INCIDENCE OF DYSPHAGIA IN COVID-19 PATIENTS POST EXTUBATION

Incidência de disfagia em pacientes com COVID-19 após extubação.

Perez-Ramos, Isabel Cristina Sabatini[1*]; Scaranello-Domingues, Carla Alessandra[1]; Lima, Bárbara Martins[2]; Santos, Sigrid de Sousa[3].
[1] Fonoaudióloga EBSERH/ HU-UFSCar, São Carlos, São Paulo, Brasil
[2] Médica infectologista EBSERH/ HU-UFSCar, São Carlos, São Paulo, Brasil
[3] Professora Associada II do Departamento de Medicina da UFSCar, São Carlos, São Paulo, Brasil

*isabel.ramos@ebserh.gov.br

ABSTRACT: The covid-19 pandemic has resulted in several hospitalizations and deaths. Many patients are admitted to an intensive care unit to receive invasive ventilation. Despite having the tools and techniques for orotracheal intubation a large number of patients can lead to swallowing impairments following extubation. Dysphagia can be a consequence of prolonged hospitalization in intensive care units due to severe SARS-CoV-2 pneumonia. **Objective:** To verify the incidence of dysphagia in patients with covid-19 after mechanical ventilation extubation. **Method:** Observational, descriptive, study of SARS-CoV-2 patients admitted into the intensive care unit. **Results:** A total of 29 patients were admitted into intensive care unit for intubation and mechanical ventilation and they were successfully extubated. And 82.7% of patients that underwent speech-language assessment of swallowing had some level of dysphagia. **Conclusions:** Dysphagia affects several patients post extubation due SARS-COV-2.
Descriptors: COVID-19; dysphagia; mechanical ventilation; post extubation; swallowing; intensive care unit.

RESUMO: A pandemia de covid-19 resultou em diversas hospitalizações e óbitos. Muitos pacientes são admitidos em unidade de terapia intensiva para receber ventilação invasiva. Apesar de possuir as ferramentas e técnicas para a intubação orotraqueal, um grande número de pacientes pode apresentar distúrbios de deglutição após a extubação. A disfagia pode ser consequência de internação prolongada em unidades de terapia intensiva por pneumonia grave por SARS-CoV-2. **Objetivo**: Verificar a incidência de disfagia, após extubação, em pacientes com covid-19 e que utilizaram ventilação mecânica. **Método**: Estudo observacional, descritivo, de pacientes com SARS-CoV-2 admitidos na unidade de terapia intensiva. **Resultados**: Um total de 29 pacientes foram admitidos na unidade de terapia intensiva para intubação e ventilação mecânica e foram extubados com sucesso. E 82,7% dos pacientes que realizaram avaliação fonoaudiológica da deglutição apresentaram algum grau de disfagia. **Conclusões**: A disfagia afeta vários pacientes pós-extubação por SARS-COV-2.
Palavras-Chave: COVID-19; disfagia; ventilação mecânica; pós-extubação; deglutição; unidade de terapia intensiva.

1. INTRODUCTION

The COVID-19 pandemic has resulted in 5.592.266 deaths and there have been 349.641.119 confirmed cases in the world until 24 January 2022. In Brazil, there have been 23.909.175 confirmed cases of COVID-19 with 622.801 deaths[1]. In the current context of COVID-19 pandemic most patients only develop mild to moderate symptoms, but a small subset develops a critical illness. Sepsis, respiratory failure, acute respiratory distress syndrome, thromboembolic complications, disseminated intravascular coagulopathy and multi-organ failure are all life-threatening complications of this new disease[2]. COVID-19 is caused by the highly contagious severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that infected patients who needs

hospital care and eventually admitted to an intensive care unit (ICU) to receive invasive ventilation[3].

Despite having the tools and techniques for tracheal intubation and performing oral intubation with positive pressure mechanical ventilation for a long time, only recently has attention focused on patient issues following extubation, particularly swallowing-related complications.

Oropharyngeal dysphagia in general can be caused by either severe neurological impairment, affecting the central nervous system directly, due to traumatic peripheral nerve damage and impaired function of the neuro-muscular junction, primary neuro-muscular junction abnormalities, or a primary muscular disease; structural damage (e.g., trauma caused by the intubation); medication or toxic/drug side-effects; presbyphagia; or phagophobia[4,5].

