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Swallowing of critical patients and its association with epidemiological and clinical characteristics

Deglutição de pacientes críticos e sua associação com características epidemiológicas e clínicas

Deglución de pacientes críticos y su associación con características epidemiológicas y clínicas

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Abstract

Introduction: Dysphagia is a swallowing disorder with specific signs and symptoms, characterized by alterations in any phase or between phases of swallowing dynamics, of congenital or acquired origin, which can lead to pulmonary, nutritional and social damage. It is a disorder often found in the intensive care unit (ICU). Therefore, the early identification of the main etiological agents for swallowing disorders is essential to promote more adequate speech therapy assistance. Objective: To verify the association between epidemiological and clinical characteristics with the outcome speech-language pathology contraindication for oral feeding in patients admitted to an ICU. Methods: Cross-sectional study that

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Authors' contributions:
FMS: data collection, results analysis, article writing and revision.
OSF: results analysis, article revision.
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LCB: data collection, article writing and revision.
SD: results analysis, article revision, study supervision, study evaluation, methodology design.

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evaluated patients admitted to the ICU who underwent clinical evaluation of swallowing between October 2018 and May 2019. Level 1 of the Functional oral intake scale (FOIS) was considered at higher risk for respiratory aspiration and compared with FOIS levels 2-7. Epidemiological and clinical variables were obtained from patient records. Univariate and multivariate analyses were performed to identify associations and effects between variables and the outcome contraindication of oral feeding. The significance level adopted was 5% and the analyses were performed using the SPSS v.21.0 program. Results: 128 patients were included (64.9% undergoing orotracheal intubation - OTI; age of 60 ± 15.3 years). Patients with FOIS 1 spent more days on OTI, had a prolonged stay in the ICU and each day of hospitalization had a 5% risk of contraindication of oral feeding in the speech-language pathology assessment. Conclusion: There was an association between longer times of orotracheal intubation, in addition to longer previous hospitalization time, with the contraindication of oral feeding.

Keywords: Deglutition Disorders; Intensive Care Units; Risk Factors; Intubation, Intratracheal; Deglutition.

Resumo

Introdução: Disfagia é um distúrbio de deglutição com sinais e sintomas específicos, caracterizada por alterações em qualquer fase ou entre as fases da dinâmica de deglutição, de origem congênita ou adquirida, podendo gerar prejuízo pulmonar, nutricional e social. É um transtorno frequentemente encontrado no centro de tratamento intensivo (CTI). Sendo assim, a identificação precoce dos principais agentes etiológicos para transtornos de deglutição é essencial para promover uma assistência fonoaudiológica mais adequada. **Objetivo:** Verificar a associação entre características epidemiológicas e clínicas com o desfecho contraindicação fonoaudiológica de alimentação por via oral em pacientes internados em um CTI. **Métodos:** Estudo transversal que avaliou pacientes internados no CTI submetidos a avaliação clínica da deglutição no período entre outubro de 2018 e maio de 2019. O nível 1 da Escala funcional de ingestão por via oral (FOIS) foi considerado de maior risco para aspiração respiratória e comparado com os níveis FOIS 2-7. Variáveis epidemiológicas e clínicas foram obtidas a partir dos registros dos pacientes. Análises univariadas e multivariadas foram realizadas para identificar associações e efeitos entre as variáveis e o desfecho contraindicação da alimentação por via oral. O nível de significância adotado foi de 5% e as análises foram realizadas no programa SPSS v.21.0. **Resultados:** Foram incluídos 128 pacientes (64,9% submetidos a intubação orotraqueal – IOT; idade de 60 ± 15,3 anos). Pacientes com FOIS 1 permaneceram mais dias em IOT, tiveram a internação no CTI prolongada e a cada dia de internação apresentaram risco de 5% de contraindicação da alimentação por via oral na avaliação fonoaudiológica. **Conclusão:** Foi evidenciada associação entre maior tempo de intubação orotraqueal, além de maior tempo de internação prévio, com a contraindicação da alimentação por via oral.

Palavras-chave: Transtornos de Deglutição; Unidades de Terapia Intensiva; Fatores de Risco; Intubação Intratraqueal; Deglutição.

