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Dysphagia occurrence in COVID-19-positive patients in two hospitals in Brazil

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ABSTRACT – Background – COVID-19 comprises a respiratory infection resulting from contamination by SARS-CoV-2, with acute respiratory failure being one of its main characteristics, leading to a high frequency of orotracheal intubation (OTI), which in turn increases the risk for dysphagia. Since this can lead to pulmonary impairment, knowing the real occurrence of dysphagia in part of the Brazilian population and its associations allows early and effective clinical management of the multidisciplinary team in relation to patients. **Objective** – To verify the occurrence of dysphagia in COVID-19-positive adult patients in two Brazilian reference hospitals in the care of the pandemic. **Methods** – This was a prospective, longitudinal observational study carried out in two private hospitals in Brazil, both references in the care of patients with coronavirus isolation. Data were initially collected by consulting the medical records of each patient. Information was collected regarding sex, age, previous diseases, COVID-19 testing, and the OTI period. After data collection, the clinical speech-language assessment of swallowing for each patient was carried out using the adapted Gugging Swallowing Screen (GUSS), the ASHA NOMS and the Functional Oral Intake Scale (FOIS). **Results** – A total of 129 participants were evaluated, with a mean age of 72 years. According to the GUSS scale, 9.3% of the patients presented normal/functional swallowing, while 90.7% presented dysphagia, with mild dysphagia in 17.05%, moderate dysphagia in 33.33%, and severe dysphagia in 37.98%. As for the results of the ASHA NOMS, the majority (36.5%) of the patients were at level 1, which represents the patient who is not able to receive his or her food supply orally, having the need to use tube feedings. This is in line with the results observed with the FOIS scale, whereby most patients (42.1%) were classified as Level I, when food intake occurs exclusively through feeding tubes, with no oral supply. Of the 129 participants, 59% of them required OTI. When comparing the time of OTI and the severity of dysphagia, there was a statistically significant difference, with more severe dysphagia, the longer the patient remained intubated. **Conclusion –** There is a high incidence of oropharyngeal dysphagia in patients with COVID-19, with increased severity during longer periods of OTI.

Keywords – Deglutition disorders; coronavirus infections; incidence; critical care; speech, language and hearing sciences.

INTRODUCTION

COVID-19 comprises a respiratory infection resulting from contamination by SARS-CoV-2[1,2]. In March 2020, it was considered a pandemic by the World Health Organization (WHO), with contagion beginning in China and the first cases reported in Brazil in February 2020[3].

Acute respiratory failure is one of the main characteristics of the disease, leading to a high frequency of hospitalizations and the need for orotracheal intubation (OTI). Acute respiratory worsening occurs more markedly in adults with previous comorbidities and in healthy elderly individuals and/or with comorbidities[1,2].

In addition to the presence of prolonged OTI, whose correlation with dysphagia is already a consensus in the specialized literature[4-8], other clinical aspects related to SARS-CoV-2 infection are beginning to be correlated with the risk for the occurrence of dysphagia, such as the resulting muscle weakness of prolonged hospitalization, the use of sedatives and the possible neurological damage resulting from the infection itself[9-11].

Changes in the security and efficiency of the transport of the food bolus from the oral cavity to the stomach are called dysphagia and can lead to malnutrition, dehydration, pulmonary repercussions, and interference with the quality of life of individuals[12]. Since COVID-19-positive patients have had an impact on the condition of their lungs due to the infection itself, the occurrence of tracheal aspiration of saliva and/or food further increases the risk of clinical worsening and an increase in hospital stay[10,13]. Speech therapy is essential in the identification and rehabilitation of changes in the biomechanics of swallowing, which may reduce the morbidity rate[14], and it must begin in COVID-19-positive patients after their clinical stabilization.

The incidence and characteristics of dysphagia in COVID-19 patients are beginning to be outlined in the literature. Publications indicate that the occurrence of dysphagia is prevalent in this profile of patients, reaching 96% in a study with 25 adult patients after extubation due to COVID-19[9], but still with some variations depending on the evaluation environment (e.g., critical care unit or hospital ward) and if the patient underwent an OTI procedure or a tracheostomy[15].

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Since dysphagia is a disorder that can lead to clinical pulmonary impairments and COVID-19 is a disease that has a respiratory impact, knowing the real occurrence of dysphagia in part of the Brazilian population and its associations allows early and effective clinical management of patients by a multidisciplinary team.