In critically ill patients on the ICU, the etiology of dysphagia post-extubation appears less clear. Dysphagia post-extubation is considered multifactorial with underlying mechanisms unknown, and the presence of an endotracheal tube/prolonged mechanical ventilation is considered a key risk factor for dysphagia.

Forms of invasive mechanical ventilation, such as prolonged orotracheal intubation, can lead to laryngeal injury and/or dysphagia immediately following extubation in prevalence of 83% to 94% of cases. Prolonged intubation also leads to oral and pharyngeal swallowing impairments including the presence of laryngeal penetration and/or aspiration, contributing to adverse outcomes including pneumonia[4-6]. Although a majority of such injuries are trivial and self-limiting, moderate to severe injuries occurs in an estimated 13-31% of patients[6].

Although the work of Speech-language pathology (SLP) has long been established in critical care for long time, it was only on April 2020, that the World Health Organization recognized the role of SLP in the treatment of patients with COVID-19 and emphasized that all members of the multidisciplinary team are extremely important for the rehabilitation of patients with the goal to return to their previous level of function and with an ability to be independent again[8].

International groups have provided extensive guidance on the risk level of procedures related to the management of dysphagia in patients with COVID-19. Clinical evaluation is the most frequently recommended method of swallowing assessment for patients with COVID-19[9].

2. METHOD

Descriptive longitudinal study of the patients admitted to the intensive care unit of the university hospital of Federal University of São Carlos (*UFSCar*) with severe acute respiratory syndrome (SARS) caused by coronavirus-19 between May and November 2020. We enrolled participants who were older than 18 years of age, were diagnosed with SARS, have at least one positive RT-PCR for SARS-CoV-2 in nasopharyngeal/ oropharyngeal swab, and were weaned from mechanical ventilation (figure 1). This study was approved by the Human Research Ethics Committee (HREC) of the *UFSCar* (CAAE: 34344520.8.0000.5504).

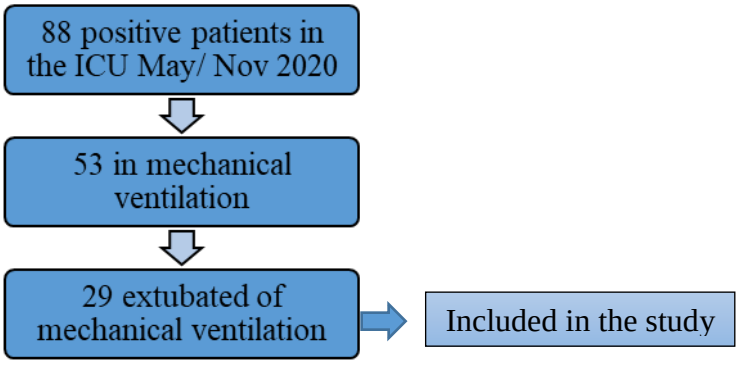

Figure 1: Patients included in the study

All patients were evaluated using a standardized questionnaire with demographic, epidemiological, clinical, virological, laboratory and imaging data. Clinical data included tracheostomy, worse pO2 / FiO2, higher positive end-expiratory pressure (PEEP) and time on invasive mechanical ventilation.

The speech-language assessment of swallowing was performed following the institution's protocol. The initiation of an oral diet was post-extubation of the patient. The Functional Oral Intake Scale (FOIS) scale[10] was used to score oral intake based on food consistencies that were safe for the patient.

3. RESULTS

Over a six months period 29 patients were discharged from our institution following emergency ICU admission for intubation and mechanical ventilation with the primary diagnosis of COVID–19 and they were successfully extubated. Others patients did not meet the inclusion criteria and were excluded from data analysis.

The average age of the patients was 58.6 ± 11 years old. Twenty patients (69%) were male. The average number of days that patients remained on mechanical ventilation was 14.4 days (± 10 days).

Among the study subjects, 86.2% of the patients underwent speech-language assessment of swallowing.

The 82.7% of patients that had some level of dysphagia, and 91.7% of those with dysphagia received this diagnosis after a speech-language assessment of swallowing. Only 17.2% of patients did not present signs of dysphagia according figure 2.