Resumen

Introducción: La disfagia es un trastorno de la deglución con signos y síntomas específicos, caracterizado por alteraciones en cualquier fase o entre fases de la dinámica de la deglución, de origen congénito o adquirido, que pueden conducir a daño pulmonar, nutricional y social. Es un trastorno que se encuentra a menudo en la unidad de cuidados intensivos (UCI). Por lo tanto, la identificación temprana de los principales agentes etiológicos de los trastornos de la deglución es fundamental para promover una asistencia logopédica más adecuada. Objetivo: Verificar la asociación entre las características epidemiológicas y clínicas con el desenlace fonoaudiológico contraindicación para alimentación oral en pacientes internados en una UTI. Métodos: Estudio transversal que evaluó a pacientes ingresados en UCI a quienes se les realizó evaluación clínica de la deglución entre octubre de 2018 y mayo de 2019. Nivel 1 de la Escala de ingesta oral funcional (FOIS) fue considerado de mayor riesgo para aspiración respiratoria y comparado con los niveles de FOIS 2-7. Las variables epidemiológicas y clínicas se obtuvieron de las historias clínicas de los pacientes. Se realizaron análisis univariados y multivariados para identificar

asociaciones y efectos entre las variables y el resultado contraindicación de la alimentación oral. El nivel de significación adoptado fue del 5% y los análisis se realizaron con el programa SPSS v.21.0. Resultados: se incluyeron 128 pacientes (64,9% sometidos a intubación orotraqueal - IOT; edad de 60 ± 15,3 años). Los pacientes con FOIS 1 pasaron más días en OTI, tuvieron una estancia prolongada en la UCI y cada día de hospitalización tenían un 5% de riesgo de contraindicación de alimentación oral en la evaluación de patología del habla y lenguaje. Conclusión: Hubo asociación entre mayor tiempo de intubación orotraqueal, además de mayor tiempo de hospitalización previa, con la contraindicación de alimentación oral.

Palabras clave: Trastornos de la Deglución; Unidades de Cuidados Intensivos; Factores de Riesgo; Intubación Intratraqueal; Deglución.

Introduction

Dysphagia is a swallowing disorder with specific signs and symptoms, characterized by changes in any phase or between dynamic phases of swallowing[1]. In general, its etiology is varied, and it can be caused by neurological impairment, structural damage, side effects of medications and presbyphagia. Its consequences tend to be serious, and it is possible to negatively impact the quality of life of the affected individual, in addition to being able to lead to social isolation, malnutrition, dehydration, aspiration pneumonia and death[2,3,4]. The incidence of dysphagia in intensive care units (ICUs) has very diverse data in the literature, ranging from 3% to 62%, according to the population and study design[3].

Among the various pathologies and situations that may present oropharyngeal dysphagia as a symptom, some are frequently found in the intensive care unit, such as neurodegenerative diseases, neuromuscular diseases, stroke, head and neck cancer, chronic obstructive pulmonary disease (COPD), critical patient polyneuropathy, muscle weakness acquired in the ICU, tracheostomy and orotracheal intubation, the latter being the most commonly observed factor. As consequences of dysphagia in the hospital environment, there is a longer hospital stay, high costs and a higher risk of death. In addition, critically ill patients also have a higher risk of frequent aspiration due to the lowered level of consciousness, the supine position, among other factors[3,4,5].

In the ICU, early speech therapy intervention is important to minimize the occurrence of laryngotracheal aspiration and to indicate efficient and safe oral feeding. And the clinical evaluation of swallowing is essential for adequate therapeutic planning and to achieve the objective of the therapy for swallowing. With this, the need to carry out the present research emerges to show which the main etiological agents for oropharyngeal dysphagia are, and which may be related to the most unfavorable outcomes in the clinical evaluation of swallowing, performed at the bedside. From this, there will be the possibility of promoting actions related to the identification of patients who are at greater risk of oropharyngeal dysphagia and bronchoaspiration, enabling safer assistance to them with regard to oral feeding.

The present study aimed to verify the association between epidemiological and clinical characteristics with the outcome speech-language pathology contraindication for oral feeding in patients admitted to an intensive care unit.