Taking into account the influence of severe acute respiratory syndrome (COVID-19) and the enhancement of its treatments and sequelae to contribute to changes in the biomechanics of swallowing, it is necessary to verify the occurrence of dysphagia in adult patients positive for COVID-19 in two Brazilian hospitals of reference in the care of the pandemic to contribute to the field of interventions in critical patients with dysphagia and speech therapy in the multidisciplinary team in light of the new coronavirus pandemic.

METHODS

This was a multicenter, prospective, longitudinal observational study with a convenience sample. It was carried out in two private hospitals, one in the city of Porto Alegre/RS and the other in São Paulo/SP, both references in the care of patients with coronavirus isolation in Brazil. The study was submitted to and approved by the Ethics Committee of the two institutions involved, with CAAE number: 30651920.1.10008, with the application of the informed consent form, that was signed by the person who was responsible for each patient.

The convenience sample consisted of adult and elderly patients admitted to hospital care units with a focus on treatment for COVID-19 at both hospitals. As inclusion criteria, patients should present a positive clinical diagnosis of COVID-19, be at least 18 years old, authorization from the person responsible for the patient to participate in the study with the signature of the informed consent form and meet the eligibility criteria for speech therapy evaluation, that include, among other aspects, the need for the patient not to be in OTI at the time of evaluation. Exclusion criteria were as follows: patients receiving a tracheostomy prior to a COVID-19 diagnosis, patients undergoing OTI, and lowering level of consciousness with a Glasgow Coma Scale of 12 or less.

The data were collected initially through the consultation of the medical records of each patient, and other information was gathered by questioning the individual or responsible family member. Information was collected regarding sex, age, previous diseases, COVID-19 testing, use of a high flow catheter (HFC) as ventilatory support, and the OTI period.

After data collection, the clinical speech-language assessment of swallowing of each patient was carried out using the adapted Gugging Swallowing Screen (GUSS)[16], which comprises an instrument for assessing the swallowing in adult patients and is validated for Brazilian Portuguese. Assessment of swallowing occurred only after extubation of the patient, with a minimum interval of 24 hours.

According to the instrument, the clinical evaluation started with the verification of swallowing with the patient's own saliva, with or without the offer of flavor stimuli, and, depending on the findings, food was offered in the following consistencies: pasty (water added to 3.6 g of Thicken up Clear® food thickener; 5 mL and 10 mL in a spoon), liquid (water; 5 mL and 10 mL in a spoon), free sips and solid (saltine cracker; one chunk). During the evaluation, the following aspects were observed: presence or absence of saliva swallowing, efficiency of lip sealing, oral preparation conditions, oral transit time, presence of food residues in the oral cavity after swallowing, efficiency of laryngeal elevation, presence of signs suggestive of pharyngeal food stasis (more than three episodes of swallowing and/or coughing, choking or clearing after swallowing) and signs suggestive of laryngotracheal penetration and/or aspiration (coughing, choking, clearing, dyspnea, and/or wet voice). In the end, according to the score in the instrument applied, the swallowing of each patient was classified as normal/functional, mild dysphagia, moderate dysphagia, or severe dysphagia. These were the data used for the comparisons in this study.

In addition to the application of the GUSS scale, the authors also applied the Functional Oral Ingestion Scale (FOIS)[17] and the ASHA NOMS[18] instruments to more comprehensively understand the swallowing status of these patients. The application of these two scales occurred shortly after the evaluation, according to the functional swallowing result observed.

The FOIS comprises a tool that classifies the adult patient into seven levels, according to food intake and its characteristics, with level 1 the patient who feeds exclusively through tube feeding and level 7 the one who only feeds orally, without restrictions. The ASHA NOMS scale comprises an instrument that classifies the patient's swallowing into seven levels, and the lower the level is, the more severe the dysphagia. It takes into account the safety of swallowing and the need for clues and compensatory strategies for the patient.

The collected data were entered and transferred to the Statistical Package for the Social Sciences (SPSS) version 20.0 for statistical analysis; quantitative variables were described as means and standard deviations or medians and interquartile ranges depending on their Gaussian distribution. The averages were evaluated by Student's *t* test, and the median comparisons were evaluated by Fisher's exact test. The level of significance was set at $P<0.05$ or 5%. The results deemed significant are marked with an asterisk (*).

RESULTS

A total of 129 participants were enrolled in the study, distributed according to their classification of swallowing and severity of dysphagia by the GUSS scale and by the classification of functionality by the ASHA NOMS and FOIS scales. Three participants did not reach the proper classification in the ASHA NOMS and FOIS scales and were therefore excluded from further analysis with these instruments. Thus, the data obtained from the swallowing classification using the GUSS scale occurred with 129 patients, while the data from the ASHA NOMS and FOIS scales were obtained from 126 patients.

