

Dysphagia rehabilitation in post-COVID patients: Review of the literature

Jimena Cano-Crespo¹, Héctor De la Torre-Barrios¹, Carolina D. Tejeda-Franco¹, Itzel Solís-Sánchez¹, Nallely Bueno-Hernández², and Annel Gómez-Coello^{1*}

¹Phoniatrics Division, "Luis Guillermo Ibarra Ibarra" National Rehabilitation Institute, Mexico City; ²Research Department, Hospital General de México, Mexico City, Mexico

Abstract

COVID-19 causes acute respiratory failure syndrome (SIRA), leading patients to require intubation in the intensive care unit (ICU). A common complication of this ventilatory support is dysphagia, which has a prevalence of up to 30%. This work aims to describe rehabilitation methods in patients with coronavirus infection based on levels of evidence according to the GRADE System, so a systematic review of the literature was carried out. The selected articles were divided into the following subtopics: diagnosis of dysphagia and rehabilitation in COVID patients. The gold standard for the diagnosis of dysphagia is the videofluoroscopic swallowing study (VFS). Fiberoptic Evaluation of Swallowing Assessment (FEES) has high sensitivity and specificity, although they have the disjunction of an aerosol-generating procedure (AGP); however, in a pandemic situation, the study of choice in the literature is VF. Once the diagnosis is made, it is necessary to initiate rehabilitation as soon as possible, even from hospitalization in patients who have hemodynamic stability to prevent long-term effects and promote normal swallowing even before discharge. In patients with COVID-19 infection dysphagia, the risk-benefit of assessment tools and therapy used for diagnosis should be decided to help to maintain social distancing. It becomes imperative to carry out clinical studies with high levels of evidence that allow us to generate Clinical Practice Guides for the benefit of our patients.

Keywords: Dysphagia. COVID-19. Swallowing rehabilitation.

Introduction

Coronavirus 19 disease (COVID-19) spread from Wuhan, China in December 2019 and declared a pandemic by the World Health Organization (WHO) on March 11, 2020, produces severe acute respiratory syndrome as one of its complications associated with coronavirus 2 (SARS-CoV-2)¹.

Dyspnea occurs in 55% of patients and is characterized by Progressive Respiratory Distress Syndrome (ARDS) and even death. Most patients admitted to

hospital report symptoms such as dyspnea and cough, and many of them end up on respiratory support in the intensive care unit (ICU)¹.

Among patients intubated in the ICU, a frequent complication after extubation is dysphagia, with a prevalence of up to 30% according to data reported by Dawson C². It can be characterized by difficulty in initiating swallowing, nasal regurgitation, aspiration in the airway and/or presence of pharyngeal residue, secondary to incoordination between swallowing and breathing,

Correspondence:

*Annel Gómez-Coello
E-mail: annelgomezc@gmail.com,
angomez@inr.gob.mx

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these two-share neurological, physiological, structural and functional systems^{1,2}.

Endotracheal intubation can result in laryngeal trauma, causing vocal cord and arytenoid edema, granuloma, and vocal cord paralysis. The presence of an endotracheal tube for more than 4 days is related to dysphagia in 86% of cases. In patients who require endotracheal intubation, the appearance of dysphagia is secondary to multifactorial changes, mainly mechanical and cognitive¹.

Objective

Describe the methods of swallowing rehabilitation in patients with a history of SARS-CoV-2 infection.

Material and Methods

A systematic review of the literature was carried out to determine the rehabilitation of dysphagia in patients with a history of COVID infection, in which an applied search strategy was carried out. The inclusion criteria are:

Type of design: qualitative and quantitative methodologies were included for the review, including experimental, quasi-experimental and descriptive designs, as well as expert consensus and review articles.

Type of measures:

Language of the documents: studies in Spanish and English were included.

Temporality: March 2020 to February 2021.

The exclusion criteria were articles where clinical case and letters to the editor.