Material and methods

Ethical considerations

Cross-sectional, observational, analytical, retrospective study, approved by the Research Ethics Committee of the institution of origin under opinion 3,657,853.The informed consent form was waived because this is a study based on the analysis of medical records.

Sample

The sample consisted of patients who underwent a speech-language pathology assessment of swallowing at the bedside from October 2018 to May 2019, who had clinical and respiratory stability, as well as being 18 years of age or older, and also of the patients who required orotracheal intubation (OTI), only those evaluated within 48 hours of extubation were included. Finally, tracheostomized patients with esophageal dysphagia and

who were evaluated at the time of the bedside meal were excluded.

Demographic, clinical and hospitalization-related variables

The selected demographic variables were gender and age. And in relation to clinical variables, the reasons for hospitalization in the ICU and the variables that could have had an effect on the clinical evaluation of swallowing were collected using an electronic medical record. In relation to clinical variables, were collected: body mass index (BMI), simplified acute physiological score (SAPS 3), days of OTI, use of neuromuscular blockers during the OTI period, presence of respiratory diseases, ejection fraction value of the echocardiogram of the patients who underwent it, presence of delirium on the day of the speech-language therapist evaluation, acquired encephalic diseases, neurodegenerative diseases, history of surgery and radiation in the head and neck region and presence of dysphagia prior to hospitalization. The data referring to the days of hospitalization of the patients in the ICU before the speech-language pathologist evaluation was also verified.

Clinical evaluation of swallowing (outcome variables)

Based on the medical request for the speech-language evaluation, a clinical evaluation of swallowing was carried out based on the Dysphagia Risk Assessment Protocol (PARD)[6]. This protocol contemplates the evaluation with the pasty and liquid consistencies, being evaluated the items previous oral escape, oral transit time, nasal reflux, number of deglutitions, residues in oral cavity, laryngeal elevation, cervical auscultation, oxygen saturation, vocal quality, cough and choke. In addition, other signs to be observed are the presence of cyanosis, bronchospasm and changes in vital signs. And from this assessment, the degrees of dysphagia are obtained, ranging from normal swallowing to severe dysphagia[6].

With the clinical evaluation of swallowing, the classification of the functional level of oral food and liquid intake was obtained using the Functional oral intake scale (FOIS). The scale ranges from levels 1 to 7, with level 1 (nothing by mouth) characterizing the worst functionality, and level 7 characterizing the best oral intake functionality. And for data analysis, the FOIS level variable was used in a dichotomized way, with level 1 being considered the highest risk for laryngotracheal aspiration, then comparing it to the other levels (from 2 to 7)[7].

Data analysis

Quantitative variables were described as mean and standard deviation or median and interquartile range. Categorical variables were described by absolute and relative frequency.

To compare means, the t test was applied, and in cases of asymmetry, the Mann-Whitney u test was used. In addition, when comparing proportions, Pearson's chi-square or Fisher's exact tests were used. And to control for confounding factors, the Poisson regression model was applied.

The variable entry criterion in the multivariate model was that it had a $p<0.20$ in the bivariate analysis. And as in the multivariate analysis some variables that presented criteria for entry did not have statistical significance, the simple regression analysis was also performed. The significance level adopted was 5% and the analyses were performed using the Statistical package for social science (SPSS) version 21.0.

Results

During the study's data collection period, 184 patients underwent speech-language evaluation. Of these, 56 were excluded after application of the sample selection criteria, with data from 128 patients actually being analyzed, as shown in Figure 1.