The mean age of the 129 participants was 72 years old, and the highest incidence of COVID-19 infection was found in men (54%). Regarding the findings of personal medical history, 40.3% of the patients had underlying cardiac diseases, 38% had underlying neurological diseases, and to a lesser extent, pulmonary antecedents and neoplasms were found in 6.2% and 3.1% of the participants, respectively, as shown in TABLE 1.

As shown in TABLE 2, according to the GUSS scale, 9.3% (n=12) of patients were classified as having normal/functional swallowing and 90.7% of patients as having dysphagia, with mild dysphagia in 17.05% (n=22), moderate dysphagia in 33.33% (n=43), and severe dysphagia in 37.98% (n=49). The most frequently found functional impacts were severe and moderate dysphagia.

Comparing the classification of swallowing and severity of dysphagia according to the disease previously presented by the patient (TABLE 3), there is a similarity of findings between the

TABLE 1. Description of the characteristics of the studied patients.

Age (mean ± standard deviation)	
Years	71.3±14.2
Gender	
female	45.7%
male	54.3%
Clinical changes/previous diseases	
Cardiological	40.3%
Neurological	38%
Pneumological	6.2%
Malignancies	3.1%
Chronic obstructive pulmonary disease	0.8%
Obesity	0.8%
Others	4.7%
Without previous diseases	6.2%

TABLE 2. Numerical and percentage distribution of the swallowing classifications of the patients studied according to the GUSS (n=129), ASHA NOMS (n=126), and FOIS (n=126) scales.

Indicators		Percentage
GUSS	Normal/functional	9.3% (n=12)
	Mild dysphagia	17.05% (n=22)
	Moderate dysphagia	33.33% (n=46)
	Severe dysphagia	37.98% (n=49)
ASHA NOMS	Level 1	36.5% (n=46)
	Level 2	11.1% (n=14)
	Level 3	15.9% (n=20)
	Level 4	7.9% (n=10)
	Level 5	23.8% (n=30)
	Level 6	4.8% (n=6)
	Level 7	0
FOIS	Level I	42.1% (n=53)
	Level II	15.1% (n=19)
	Level III	14.3% (n=18)
	Level IV	0
	Level V	23.8% (n=30)
	Level VI	3.2% (n=4)
	Level VII	1.6% (n=2)

GUSS: Gugging Swallowing Screen; FOIS: Functional Oral Intake Scale; n=number of patients.

two groups of diseases most frequently found: cardiological and neurological, with both groups presenting the majority of patients with moderate dysphagia, 34.61% and 42.85%, respectively. In a very close percentage, the second most frequently found classification was severe dysphagia in both groups, being present in 30.63% of cardiac patients and 30.63% of neurological patients.

For the results of the ASHA NOMS scale, the majority (36.5%) of the 126 patients were at level 1, which represents the patient who is not able to receive their food supply orally, requiring the use of tube feedings. This is in line with the results observed with the FOIS scale, whereby most patients (42.1%) were classified as level I, when food intake occurs exclusively through feeding tubes, with no oral supply, as shown in TABLE 2.

Still analyzing the data from the ASHA NOMS and FOIS scales, it is possible to observe a high percentage (23.8%) of patients classified as level V in both scales. This profile of patients corresponds to those who eat only orally but who need strategies during feeding and special food preparation, that is, dysphagia is present, but it is possible to offer food safely with the use of offsets, as shown in TABLE 2.

Of the 129 participants, 59% of them needed OTI (n=74), and 11% had a tracheostomy (n=14). Of these, the mean intubation time was 11.6 days, but in critically ill patients, the mean was 14.6 days. When comparing the time of OTI and severity of dysphagia, there was a statistically significant difference (P<0.001*), and the worst severity of the dysphagia was, the longer the patient remained intubated (TABLE 4). Of the patients who were intubated, 28 of them required pronation during this period, which is equivalent to 22% of the participants. There was no correlation between the presence and severity of dysphagia with the team performing prone positioning (P=0.597), as shown in TABLE 4.

Analyzing the occurrence and severity of dysphagia according to the presence or absence of OTI (TABLE 5), it is possible to observe that most of the 74 patients who were intubated (48.6%) were diagnosed with severe dysphagia, with only 5.5% having the diagnosis of normal/functional swallowing. By verifying the data of nonintubated patients, it was possible to verify diagnoses of dysphagia with less severity when compared to intubated patients, with the majority (43.4%) classified as having moderate dysphagia, with 15.1% having a diagnosis of normal swallowing.

