la salud y conduce a una mayor sobrecarga de estancia en el hospital, por lo que el sistema de salud. Pacientes hospitalizados, por diferentes enfermidades, subyacentes pueden presentar riesgos para la disfagia en necesidad de rehabilitación. **Objetivo:** rastrear el riesgo de disfagia en pacientes ingresados en un hospital universitario. **Métodos:** Estudio descriptivo de corte transversal, realizado desde marzo de 2016 hasta septiembre de 2018 en un Hospital Universitario. Los datos fueron recolectados a través del análisis de gráficos y la aplicación de la herramienta de evaluación de la alimentación (EAT-10). Los pacientes que obtuvieron un puntaje de 3 o más fueron clasificados como en riesgo de disfagia. El análisis estadístico consideró el nivel de significancia del 5%. **Resultados:** El riesgo de disfagia se identificó en 191 (7,8%) pacientes. Hubo una prevalencia masculina, mayor de 60 años, y la enfermedad subyacente prevalente fue cardiovascular. La disfonía (4,2%), el reflujo gastroesofágico (3,8%), el uso de traquestomía (1,1%) y la alimentación alternativa (3,1%) se asociaron con el riesgo de disfagia. **Conclusión:** el riesgo de disfagia se observó en pacientes hospitalizados, principalmente en hombres, ancianos y pacientes con enfermedades cardíacas. La disfonía, el reflujo gastroesofágico, el uso de traquestomía y la alimentación alternativa fueron factores asociados con el riesgo de disfagia.

Palabras clave: Deglución; Trastornos de Deglución; Tamizaje Masivo.

Introduction

Patients with neurological, mechanical and/or functional disorders may have different degrees of dysphagia, including impairments that range from the early stage of swallowing to food reaching the stomach. Clinically, these changes are manifested through signs and symptoms that are characterized by difficulties in chewing, xerostomia, choking/coughing and/or throat clearing before, during and/or after swallowing, residues, hoarseness, wet vocal quality, respiratory change and odynophagia[1,2], which may lead to several damages to the patient, such as malnutrition, dehydration, pneumonia, increased hospital stay, social isolation and even death[3].

Elderly hospitalized patients are at risk for dysphagia due to the natural aging of the structures that participate in the swallowing mechanism[4,5]. These changes may be due to the reduced tone, mobility and strength of the phonoarticulatory organs, absence of teeth and/or poorly adapted prostheses and the onset of symptoms of diseases resulting from the aging process associated with malnutrition, increased hospital stay and mortality[5].

Patients with neurological diseases, such as degenerative diseases, stroke, brain trauma and cerebral palsy, may be at risk for dysphagia resulting from changes that affect one or all peripheral and/or central components that participate in swallowing[3,6]. In cancer patients it may be due to anatomical and/or functional changes due to different treatments[7].

The presence of dysphagia in the hospital setting increases health care costs by 40.36% and hospital stays by 2.99 days. Given this context, it is essential to recognize swallowing disorders as a public health issue, which overloads the health care system and therefore requires an early detection to minimize the functional sequelae of the patient, the occurrence of aspiration pneumonia, reduce mortality, improve quality of life and reduce the financial burden of the health service[8,9]. Therefore, screening practices for dysphagia should be incorporated into the hospital routine through the use of screening tools, which allow detecting the risk of dysphagia in order to refer early cases, in which there is a need for formal speech-language pathology assessment at the bedside [2,8,9].

Some instruments are used for this purpose, such as the *Eating Assessment Tool* (EAT-10)[10,11]. The EAT-10 was originally developed as an instrument to document the initial severity of dysphagia and to monitor treatment in people with swallowing disorders[11]. However, the literature reports its use for screening[12-14], evaluation and self-evaluation[2,10,11,15] purposes.

In 2016, authors[16] reported that 43% of hospitalized elderly people were at risk of dysphagia, while a recent research[2] in a philanthropic hospital found a risk of dysphagia in 10.5% of hospitalized patients. According to Izaola et al.[17], 83.1% of hospitalized elderly are at risk of dysphagia and association with nutritional status and prognosis.

Thus, given this context and the extent of the topic, this study aimed to monitor the risk of dysphagia in patients admitted to a University Hospital.

Material and Methods

This is a cross-sectional, descriptive study that was carried out in a University Hospital and approved by the Research Ethics Committee (REC), of the institution, under the no. 1,655,313 and CAAE no. 54342716.9.0000.5071. Sociodemographic data and information related to the variables dysphonia, gastroesophageal reflux (GER), tracheostomy (TCT), alternative feeding route (AFR) and underlying disease were collected through analysis of patient records, while the variable risk of dysphagia was obtained through the application of the screening instrument, EAT-10, from March 2016 to September 2018. All subjects enrolled in the research were previously informed of the procedures and signed the Informed Consent Form (ICF).