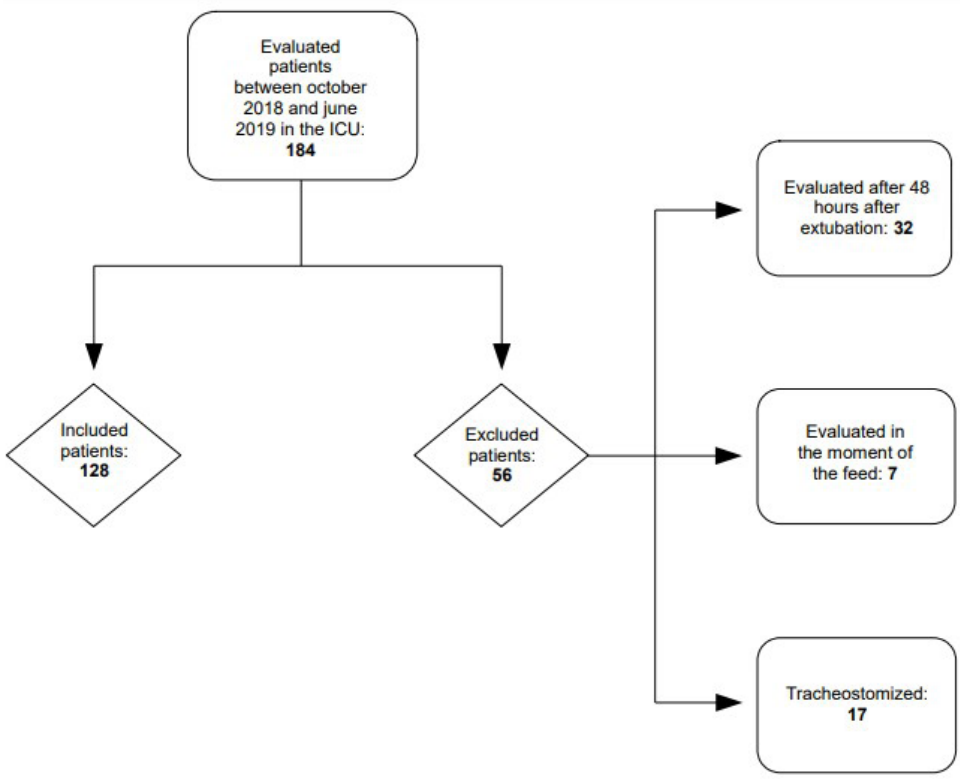

Figure 1. Diagram of the flow of the patient inclusion and exclusion process.

Of the 128 patients included in the study, 71 (55.5%) patients were male, with a mean age of 60.0± 15.3 years. In addition, a median of four days of hospitalization prior to the speech-language evaluation was found.

Of the total number of patients evaluated, 63.3% required OTI, of which 51.6% required prolonged OTI for 48 hours or more. It was also found that 35.9% of patients had acquired brain diseases, with stroke being the most frequent, found in 28.1% of the sample (Table 1).

Table 1. Epidemiological and clinical characteristics

Variables	n = 128
Male	71 (55,5)
Age, years	60,0±15,3
Body Mass Index (BMI) kg/m²	26,6±6,5
SAPS 3	62,2±19,1
Days from admission to the ICU until evaluation date	
Total in ICU	9(4-16)
Prior to speech therapy evaluation	4(2-8,75)
Orotracheal intubation (OTI) (n=81)	
Prolonged (48 horas ou mais)	66(51,6)
Days on IOT	5 (2-9)
Use of neuromuscular blockers in OTI	
Number of patients who needed	15(12,15)
Median in days	3(2-3)
COPD (n=13)	
Severe (Gold 3 or 4 and/or home oxygen therapy)	10(76,92)
CHF	
Mean ejection fraction of 108 patients who underwent echocardiography	57,87(15,6)
Patients with ejection fraction	10(9,3)
Presence of delirium on the day of the speech-language evaluation	20(15,6)
Ischemic stroke	24(18,8)
Hemorrhagic stroke	12(9,4)
History of previous stroke	26(20,3)
Acquired brain diseases	
Acute stroke	36(28,1)
Epilepsy	6(4,7)
Surgery or Brain Tumor	2(1,6)
Encephalopathy	1(0,8)
Traumatic brain injury	1(0,8)
Guillan Barré	1(0,8)
Neurotoxoplasmosis	1(0,8)
Total of pacients	46(35,9)
Neurodegenerative diseases	
Alzheimer	1(0,8)
Amyotrophic Lateral Sclerosis	1(0,8)
Myasthenia Gravis	2(1,6)
Total of pacientes	4(3,1)
History of surgery in the head and neck region	1(0,8)
Radiation in the head and neck region	6(4,7)
Dysphagia prior to hospitalization	11(8,6)

Variables expressed in n (%), mean ± SD, median (interquartile range)

As for the reasons for admission to the ICU, 82.8% of the patients had clinical reasons, with neurological diseases and sepsis being the most frequent, observed in 35 (33%) and 32 (30%) patients, respectively. And of the reasons for surgical hospitalization, the highest occurrence was due to cardiac surgery, observed in 11 (50%) patients (Table 2).