Bibliographic search

The Pubmed, MedLine, Scopus, Science Direct and Scielo databases were consulted using an applied search strategy that includes DeCS and MeSH descriptors, using the terms: dysphagia, swallowing, deglutition, rehabilitation. With the terms equations were constructed using the AND and OR connectors. These articles should answer the question: What is the best rehabilitation method for dysphagia in post-COVID patients? Articles were staged according to their level of evidence, according to the Center of Evidence-Based Medicine (CEBM).

Article selection process

The checklist of the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA)

method were used. The articles obtained with the previously described search strategy were subjected to a selection process based on the title and abstract, then the rest of the content of the article was read and analyzed. Finally, the search results were imported into the Mendeley reference manager for your organization. The records were exported to an Excel document to subsequently carry out the selection of studies relevant to the investigation.

Results

Thirty-four documents were found with the established terms, of which 13 fit the inclusion criteria (Table 1), they were ordered by chronological reference, including the main author, study design and results. The level of evidence was classified according to the GRADE System (Grading of Recommendations, Assessment, Development and Evaluation)³.

Discussion

From the selected articles, they were divided into the following subtopics: diagnosis of dysphagia and rehabilitation in COVID patients. It is important to emphasize that according to the GRADE system, the levels found in the selected articles correspond to levels with low evidence, which could be due to the recent appearance of COVID-19, and the difficulty in being able to systematize swallowing studies in the context of the pandemic.

The recommended management in Acute Respiratory Failure Syndrome (SIRA) due to COVID-19 is early intubation that can have dysphagia as sequelae in 3-62% of patients when it is maintained for more than 4 days. According to Mohan R, these sequelae can last for up to 6 months. Patients with COVID are pronated for 12-18 hours to maintain saturation levels, which can increase the risk of aspiration of saliva and secretions, in addition to preventing proper oral hygiene, which can cause aspiration of microorganisms¹⁻⁶.

In these patients there may also be olfactory, taste and pharyngolaryngeal sensitivity alterations which have an impact on the dysphagia of these patients; this is important for the evaluation, diagnosis and rehabilitation, according to that reported by Vergara J⁶⁻⁹.

According to Stierli S et al., the tracheostomy also favors the desensitization of the structures, losing the gag reflex and vocal clearance, in addition to increasing the risk of aspiration pneumonia. To facilitate verbal communication and food intake in intensive care patients,