The hospital included is a medium-sized hospital with 249 ward beds for Urology, Pulmonology, Gastroenterology, Cardiology, Neurology, Rheumatology, Hematology, Medical Clinic, Infectious Diseases, Nephrology, Surgical Clinic, Gynecology and Obstetrics, Pediatrics, Emergency Room, Intensive Care Unit (ICU), Neonatal ICU, Surgical Center, Milk Bank and Imaging and Diagnosis facilities. The clinical staff of the hospital includes six speech-language pathologists, and the care is provided through a request for medical opinion and through an active search of patients with needs for referral and/or speech-language pathology intervention. The sample was for convenience.

The study included all patients hospitalized in the departments of Internal Medicine, Surgical

Clinic, Urology, Pulmonology, Cardiology, Gastroenterology, Neurology, Hematology, Rheumatology, Infectious Diseases and Nephrology, in which patients remain in wards, regardless of associated factors, aged 18 or more, of both sexes, and with sufficient alertness to answer the instrument. As for the diagnosis, which was conducted by different specialties, the study chose to categorize it in neurological, oncological and other diseases. Other diseases included diagnoses from Pulmonology, Cardiology, Gastrology, Hematology, Rheumatology, Urology, Nephrology, Infectious Diseases and Surgical Clinic.

However, the study did not include hospitalized patients with difficulties in understanding sentences and/or instructions, patients readmitted with previous screenings, lack of interest/unavailability to participate in the study, patients who were not in bed at the time of screening, or who had an unstable clinical condition.

The EAT-10 is a self-assessment instrument that is used by some authors to screen for the risk of dysphagia in patients, with different diagnoses[12-14]. The instrument has ten simple questions and is quick to apply, in addition to not requiring analog visual measurements and formulas for calculations. The EAT-10 also has excellent internal consistency, reproducibility and validity based on criteria of 0.85 and 0.82 of sensitivity and specificity, respectively. The EAT-10 can be applied by different health professionals, which may favor the increase in referrals to a speech-language pathology assessment, thus contributing to earlier multidisciplinary interventions, reducing treatment costs and improving quality of life. The instrument has a cut-off point of 3, which indicates the risk of dysphagia and, consequently, the need for a formal speech-language pathology assessment[10-12]. Cordier et al. (2017)[18] recommend the use of Rasch analysis in order to reconstruct the EAT-10. This study used the original version of the instrument based on previous studies already reported.

Due to the socioeconomic conditions of the patients who attend the University Hospital, the study chose to train the researcher who was responsible for collecting data, and the questions were read and explained to each patient.

The results of the patients' characteristics were described by absolute and relative frequencies for statistical analysis. The Chi-Squared Test and Fisher's exact test were used to associate characteristics and risk of dysphagia, when necessary. A 5% significance level was used for the analysis.

Results

The sample consisted of 4,265 patients. 2,465 (57.8%) of these were included and 1,800 (42.2%) were excluded due to readmission with previous screening, difficulties in understanding sentences and/or instructions or a clinical condition that would prevent the application of the instrument.

There was a prevalence of male subjects (62.5%; n=1,540), aged over 60 years (63.2%; n=1,557), presence of dysphonia in 104 (4.2%) patients, gastroesophageal reflux (GER) in 93 (3.8%), use of TCT in 27 (1.1%) and 76 (3.1%) patients with alternative feeding route (AFR). As the diagnosis was categorized as neurological, oncological and other diseases, the prevalence of other underlying diseases was observed (83.3%; n=2053) and cardiovascular disease (21.7%; n=535) was reported as the most common among them. 366 (14.8%) oncological patients and 46 (1.9%) neurological patients were diagnosed. The risk of dysphagia was detected in 191 (7.8%) patients.

Regarding the association of clinical and demographic characteristics of patients at risk of dysphagia, there was an association between the risk of dysphagia and the presence of dysphonia ($p<0.0001$), GER ($p<0.0001$), TCT ($p=0.0007$) and AFR ($p<0.0001$).

Table 1. Clinical and Demographic Characteristics of Hospitalized Patients (*n*=2465).