HFC was present in 34 of the patients evaluated, all of them in the nonintubated group, with a majority having a diagnosis of moderate dysphagia (47.06%) in this group of patients (TABLE 5). There were no patients who used HFC with severe dysphagia, and 20.59% of patients were diagnosed with normal/functional swallowing.

TABLE 3. Numerical and percentage distribution of swallowing classifications compared with disease prior to COVID-19 (N=129).

Disease	Swallowing Classification				
	Normal/functional	Mild dysphagia	Moderate dysphagia	Severe dysphagia	Total
Cardiological	9.61% (n=5)	25% (n=13)	34.61% (n=18)	30.78% (n=16)	100% (n=52)
Neurological	12.24% (n=6)	14.28% (n=7)	42.85% (n=21)	30.63% (n=15)	100% (n=49)
Pneumological	12.5% (n=1)	0% (n=0)	37.5% (n=3)	50% (n=4)	100% (n=8)
Without previous diseases	0% (n=0)	0% (n=0)	12.5% (n=1)	87.5% (n=7)	100% (n=8)
Others	0% (n=0)	33.34% (n=2)	16.66% (n=1)	50% (n=3)	100% (n=6)
Malignancies	0% (n=0)	0% (n=0)	0% (n=0)	100% (n=4)	100% (n=4)
Obesity	0% (n=0)	0% (n=0)	100% (n=1)	0% (n=0)	100% (n=1)

n=number of patients.

TABLE 4. Description of the swallowing classifications compared with the time of orotracheal intubation and the occurrence of prone positioning in the orotracheal intubation period (n=74).

Orotracheal intubation	Classification of Swallowing					*P*
	Normal/ functional	Mild dysphagia	Moderate dysphagia	Severe dysphagia	Total	
Time in days (mean ±SD)	4.8±2.1	6.7±2.4	10.1±4.8	14.6±5.6	11.6±5.9	<0.001*
Prone positioning requirement (%)	25%	31.8%	18.2%	20.8%	22.2%	0.597

P: statistical significance; SD: standard deviation. Fisher's exact test.

TABLE 5. Numerical and percentage distribution of swallowing classification compared to the ventilatory support condition (n=129).

Ventilatory support Normal/functional		Classification of Swallowing				
		Mild dysphagia	Moderate dysphagia	Severe dysphagia	Total	
OTI	Yes	5.4% (n=4)	16.2% (n=12)	29.8% (n=22)	48.6% (n=36)	100% (n=74)
	No	15.10% (n=8)	18.87% (n=10)	43.40% (n=23)	22.64% (n=12)	100% (n=53)
HFC		20.59% (n=7)	32.35% (n=11)	47.06% (n=16)	0 (n=0)	100% (n=34)

n: number of patients; OTI: orotracheal intubation; HFC: high flow catheter.

When comparing the application of the ASHA NOMS scale with the functional classification of swallowing by the GUSS scale, there was a statistically significant difference (*P*<0.001*) between the data; the more severe the dysphagia was, the lower the level of classification in the ASHA NOMS scale, as shown in TABLE 4. It is possible to observe the 1.3 mean by the ASHA NOMS scale in patients with severe dysphagia, demonstrating the impossibility of a safe supply of food orally in these patients, while the mean of patients with mild dysphagia was 4.5, comprising the use of moderate strategies for safe offering of food orally or even the partial use of food probes in these patients.

In the analysis of the results of the FOIS scale, as well as in the ASHA NOMS scale, there was statistical significance (*P*<0.001*) in comparison with the functional classification of swallowing by the GUSS instrument, and the worst severity of dysphagia was associated with a lower level of classification in the FOIS scale (TABLE 6). In patients classified as having severe dysphagia, the mean FOIS was 1.1, indicating the exclusive use of tube feeding for food supply. In those considered as having mild dysphagia, the mean found was 4.3 on the FOIS scale, which indicates the offer of food exclusively orally, but only with a single consistency (thickened liquid or liquid pasty foods). It is worth mentioning that both the scores on the ASHA NOMS scale and on the FOIS scale were similar among patients classified as having normal/functional swallowing and mild dysphagia.

During the study, 11 individuals died, corresponding to 8.7% of the sample.

DISCUSSION

The short- and long-term consequences of COVID-19 for patients who have the severe form of the disease and need to be admitted to the ICU are beginning to be better known. Factors such as old age and underlying diseases associated with severe COVID-19 can increase rehabilitation needs[3]. Patients may experience postacute consequences, including severe muscle weakness and fatigue, joint stiffness, dysphagia, neuropsychological problems and impaired functioning in terms of mobility and activities of daily living[19].