Table 1. Level of evidence according to the Centre of Evidence-Based Medicine

Author	Year	Findings or conclusions	Level of evidence CEBM*
Mohan R	2020	Dysphagia is associated with malnutrition, dehydration, aspiration pneumonia, and death. Post-extubation rehabilitation is recommended to minimize long-term effects.	5
Dawson C	2020	The average start of oral post-extubation in post-covid-19 patients with dysphagia was 5.3 days and in patients with tracheostomy 14.8 days. The more days the intubation lasted the more days to start the oral route. The average days of therapy were 8.6. Postcovid dysphagia prevalence was 30%. Most of the patients required modifications to the diet due to problems in the oral phase, thickening liquids, tongue and lip exercises. Nebulizations with saline solution were used to avoid the thickness of the secretions. The emotional state and delirium affected many patients for their recovery.	2a
Fritz MA	2020	Videofluoroscopy is the method of choice for the evaluation of swallowing in SARS-COV2 positive patients or with a high probability of infection. Intubation longer than 4 days is associated with swallowing problems.	5
Kimura Y	2020	The risk of COVID-19 infection in swallowing therapy can be decreased by direct contact with the patient and with the appropriate personal protective equipment. Proper oral hygiene is recommended. Tracheostomy along with surgical aspiration of secretions helps reduce complications of post-COVID-19 dysphagia.	5
Stierli S	2020	After 2 weeks of swallowing therapy, patients with tracheostomy began to eat a soft diet with the need for tracheal aspiration. Early intervention and speech and swallowing therapy and the use of ventilator compatible speech valves decrease the negative consequences of prolonged intubation.	4
Vergara J	2020	Swallowing therapy in post-COVID-19 patients with tracheostomy is aimed at manipulation of the balloon, safe swallowing measures, tracheal suction, communication (the use of valves for speech, digital occlusion) and decannulation (inflation of the balloon); and in laryngectomized patients, respiration (use filters or masks on the stoma), pulmonary aspiration, and laryngeal speech are recommended.	3a
Coutts KA	2020	Dysphagia is a frequent complication in post COVID patients. Speech and language therapists are therefore an essential part of the treatment of these patients but it is important to take measures to avoid close contact with patients where distance can be maintained and the generation of aerosols can be reduced.	5
Castillo- Allendes A	2020	Recommendations are issued to minimize the risk of contagion and reduce contact with patients in voice therapy.	5
Francesco A	2021	In stable patients hospitalized with severe COVID-19 it is recommended to start swallowing and pulmonary therapy.	3a
Mooney B	2020	In post-covid-19, post-extubated, and tracheostomy patients, therapy was emphasized in a sitting posture, strengthening the muscles for swallowing, improving lung capacity, and participating in different activities. Digital occlusion of the tracheostomy helped verbal communication, motivation and participation as well as the contact of patients with their families through applications.	4
Pandian V	2021	Otolaryngologists must participate as part of the multidisciplinary team in the treatment of post-COVID patients in sequelae such as dysphagia, dysphonia, anosmia, dysgeusia, hearing loss, vertigo, among others.	5
Meister KD	2020	It is recommended to take precautions in aerosol generating procedures, to minimize the exposure of health workers, caregivers and patients. It is important to care for the tracheostomy of patients and to manage sequelae such as vocal cord injuries, glottic and subglottic stenosis.	3a
Schindler A	2020	It is important within the evaluation of patients to use PPE, to maintain a distance greater than 1 meter. If telemedicine can be used, it should always be preferred in order to reduce exposure to the SARS-CoV-2 virus.	5

* Centre of evidence-based medicine (CEBM).

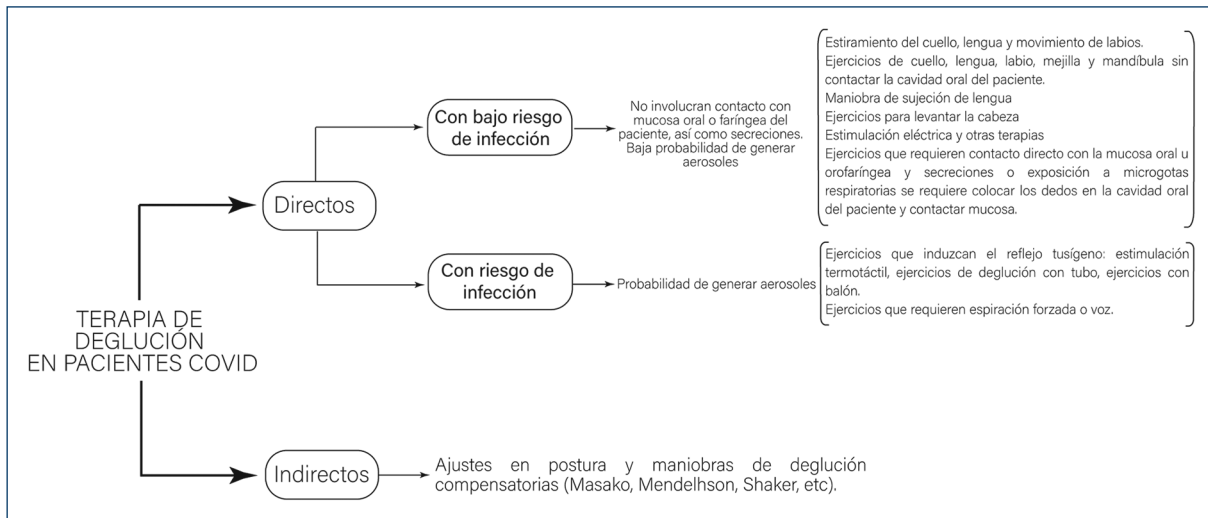


Figure 1. Direct and indirect interventions in swallowing therapy in COVID patients.

ventilator-compatible speech valves are recommended as long as the positive expiratory pressure (PEEP) is less than 8cmH2O. Similarly, it should be considered that the balloon of the cannula must be completely deflated before the valve is inserted to ensure that the expired air passes through the tracheostomy tube, always verifying that CO2 levels do not increase as a result¹⁰⁻¹⁶.