Table 2. Reasons for hospitalization in the Intensive Care Unit of the 128 patients studied

Reasons for hospitalization	**n(%)**
Clinical	106(82,8)
Surgical	22(17,2)
Elective Surgery	11(8,6)
Emergency surgery	11(8,6)
Reasons for clinical admission	
Neurological	35(33,0)
Sepsis	32(30,0)
Cardiology	21(19,8)
Respiratory	13(12,2)
Gastroenterological	2(1,9)
Endocrinological/metabolic/nephrologic	2(1,9)
Hematological	1(0,9)
Reasons for surgical hospitalization	
Cardiology	11(50,0)
Neurological	5(22,7)
Laparotomy	2(9,1)
Digestive	1(4,5)
Thoracic	1(4,5)
Vascular/plastic	1(4,5)
Urological	1(4,5)

Variables described with absolute and relative values.

From the clinical evaluation of swallowing, it could be observed that 38 (29.7%) had FOIS 1, that is, they could not receive nothing by mouth, and that 27 (21.1%) patients could receive minimal oral. Of the total number of patients evaluated, 101 were using an alternative feeding route (FOIS 1 to 3), of which 63 could also receive oral feeding (FOIS 2 and 3). As for the degrees of dysphagia obtained by the PARD, it was observed that only 20.3% of the sample did not present a risk of laryngotracheal aspiration of at least one consistency, which corresponds to normal, functional swallowing and mild dysphagia (Table 3).

Table 3. Características related to the clinical evaluation of deglutition of the 128 patients studied

Variables	n(%)*
***Functional Oral Intake Scale* – FOIS**	
Level 1: Nothing by mouth	38(29,7)
Level 2: Tube dependent with minimal attempts of food or liquid.	27(21,1)
Level 3: Tube dependent with consistent oral intake of food or liquid	36(28,1)
Level 4: Total oral diet of a single consistency	11(8,6)
Level 5: Total oral diet with multiple consistencies, but requiring special preparation or compensations	13(10,2)
Level 6: Total oral diet with multiple consistencies without special preparation, but with specific food limitations	-
Level 7: Total oral diet with no restrictions	3(2,3)
Prescribed feeding route after speech-language pathology evaluation	
Exclusive alternative feeding diet	52(40,6)
Mixed diet (alternative and oral)	49(38,3)
Exclusive by mouth diet	27(21,1)
Degrees of dysphagia – Protocolo de Avaliação do Risco para Disfagia (PARD)	
Normal ou functional deglutition (end)	7(5,5)
Mild oropharyngeal dysphagia	19(14,8)
Mild to moderate oropharyngeal dysphagia	27(21,1)
Moderate oropharyngeal dysphagia	25(19,5)
Moderate to severe oropharyngeal dysphagia	21(16,4)
Severe oropharyngeal dysphagia	19(14,8)
Inconsistent response / fluctuation in levels of consciousness	10(7,8)

* Variables described by mean ± standard deviation (SD), median (25th-75th percentiles) or n(%).

In the bivariate analysis, considering FOIS 1 as the highest risk for laryngotracheal aspiration in relation to the other levels of the scale, it was evidenced that patients who presented FOIS 1 spent more time in orotracheal intubation, with a median of seven days (p=0.014). Furthermore, patients with FOIS 1 had a greater number of days spent in the ICU prior to the speech-language pathology evaluation (p=0.006) than patients with FOIS 2 to 7 (Table 4).