Variable	Characteristic	N(%)
Gender	Female	925 (37.5)
	Male	1540 (62.5)
Age	≤ 60 years	908 (36.8)
	> 60 years	1557(63.2)
Dysphonia	Reported	104 (4.2)
	Not Reported	2361 (95.8)
GER	Reported	93 (3.8)
	Not Reported	2372 (96.2)
Tracheostomy	Reported	27 (1.1)
	Not Reported	2438 (98.9)
AFR	Reported	76 (3.1)
	Not Reported	2389 (96.9)
Underlying disease	Neurological	46 (1.9)
	Oncological	366 (14.8)
	Other Diseases	2053 (83.3)
	Cardiovascular	535 (21.7)
	Kidney	186 (7.5)
	Respiratory	132 (5.4)
	Liver	272 (11.0)
	Viral	68 (2.8)
	Infectious	75 (3.0)
	Hematological	90 (3.7)
	Gastric	362 (14.7)
	Surgical	148 (6.0)
	Urologic	185 (7.5)
Risk of dysphagia	Reported	191 (7.8)
	Not Reported	2274 (92.2)

Legend: GER: gastroesophageal reflux; AFR: alternative feeding route;
N: number of subjects; %: percentage.

Table 2. Association of Clinical and Demographic Characteristics of Hospitalized Patients at Risk for Dysphagia (*n* =191).

Characteristic		Risk of dysphagia N(%)		p-value
		Reported	Not Reported	
Gender	Female	70 (7.6)	855 (92.4)	0.8551*
	Male	121 (7.9)	1419 (92.1)	
Age	≤ 60 years	58 (6.4)	850 (93.6)	0.0641*
	> 60 years	133 (8.5)	1424 (91.5)	
Dysphonia	Reported	36 (34.6)	68 (65.4)	< 0.0001*
	Not Reported	155 (6.6)	2206 (93.4)	
GER	Reported	32 (34.4)	61 (65.6)	< 0.0001*
	Not Reported	159 (6.7)	2213 (93.3)	
Tracheostomy	Reported	8 (29.6)	19 (70.4)	0.0007#
	Not Reported	183 (7.5)	2255 (92.5)	
AFR	Reported	37 (48.7)	39 (51.3)	< 0.0001*
	Not Reported	154 (6.4)	2235 (93.6)	
Underlying disease	Neurological	7 (15.2)	39 (84.8)	0.0874#
	Oncological	33 (9.0)	333 (91.0)	
	Other Diseases	151 (7.4)	1902 (92.6)	

Legend: GER: gastroesophageal reflux; AFR: alternative feeding route; N: number of subjects; %: percentage; *Chi-Squared Test; #Fisher's exact test.

Discussion

Identifying a patient at risk of dysphagia in the hospital setting is essential to early referral to speech-language pathology, reducing functional sequelae, pulmonary complications, and mortality, improving quality of life, and reducing health care costs, hospital stay and, thus, not overloading the health system[2,8].

This study showed a prevalence of male subjects, which is in line with some studies that reported a prevalence of male subjects in the identification of risk of dysphagia in hospitalized patients[19-21]. It is believed that the prevalence of hospitalized men is due to their negligence and/or limited preventive health care[22], and also due to the inclusion criteria of predominantly male patients from the urology department.

Regarding age, there was a prevalence of elderly people, which also corroborates with the literature. Andrade et al.[2] monitored 909 patients using the EAT-10, and found a 10.5% risk of dysphagia, with age being an associated factor due to the diseases associated with this condition. This result corroborates with the study by Maciel et al.[20], who reported a risk of dysphagia in 69% of hospitalized elderly. This study found a risk of dysphagia in 7.8% (n=191) of the screened elderly. In another study using the EAT-10, Mãnas-Martínez et al.[23] found 56.7% risk of dysphagia in hospitalized elderly patients. The rapid population aging is increasing the number of elderly people who need hospital care and support the screening practices in these patients[5,20,21,23,24].

Aging leads to physical and morphofunctional changes that impair the functioning of the whole organism, then being a condition that induces a higher rate of hospitalization with the risk for dysphagia and consequent negative impact on swallowing function[2]. Other risk factors for dysphagia may also be observed, such as the absence and/or poorly adapted dental prosthesis, inadequate food consistencies and incorrect posture during meals[4,5,19]. Dysphagia, weight loss, reduced muscle strength and impaired cognition may indicate an increased risk of malnutrition in hospitalized elderly[25].

This study found a lower rate for the risk of dysphagia compared to the literature. It should be noted that the hospital in which the study was conducted is not a reference hospital in neurology and other clinics, which commonly report a greater number of cases with dysphagia. The difference in the methodology of the studies may also reflect the values found.