In this study, we found a 90.69% incidence of dysphagia in patients with a mean age of 71.3 years hospitalized in intensive care units, 37.98% of whom had severe dysphagia. Understanding the real impact of COVID-19 on the swallowing conditions of patients favors the structuring of health services, as well as the design of the rehabilitation team, both in critical care units and in outpatient support at the time of hospital discharge. The pathophysiological mechanisms of dysphagia in patients with COVID-19 are not yet well defined, but it is likely that mechanical causes, laryngeal dysfunctions (and their sequelae), muscle weakness and atrophy related to disuse, and polyneuropathy (with impaired breathing/swallowing pattern coordination) may occur and predispose patients to swallowing disorders[19,20].

The percentage of dysphagia found in this research is similar to the study by Sandblom et al.[9], which, through the nasofibrolaryngoscopy examination of swallowing, found an incidence of dysphagia of 96% in 25 Swedish patients with a

TABLE 6. Comparison of the findings of the classification of swallowing by the GUSS scale with the functional classifications of the ASHA NOMS and FOIS scales (n=126).

Mean ± SD	GUSS Swallowing Classification					*P*
	Normal/functional	Mild dysphagia	Moderate dysphagia	Severe dysphagia	Total	
ASHA NOMS	4.4±1.6	4.5±0.9	3.4±1.5	1.3±0.7	2.9±1.7	<0.001*
FOIS	4.2±2.1	4.3±1.1	3.1±1.6	1.1±0.6	2.6±1.8	<0.001*

P: statistical significance; SD: standard deviation. Fisher's exact test.

mean age of 63 years. The authors found that 92% of patients had salivary residue in the pharynx and 44% had silent tracheal aspiration, mainly for liquids. Despite the similarity in percentage, all patients in the cited study were intubated, with 52% of them in pronation, which is partially different from the profile of patients in the present study.

Since the multifactorial aspect as a cause of dysphagia in COVID-19-positive patients has already been demonstrated, it is important to compare each published percentage and all the differences between the groups of patients in an attempt to provide better guidance in understanding the dysphagia resulting from this disease.

Dawson et al.[15] clinically evaluated 208 hospitalized COVID-19-positive English patients (102 in the intensive care unit and 106 in the ward). The authors reported a high rate of dysphagia in the evaluated patients, with 30% of these patients requiring speech therapy. The authors state that, in most patients, the occurrence of dysphagia was impacted by the presence of delirium, use of sedation, significant fatigue and frequent expectoration of a high volume of secretions.

The highest average age of the patients in this study, 71.3 years old, may have potentiated the high percentage of dysphagia, since it is known that the aging process is related to the reduction of swallowing efficiency, which may be compromised in approximately 40% of healthy elderly individuals[21,22]. This percentage can reach up to 80% of elderly individuals if there is an associated neurological disorder[23], which may also have impacted the findings of this study, since 38% of the patients had some underlying neurological disease prior to hospitalization, with dementia and stroke being the most frequent.

Despite the important influence of the age factor, the authors believe that the high percentage of dysphagia found is due to multifactorial aspects, including the systemic infection caused by SARS-CoV-2. The comparison of the mean age of the patients, according to the severity of the dysphagia found, supports this idea. Only patients with mild dysphagia had a mean age that was statistically lower than those classified as having functional swallowing and moderate or severe dysphagia.

In addition to neurological disorders, it was observed that 40.3% of the patients had previous cardiac changes, with systemic arterial hypertension and heart failure being the most present. The large number of patients with cardiac alterations in the present study is because one of the hospitals where the study was carried out is a reference in the care of this profile of patients. In a study with 149 cardiac patients, the authors found dysphagia in 32.9%, with a higher prevalence in older patients and those with less muscle mass[24].

In the present study, two main groups of previous diseases were found in the patients studied, as already mentioned: cardiological and neurological. In terms of dysphagia severity, the two groups were similar in percentages. Even if cardiological impacts can impact swallowing function, previous neurogenic impairments were expected to accentuate the severity of post-COVID-19 dysphagia. Despite the fact that we do not have information on how much these patients already had or did not have dysphagia before SARS-CoV-2 infection, the data apparently indicate that previous underlying diseases may not belong in the multifactorial equation of the causes of dysphagia in COVID-19-positive patients.