Table 4. Association of demographic, clinical and length-of-stay variables with the outcome no oral use (NPO) of the 128 patients studied

Variables	Nothing by mouth		p-value
	Yes FOIS 1 n=38	No FOIS 2 - 7 n=90	
Gender			0,164
Male	17(23,9)	54(76,1)	
Female	21(36,8)	36(63,2)	
Age	61,5±14,9	56,15±15,9	0,092
BMI	26,51±6,7	6,96±146,2	0,726
SAPS3	63,24±19,8	61,8±18,8	0,703
Days from admission to the ICU until evaluation date	7(3-14)	4(2-8)	0,006*
Prolonged orotracheal intubation	22(33,3)	44(66,7)	0,439
Days of OT	7(3,5-13)	5(2-7)	0,014*
Neuromuscular blockers in OTI (days)	6(40,0)	9(60,0)	0,371
COPD	2(15,4)	11(84,6)	0,582
CHF with EF < 30%	4(40,0)	6(60,0)	
Presence of delirium on the day of the speech-language evaluation	6(30,0)	14(70,0)	0,927
Acute stroke	12(33,3)	24(66,7)	0,572
Classificação do AVC			0,157
Ischemic stroke	6(25,0)	18(75,0)	
Hemorrhagic stroke	6(50,0)	6(50,0)	
History of previous stroke	5(19,2)	21(80,8)	0,191
Acquired brain diseases	16(34,8)	30(65,2)	0,345
Neurodegenerative diseases	2(50,0)	2(50,0)	0,582
Radiation in the head and neck region	3(50,0)	3(50,0)	0,361
Dysphagia prior to hospitalization	3(27,3)	8(72,7)	1,00

Variables described by mean ± standard deviation (SD), median (25th-75th percentiles) or n(%).
*p-value ≤0.05 obtained using the Mann Whitney U test.
Subtitle: BMI: body mass index; SAPS 3: Simplified acute physiology score 3; OTI: orotracheal intubation; COPD: chronic obstructive pulmonary disease; CHF: congestive heart failure; EF: ejection fraction.

In Poisson's multiple regression analysis, the variable time on OTI was not included in the analysis, since all patients should have undergone it for this variable to be evaluated. And in the multiple regression analysis adjusted for sex and age, it was shown that there is a 4% risk for the outcome nothing by mouth for each day of hospitalization in the ICU. As in this model the gender and age variables were not statistically significant, a simple regression analysis was also performed, which showed a 5% risk for the nothing by mouth outcome for each day of hospitalization in the ICU (Table 5).

Table 5. Final model of the multivariate logistic regression analysis associated with the outcome nothing by mouth

Variable	$PR1_{brute}$ (IC 95%)	p-value	$RP2_{adjusted}$ (IC 95%)	p-value
Days from admission to the ICU until evaluation date	1,05 (1,03;1,06)	<0,001	1,04 (1,02;1,06)	<0,001
Age	0,99 (0,97;1,00)	0,076	0,99 (0,98;1,01)	0,356
Sexo				
Masculino	0,65 (0,38;1,11)	0,115	0,68 (0,40;1,14)	0,139
Feminino	1,0		1,0	

1: Simple Poisson Regression Analysis
2: Multiple Poisson Regression Analysis
Subtitle: PR: prevalence ratio; CI: confidence interval; p-value (≤0,05)

Discussion

Many studies conducted in adult intensive care units (ICUs) assess the impacts of OTI on swallowing, without including patients with other risk factors for dysphagia, which are often found in critically ill patients[8-11]. In view of this, the present study presented data related to risk factors for dysphagia that are classically known, such as COPD, acquired brain diseases, neurodegenerative diseases and head and neck cancer and their treatment approaches, since in the literature these factors are presented as risk factors for oropharyngeal dysphagia in the ICU[2,3,12,13]. In addition, other variables that could be related to the outcome studied (contraindication to oral feeding) were also included, such as SAPS 3, severe heart failure, ejection fraction, delirium and the use of neuromuscular blockers in ventilation mechanics. However, most of the selected variables did not show entry criteria in the multiple regression model ($p<0.20$), which may be related to the sample size of this study.

In the present study, stroke was the most frequent acquired brain disease, present in 36 patients (28.1%). It is known that stroke can result in damage to the swallowing process, since it is a complex process that involves both cerebral hemispheres, recruits numerous muscles and cranial nerves, in addition to requiring voluntary and involuntary coordination[2,7,14]. The physical and cognitive functions after the stroke directly influence the swallowing of the affected individual. Fatigue, decreased alertness, inability to maintain head and trunk alignment, changes in postural control and reduced tonus, communication problems, visual perceptual difficulties and depression are factors that cause swallowing disorders[14,15].