Among the screened patients, 4.2% had dysphonia and it is known that dysphonic patients are at risk of developing some degree of dysphagia[19,24,26], since changes in glottic coaptation may affect the events of the pharyngeal phase leading to the occurrence of penetration/aspiration at different times and degrees. This result may be related to various diagnoses, surgical procedures and/or devices to which the patients were submitted. Screening was performed in this study on patients with different underlying diseases that are risk factors for dysphonia and dysphagia due to sensory and/or motor changes that may impact the voice and swallowing anatomophysiology

The presence of GER is a risk factor for dysphagia and was observed in 3.8% of the patients screened. Few studies have identified the prevalence of GER in dysphagic patients. When analyzing the main complaints of patients with GER, the study by Burati et al.[27] found that the main symptoms were related to throat clearing, cough, odynophagia and choking, all of which are risk factors for dysphagia. The association between GER and dysphagia may be explained by the irritation of the laryngopharyngeal structures, cervical discomfort due to esophageal changes and changes in the upper esophageal sphincter[27]. The presence of GER was reduced in the patients enrolled in this study, which may be related to the lack of information in the patient's medical record during screening, underdiagnosis and/or due to the lack of knowledge of the patient and/or companion about the disease.

27 (1.1%) patients had TCT, which is also lower than the numbers found in the literature[21,28]. Among these, 8 (29.6%) were at risk of dysphagia. Although the presence of TCT alone is not a condition for aspiration and dysphagia, it is a factor that may cause changes in the motor and sensory functions of swallowing, thus being a risk factor for dysphagia by affecting the biomechanics of swallowing[19,21]. Rodrigues et al.[28] analyzed 14 tracheostomized patients and found a moderate prevalence of dysphagia.

It is believed that since the screening was conducted on patients with different underlying diseases and not all patients evolved with the need to perform a TCT, it may explain the small number

of individuals who used this device in addition to highlighting the profile of the Hospital in which the research was carried out. Since it is an institution whose clinical reference is cardiology, acute abdomen and high-risk maternity. However, it is necessary to highlight the 29.6% of patients who need the evaluation of the swallowing biomechanics, as they have risk of dysphagia and, therefore, risk of respiratory impairments.

3.1% of the patients did not use AFR. Although this study did not record the type of AFR, there is evidence in the literature of studies with a predominance of nasogastric tube[19,29]. Dysphagic patients are more susceptible to malnutrition and dehydration due to difficulties in swallowing or due to deteriorated clinical condition, thus the AFR is a means to supply the patient's nutritional and water support[23]. Nogueira et al.[29] noticed that patients with use of AFR had weakness and changes in the sensitivity of the swallowing muscles, thus being a risk factor for dysphagia.

The lower number of oncological and neurological diseases in this study may be explained by the fact that the study was conducted in a site that was not a reference in these areas. As shown in Table 1, although neurological disease was the least common, it had the highest risk of dysphagia, followed by oncological diseases and other diseases. These results are in line with studies that show risk of changes in the biomechanics of swallowing in oncological and neurological diseases[3,6].

The study also found a prevalence of cardiovascular disease in the screening. These data are in line with the study by Faria et al.[30], which also found a predominance of cardiovascular disease. Respiratory symptoms secondary to cardiac problems may explain these findings, since patients with respiratory disorders may have uncoordinated breathing with swallowing and affect apnea, becoming susceptible to risk of changes, especially during swallowing[19,21].

As for the association of clinical and demographic characteristics of hospitalized patients at risk of dysphagia, there was an association with dysphonia, GER, AFR and TCT.

Numerous underlying diseases may affect the myoelastic action of the larynx, leading to reduced glottic efficiency, impacting the protection of the lower airway and explaining dysphonia as an associated factor. The presence of tracheostomy alone is not an exclusive condition for the patient to have dysphagia, but the risk of alteration in the biomechanics of swallowing is expected with the tracheostomy combined to the clinical condition and the various devices that the patient may have. And, the presence of AFR, especially for extended periods, may lead to loss of mucosal-sensation. All of these factors associated to a greater or lesser degree may affect the efficiency and safety of swallowing and, therefore, are considered risk factors for dysphagia.

The presence of dysphagia in the hospital setting negatively impacts quality of life, recovery, patient prognosis and increases costs for both the patient and the hospital[1,2,8]. An easy and fast application tool for screening would help to identify patients at risk of dysphagia, thus helping to minimize symptoms, prevent pulmonary complications, improve the patient's quality of life, and reduce hospital stay and hospital costs[2,8].

The study had some limitations, such as incomplete information in the medical record of patients, and the subjectivity and fragility of the original version of the screening instrument used.

Conclusion

The screening performed in hospitalized patients allowed noticing that elderly, male and cardiac patients were at risk for dysphagia. The presence of dysphonia, GER, use of tracheostomy and AFR were associated with the risk of dysphagia using a simple, fast and low-cost instrument.

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