The occurrence of OTI, frequent in hospitalized patients due to COVID-19[25,26], tends to promote the occurrence of dysphagia[27-29]. In the present study, 74 of the 129 patients were intubated for an average of 11.6 days, 94.59% of whom were found to have dysphagia. According to previous studies in the literature with other groups of diseases, dysphagia after extubation can reach a prevalence of approximately 62% of patients[4].

The evidence found in this study is that there is a worsening of dysphagia severity, as there is an increase in OTI time. Thus, it can be indicated that OTI is one of the causes of dysphagia in patients positive for COVID-19, but not the only cause, since 5.5% of the evaluated patients who were intubated had normal/functional swallowing. The relationship between OTI and dysphagia was also verified in another study[15] that clinically evaluated 208 COVID-19-positive adult patients and found a significant correlation between days of OTI and the time of initiation of oral feeding after extubation. However, it is important to note that the authors of this publication also reinforce the idea of a multifactorial influence (i.e., sedation, delirium, generalized fatigue and increased secretion clearance) on the impact of post-COVID-19 dysphagia.

Sandblom et al.[9] also verified the correlation between dysphagia severity and OTI days, also mentioning neuromuscular weakness, reduced laryngopharyngeal sensitivity, cognitive deficits and alertness as causal factors of dysphagia in the intensive care unit. Dziewas et al.[10], in a letter to the editor, summarized possible factors that lead to the risk of dysphagia in COVID-19-positive patients, including generalized muscle weakness and central and peripheral neurogenic impacts.

The incidence and treatment of dysphagia in these patients is still uncertain, even in the face of some data already published; however, it is believed that the consequences of systemic infection with SARS-CoV-2, such as OTI, can lead to dysphagia, requiring careful management[11]. In a Brazilian study[30], the authors found the occurrence of dysfunctions, including dysphagia, in 1696 adult patients, with a mean age of 73 years, after hospital discharge due to COVID-19. When asked by telephone if they had difficulties swallowing liquids or food, 12.7% of these patients responded positively, even 1 month after hospital discharge.

Still observing the clinical conditions related to the impact on swallowing, it appears that the worst severity of dysphagia is, the greater the occurrence of prone positioning during mechanical ventilation with the studied patients; however, with little difference between the classifications and without statistical significance. Keeping a mechanically ventilated patient in a prone position favors pulmonary perfusion due to the reduction in chest resistance[31,32]. The low number of patients who underwent this intervention in the present study (n=28) may have contributed to the statistical nonsignificance.

Patients who were not intubated but who required HFC as ventilatory support had their data analyzed separately, once the use of this device indicates a greater need for pulmonary support within the group of nonintubated patients. Despite the greater need for support, the percentage of patients, according to the severity of dysphagia, was mostly (47.06%) classified as moderate, and not with severe dysphagia.

Critical care patients using HFC tend to be those with significant ventilatory instability who do not reach the severity parameters for OTI. Therefore, the use of this device tends to impact, but not prevent, the effectiveness, comfort and safety of oral delivery. Clinical experience with this profile of patients shows that they were dependent on the food supply, with greater difficulties for solids and liquids due to respiratory fatigue and spent more time receiving their meals.

In addition to diagnosing the severity of dysphagia, according to the adapted GUSS scale, the authors also chose to classify the patients studied according to two scales widely applied in the specialized literature in an attempt to further outline the swallowing profile of COVID-19-positive patients. The ASHA NOMS scale comprises an instrument that identifies feeding, the compensations used, and the level of supervision necessary for the supply of food to the patient. The FOIS scale comprises a tool that classifies the form of food intake. For both scales, the higher the level is, the more efficient and safer the swallowing.

In the 126 patients who were classified by the two scales, the average score by the ASHA NOMS scale after the speech-language evaluation was 2.9, being between level 2, when the patient can only take the oral feeding in therapy with maximum use of compensatory clues and strategies, and level 3, in which the patient ingests less than 50% of the volume of food orally, with moderate use of compensatory clues and strategies.

When comparing the ASHA NOMS scale score and the classification of the severity of dysphagia, it was observed that the more severe the dysphagia was, the lower the scale score, with statistical significance. The large difference in scores between the classifications occurred in patients diagnosed with severe dysphagia, who were scored on average as level 1, which comprises individuals who are unable to swallow food volume orally.

These findings are supported by data from a Brazilian study with COVID-19-positive patients, where approximately 29% needed compensatory strategies and restrictions on diet consistencies for swallowing to be considered safe[33].