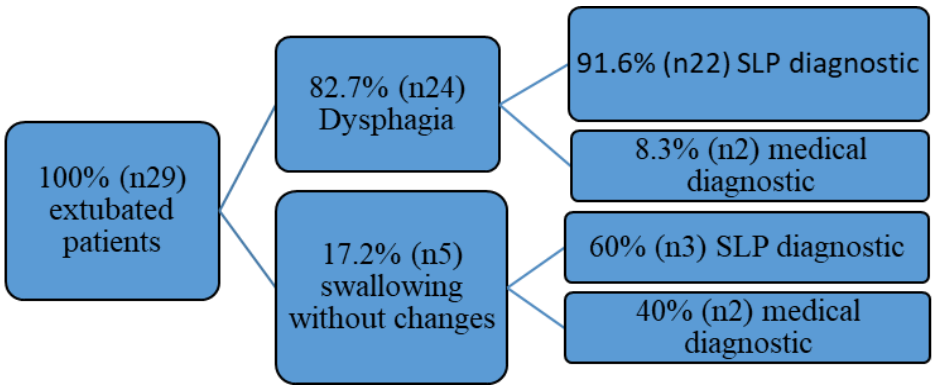

Figure 2: Extubated patients' tree

The patients who did not undergo a speech-language assessment of swallowing were due to the lack of clinical conditions for oral nutrition and the absence of dysphagia judged by the medical team.

The oral diet was released to 93.1% of patients. The average number for introducing oral nutrition after extubation was 2.7 days.

The 68.9% of patients required modifications in diet consistency to evolve with safe swallowing. The FOIS scale presented by patients at the end of the speech therapy follow-up in the ICU was 51.7% in level 5 (total oral diet with multiple consistencies, but requiring special preparation or compensations); 24.1% in level 6 (total oral diet with multiple consistencies without special preparation, but with specific food limitations); 13.8% in level 4 (total oral diet of a single consistency - thickened liquids); 6.9% in level 3 (tube dependent with consistent oral intake of food or liquid); and 3.5% in level 1 (nothing by mouth).

4. DISCUSSION

Based on the findings, dysphagia post extubation was presented as a reality. Post extubation dysphagia has been associated with poor patient outcomes, including increased risk of reintubation, development of pneumonia, prolonged hospital admissions, discharge to a nursing home, increased risk of death, need for surgically placed feeding tubes, malnutrition and dehydration[11]. Therefore, it is importance that clinicians be aware of ways to identify dysphagia and speech therapy is essential to assess, manage and treat these cases.

A study provides data on the frequency and clinical factors associated to post extubation dysphagia in critically ill patients due to SARS-COV-2 pneumonia who were admitted to the ICU during the first pandemic outbreak. Almost one-third of SARS-COV-2 individuals requiring intubation and mechanical ventilation developed post extubation dysphagia and were at risk of pulmonary aspiration[12].

The average days of positive covid-19 patients on mechanical ventilation is in agreement with other studies. Our patients remained on mechanical ventilation was 14.4 days. A study reported a period of intubation duration of 12 days (8-18)[13]. In the same study the authors also identified swallowing difficulties in patients with COVID-19 after intubation. The study indicated that 43% of subjects had some swallowing impairment, dysphagia was reported in 31% of cases[13].

Standardized rating scales that indirectly measure swallowing, such as diet scales and patient-reported quality of life scales, may provide a more robust measurement of function problems. For example, scales such as the Functional Oral Intake Scale – FOIS[10] is recommended tools to guide therapeutic planning[9].

Treatments for post-extubation dysphagia were usually focused on dietary texture modifications[14]. All of our patients required changes in the consistency of the diet or restriction of some food consistency. This management was important to define safe oral nutrition without risks for the evolution of patient recovery. The speech-language therapy intervention in the ICU also is important, and a study describe the functional progress of patients' swallowing for safe return to oral feeding indicate that there was a significant recovery of the functional swallowing patterns pre and post swallowing intervention[15].

The timing of the swallow assessment after patient extubation varies in studies and there is no consensus on screening. Screening takes place 1 to 5 days after extubation. Patients may start with an oral intake of consistency that is safe to swallow, but screening 24 hours after extubation allows for a faster return to a less restricted diet[16]. A study finded that ICU patients who have been intubated for >24 hrs demonstrate severe but transient dysfunction of the swallowing reflex after extubation[17]. Our patients had an oral nutrition an average 2.7 days post extubation with 75.8% in level 5 and 6 of score FOIS scale (few requiring special preparation/ compensations and with specific food limitations).

5. CONCLUSION

Dysphagia may be associated with increased length of hospital stay. Early screening and evaluation of swallowing function may reduce these risks in ICU patients post extubation. To perform early screening and evaluation multidisciplinary management is important trained clinicians, nurses[18] and physiotherapists to prevent aspiration problems due to dysphagia.