In this study, it was possible to evidence that there was a longer time of occurrence of OTI in patients with contraindicated oral route in the first evaluation. The influence of OTI on the biomechanics of swallowing is frequently evidenced in the literature, describing that the presence of the ventilation tube in contact with the structures of the airways can generate lesions in the mucous membranes, mainly in traumatic or prolonged intubations and also when the tubes are of great caliber. This contact compromises the protection of the lower airways due to the possible reduction in elevation, anteriorization and hyolaryngeal stabilization during swallowing[13,16,17] and also due to the probable changes in the closure of the vocal folds at the time of swallowing apnea[18], in the reduction of subglottic air pressure and decrease in inspiratory and expiratory pressures[13,19]. It should be noted that subglottic air pressure is necessary for adequate protection of the lower airway during swallowing. Therefore, when it presents a reduction, consequently there may be dysphagia[20]. Furthermore, there may be changes in oropharyngeal and laryngeal sensitivity, as well as a reduction in the strength and mobility of the orofacial muscles, thus impairing the safety of the swallowing process, and possibly causing dysphagia and risk of bronchoaspiration[5,20,21].

Regarding the length of stay in the ICU prior to the speech-language evaluation, it was possible to observe a median of seven days of hospitalization for patients who had contraindications for oral feeding in the speech-language evaluation (FOIS 1), while the median of patients in FOIS 2 to 7 was 4 days ($p=0.006$), showing a risk of the outcome nothing by mouth of 4% and 5% in the simple and multivariate regression analysis, respectively, for each day of hospitalization in the ICU. Thus, it is believed that factors such as fluctuations in levels of consciousness and muscle weakness acquired in the intensive care unit, often observed in patients with longer hospital stays, may also be related to the contraindication of the safe oral route, as studies bring these factors as potential for dysphagia[2,3,22.]

Muscle weakness acquired in the ICU is characterized by impairment of innervation, peripheral muscles and respiratory muscles, and may even progress to acute respiratory failure[22,23,24]. A review study[25] reports that patients with prolonged hospitalization acquire generalized weakness resulting from immobility, affecting the musculoskeletal and respiratory systems, among others. This study also reinforces the difficulty of assessing muscle weakness in the ICU, because in addition to the scarcity of studies on the subject, the assessment scales are not specific for the population that was assessed25. And this is one of the reasons why this data was not collected in the present study.

As for delirium, it was considered only on the day of the speech-language evaluation. However, some studies[28,29,30] point to the importance of monitoring delirium, suggesting a daily assessment, which can modify the conduct related to the indication or contraindication of oral feeding.

It should also be noted the high prevalence of dysphagia in the patients in this study, with the risk of aspiration of one or more consistencies and even the total contraindication of oral feeding, since 111 (86.6% of the sample) patients had degrees of mild to moderate to severe dysphagia. This finding reinforces the importance of the speech therapist in these units, who should help in decision-making regarding the safest feeding route and the indication of diet consistencies in conjunction with the multidisciplinary team. With speech therapy, the occurrence of laryngotracheal aspiration can be minimized, enabling the indication of more efficient and safer oral feeding for each patient, also impacting the reduction of hospital stay and hospital costs[28,29,30].

It is suggested that new studies be carried out with larger samples and with an analysis model similar to that of the present research so that it is possible to demonstrate the effect of risk factors for dysphagia and other clinical variables on outcomes related to safe oral feeding. In addition, other outcomes related to the clinical evaluation of swallowing can also be studied. Finally, since days of OTI were associated with the outcome "nothing by mouth" and due to the impossibility of dichotomizing this variable, it is suggested to adopt the presence of OTI as an inclusion criterion.

Conclusion

Based on the analysis of the results of this study, it could be concluded that the longer the length of hospital stay prior to the speech-language pathology evaluation, the greater the risk of speech-language pathology contraindications for safe oral feeding and the occurrence of laryngotracheal aspiration. There was an association between longer duration of orotracheal intubation and the contraindication of oral feeding.

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