The clinical practice in dysphagia is in line with this finding, since the classification of severe dysphagia is usually associated with patients who do not have safe pulmonary protection for food supply. The literature related to dysphagia in other diseases shows the same relationship between the severity of dysphagia and the ASHA NOMS scale score, with more severe dysphagia expected at the lowest levels of the scale[34,35].

In the research by Dawson et al.[15], in the first evaluation of swallowing of 208 patients, 67% of those who were in the intensive care unit did not receive oral feeding, as did 22% of those who were in the ward. After the evaluation, all patients started to receive oral feeding in an adapted way, totally or partially, with a high frequency of indication for thickened liquids. Of the patients evaluated, 30% of them required therapeutic intervention for an average of 8.6 days.

Lima et al.[33] clinically evaluated 101 COVID-19-positive patients who underwent OTI, with a mean age of 53.4 years, comparing their functional swallowing findings with retrospective data from critically ill patients who remained intubated for at least 48 hours. Comparing the groups, COVID-19-positive patients remained on OTI longer (8.8 days versus 6.1 days) and had more neurogenic impairment. With the application of the ASHA NOMS scale, 53.5% of patients were classified as levels 4 and 5 after the evaluation and 19.8% as levels 1 to 3, compared to critical patients, of whom 40% were in levels 1 to 3 and 26% at levels 4 and 5.

Analyzing the FOIS, the average score of the 126 patients in the postspeech evaluation was 2.6, remaining between levels 2 and 3 of the instrument, which, respectively, comprises the patient who receives the minimum volume of food supply orally and the one who receives a constant supply of food orally, but both use tube feeding.

In the study by Sandblom[9], 23 of the 25 patients exclusively used nasal tube feeding at the time of swallowing assessment, and all of them started to receive minimal or full volume oral feedings after the assessment. Of these patients, 15 required speech therapy for an average of 11 days.

As observed with the ASHA NOMS scale, the worse the severity of the dysphagia was, the significantly lower the level of scoring by the FOIS, again observing a greater difference in individuals with severe dysphagia who scored level 1 (exclusive use of tube feedings). The lower the score on the FOIS scale was, the greater the proportion of tube feeding use, correlating with more important dysphagia[36,37].

It should be noted that, despite the increase in the score in the FOIS levels for milder dysphagia, almost no difference is observed in the score between the functional swallowing and mild dysphagia ratings, both scoring level 4, exclusive of oral feeding, a single consistency. The authors believe that these data are because individuals classified as having functional swallowing often need compensations in food consistencies during the critical period of hospitalization, which are not due to the swallowing deficit but due to the conditions of alteration in the breathing pattern, increasing the risk of incoordination between swallowing and breathing. Since the patients studied are COVID-19-positive, with an inflammatory impact on pulmonary conditions and a consequent change in cardiorespiratory parameters, such observation may be consistent.

For both scales, the ASHA NOMS and FOIS, when comparing the classifications by levels, previously and immediately after the evaluation, there are important changes, both in the release of oral feeding in patients who were not receiving this type of supply, as well as in the interruption or reduction of it, supporting the observation of increased risk during evaluation. Such findings reinforce the need for an evaluation by a professional specialized in verifying swallowing changes, including in COVID-19-positive patients[10,13].

Despite the use of validated scales in the literature, all the swallowing classifications of COVID-19-positive patients performed in this study were due to the assessment of swallowing by the clinical speech-language therapist. Although this procedure is frequently used in intensive care units, it is still considered a subjective diagnostic method because it does not allow the actual verification of the findings of the pharyngeal phase of swallowing. However, due to the high risk of contamination of COVID-19-positive patients, it was not possible to carry out objective swallowing assessment exams, such as nasoendoscopy or swallowing video fluoroscopy.

The present research contributes to the performance of the multidisciplinary team in the face of COVID-19-positive patients. Trying to understand the disease and its influence on swallowing in a more comprehensive way is essential for adequate management of each case. The authors of the present study, both because of the data collected and because of the clinical experience of working with this profile of patients, believe that dysphagia occurs largely due to the occurrence of prolonged OTI, but there is also a great influence of systemic neurological and muscle damage resulting from the infection with SARS-CoV-2.

In a review article[38], the authors reinforce how much neuroinfection in central and peripheral regions, including receptors for smell, taste and, possibly, the sensitivity of the laryngopharyngeal region, contributes to the occurrence and severity of dysphagia in COVID-19-positive patients. Future studies are needed to correlate the aspects that promote an impact on the safety conditions and swallowing efficiency in this patient profile.