6. REFERENCES

1. World Health Organization. WHO COVID-19 Dashboard [Internet]. World Health Organisation. World Health Organization; 2021. [cited 2022 Jan 24] Available from: https://covid19.who.int.
2. Sepulchre E, Pittie G, Stojkovic V, Haesbroek G, Crama Y, Schyns M, et al. Covid-19: contribution of clinical characteristics and laboratory features for early detection of patients with high risk of severe evolution. Acta Clin Belg. 2020 Sep 16:1-7.
3. Botta M, Tsonas AM, Pillay J, Boers LS, Algera AG, Bos LDJ, et al. Ventilation management and clinical outcomes in invasively ventilated patients with COVID-19 (PRoVENT-COVID): a national, multicentre, observational cohort study. Lancet Respir Med. 2021 Feb;9(2):139-148.
4. Reiter R, Brosch S. Update oropharyngeal dysphagia part 2: etiology and therapy. Laryngorhinootologie. 2012;91(5):291–9.
5. Brodsky MB, Levy MJ, Jedlanek E, Pandian V, Blackford B, Price C, et al. Laryngeal Injury and Upper Airway Symptoms After Oral Endotracheal Intubation With Mechanical Ventilation During Critical Care: A Systematic Review. Crit Care Med. 2018;46(12):2010-17.
6. Schefold JC, Berger D, Zürcher P, Lensch M, Perren A, Jakob SM, et al. Dysphagia in Mechanically Ventilated ICU Patients (DYnAMICS): A Prospective Observational Trial. Crit Care Med. 2017;45(12):2061-69.

7. Zuercher P, Moret CS, Dziewas R, Schefold JC. Dysphagia in the intensive care unit: epidemiology, mechanisms, and clinical management. Crit Care 2019; 103 (23).
8. World Health Organization/Europe. COVID-19 exposes the critical importance of patient rehabilitation [Internet]. www.euro.who.int. [cited 2021 Dec 20] Available from: https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/4/covid-19-exposes-the-critical-importance-of-patient-rehabilitation.
9. Vergara J, Skoretz SA, Brodsky MB, Miles A, Langmore SE, Wallace S, et al. Assessment, Diagnosis, and Treatment of Dysphagia in Patients Infected With SARS-CoV-2: A Review of the Literature and International Guidelines. Am J Speech Lang Pathol. 2020 Nov 12;29(4):2242-53.
10. Crary MA, Mann GD, Groher ME. Initial psychometric assessment of a functional oral intake scale for dysphagia in stroke patients. Arch Phys Med Rehab. 2005 Aug; 86(8):1516-20.
11. Dobak S, Kelly D. Tough Pill to Swallow: Postextubation Dysphagia and Nutrition Impact in the Intensive Care Unit. Nutr Clin Pract, 2021; 36(1):80-87.
12. Laguna LB, Marcos-Neira P, Zurbano IML, Marco EM, Guisasola CP, Soria CDV, et al. Dysphagia and mechanical ventilation in SARS-COV-2 pneumonia: It's real. Clinical Nutrition, 2021; (21):527-6.
13. Miller B, Tornari C, Miu K, Slack A, Murphy P, Ahmed I, et al. Airway, voice and swallow outcomes following endotracheal intubation and mechanical ventilation for COVID-19 pneumonitis: preliminary results of a prospective cohort study. Research Square, 2020.
14. Macht M, Wimbish T, Clark BJ, Benson AB, Burnham EL, Williams A, et al. Diagnosis and treatment of post-extubation dysphagia: Results from a national survey. Journal of Critical Care, 2012; 27(6):578-86.

15. Lima MS, Sassi FC, Medeiros GC, Ritto AP, Andrade CRF. Functional development of swallowing in ICU patients with COVID-19. CoDAS, 2020; 32(4).
16. Frajkova Z, Tedla M, Tedlova E, Suchankova M, Geneid A. Postintubation Dysphagia During COVID-19 Outbreak-Contemporary Review. Dysphagia. 2020;35(4):549-557.
17. Larminat V, Montravers P, Dureuil, B, Desmonts, JM. Alteration in swallowing reflex after extubation in intensive care unit patients. Critical Care Medicine, 1995;3 (23):486-90.

Brodsky MB, Pandian V, Needham DM. Post-extubation dysphagia: a problem needing multidisciplinary efforts. Intensive Care Med. 2020;4