Early diagnosis of dysphagia, or even understanding that there is a high risk of this dysfunction occurring in COVID-19-positive patients, guarantees pulmonary stability by minimizing the risk of tracheal aspiration of saliva and/or food in a lung condition already aggravated by the disease itself. The data from this research, as well as the studies described here and other notes in the specialized literature[13,15], demonstrate the need for a speech therapist specialized in the care of dysphagia for COVID-19-positive patients in an intensive care environment, as well as in wards and outpatient clinics, diagnosing and rehabilitating swallowing disorders, thus preventing the pulmonary and nutritional impacts resulting from dysphagia.

The release of oral feeding to COVID-19 patients, without an assessment of swallowing by a speech-language therapist, is at high risk, since there is evidence that 20% of patients do not have the minimum conditions for safe eating[33].

CONCLUSION

From the observation of the analyzed aspects, there is a high incidence of oropharyngeal dysphagia in patients with COVID-19, with increased severity during longer periods of OTI. In the sample, elderly patients stood out, with age being another risk factor associated with infection.

These results demonstrate the need for speech therapy and a multidisciplinary approach in this population to rehabilitate swallowing and reduce the negative impact of swallowing disorders on the quality of life of these patients.

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Authors' contribution

Nascimento Junior JR, Ceron CF and Silvério CC contributed to the study design, guidance, writing and preparation of the article. Signorini AV, Klein AB, Castelli CTR, Otto DM, Antunes HA, Sotero LKB, Cirino PB, Vizioli PT, and Lima VC contributed to data collection and writing.

Nascimento Junior JR, Ceron CF, Signorini AV, Klein AB, Castelli CTR, Silvério CC, Otto DM, Antunes HA, Sotero LKB, Cirino PB, Viziolo PT, Lima VC. Ocorrência de disfagia em pacientes COVID-19 positivo em dois hospitais do Brasil. Arq Gastroenterol. 2022;59(3):439-46.

RESUMO – Contexto – A COVID-19 compreende uma infecção respiratória decorrente da contaminação pelo vírus SARS-CoV-2, sendo a insuficiência respiratória aguda uma de suas principais características, levando a uma alta frequência de intubação orotraqueal (IOT), que por sua vez aumenta o risco para a disfagia. Uma vez que esta pode levar ao comprometimento pulmonar, conhecer a real ocorrência de disfagia em parte da população brasileira e suas associações permite o manejo clínico precoce e eficaz da equipe multidisciplinar em relação aos pacientes. **Objetivo –** Verificar a ocorrência de disfagia em pacientes adultos positivos para COVID-19 em dois hospitais brasileiros, referências no atendimento à pandemia. **Métodos** – Trata-se de um estudo prospectivo, observacional longitudinal, realizado em dois hospitais privados no Brasil, ambos referências no atendimento de pacientes com isolamento por coronavírus. Inicialmente os dados foram levantados por meio de consulta aos prontuários de cada paciente. Foram também coletadas informações sobre sexo, idade, doenças anteriores, teste de COVID-19 e período de IOT. Após a coleta de dados, foi realizada a avaliação fonoaudiológica clínica da deglutição de cada paciente por meio do *Gugging Swallowing Screen* (GUSS) adaptado, do ASHA NOMS e da *Functional Oral Intake Scale* (FOIS). **Resultados –** Foram avaliados 129 participantes, com média de idade de 72 anos. De acordo com a escala GUSS, 9,3% dos pacientes apresentaram deglutição normal/funcional, enquanto 90,7% apresentaram disfagia, sendo esta de grau leve em 17,05%, moderado em 33,33% e grave em 37,98%. Quanto aos resultados do ASHA NOMS, a maioria (36,5%) dos pacientes encontrava-se no nível 1, que representa o paciente que não consegue receber alimentação por via oral, tendo a necessidade do uso de alimentação por sonda. Esse dado está de acordo com os resultados observados com a escala FOIS, em que a maioria dos pacientes (42,1%) foi classificada como nível I, quando a ingestão de alimentos ocorre exclusivamente por sondas, sem oferta por via oral. Dos 129 participantes, 59% deles necessitaram de IOT. Ao comparar o tempo de IOT e a gravidade da disfagia, encontrou-se diferença estatisticamente significante, sendo que quanto mais grave a disfagia, maior o tempo que o paciente permaneceu intubado. **Conclusão –** Existe alta incidência de disfagia orofaríngea em pacientes com COVID-19, com maior gravidade durante períodos mais longos de IOT.

Palavras-chave – Transtornos da deglutição; COVID-19; incidência; cuidados críticos; fonoaudiologia.

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