All of these steps must be taken to prevent dysphagia. It is considered that the use of speech valves and preventive and post-decannulation speech therapy reduces risks in patients with prolonged intubation, not only for dysphagia, but also for speech and voice in articulatory and sensory perception issues¹⁷⁻¹⁹.

Diagnosis in COVID patients

The gold standard for the diagnosis of dysphagia is the videofluoroscopic study of swallowing (VF), but the Fibroendoscopic Evaluation of Swallowing (FEES) has great sensitivity and specificity. Both procedures are aerosol generators (PGA), however, in a pandemic situation the study of choice is VF since the patient can take food by himself, reducing close contact^{5,20-23}.

Stierli et al. suggest conducting a FEES when:

The clinical evaluation has failed and does not provide enough information to stage dysphagia or airway condition or it is incomplete information.

The patient has a previous history of aspiration pneumonia

A recent increase in symptoms such as fever, cough, and weight loss

Mismanagement of secretions or suspicion of silent aspiration²².

In the literature, it is recommended to use two consistencies for the FEES with two attempts of each, using the New Zealand Secretion Scale (NZSS), Yale Residue Scale (YRS) or Penetration Aspiration Scale (PAS) for staging¹⁰.

It is important to support the clinical evaluation with questionnaires for a comprehensive evaluation such as the Eating Assessment Tool (EAT-10), Sidney Swallow Questionnaire (SSQ), Royal Brisbane Hospital Outcome Measure for Swallowing (RBHOMS) or the Yale Swallow Protocol (YSP)^{23,24}.

At all times, it is imperative to use full personal protective equipment (PPE) at the time of evaluations, which includes an N95 mask verifying that it seals properly, eye protection (mask or goggles), clean long-sleeved gowns and gloves, preferably in a place with adequate ventilation. During the pandemic situation, it is advisable to perform out screening tests before carrying out these studies, among which are cervical auscultation of swallowing, viscosity volume test, among others, thus avoiding PGA unnecessarily^{17,21,23,25,26}.

Rehabilitation of COVID patients

Once the diagnosis has been made, it is necessary to start rehabilitation as soon as possible, even from the moment of hospitalization in patients who have 3 consecutive days of hemodynamic stability. This in order to prevent long-term effects and promote normal

swallowing even before hospital discharge. During hospitalization after extubates and with tracheostomy, the posture should be emphasized when sitting, strengthening the muscles for swallowing, improving lung capacity and participation in different activities^{1,2,4,5,27,28}.

For the rehabilitation of dysphagia, it is important to take into account that a multidisciplinary team is required to provide the best treatment to the patient. This team should include the speech therapist, speech pathologist, speech therapist, otolaryngologist, among others^{23,27}.

Fritz MA et al. recommend that patients admitted for rehabilitation meet the following characteristics:

More than 7 days of diagnosis of COVID-19

At least 72 hours without fever or without fever even with medication

Stable respiratory rate and saturation

Clinical and radiological stability by CT or pulmonary ultrasound⁴.

There is a closeness between the patient and the health professional who provides the therapy, so there is a high risk of transmitting the virus. Both exercises, both indirect (no swallowing exercises) and direct (swallowing exercises) involve direct contact with the patient's oral mucosa, secretions, exposure to droplets and aerosols, according to Kimura, et al (Fig. 1)¹⁷.

Necessary precautions should be taken, such as the use of PPE during therapy, and even in cases where telemedicine can be used. In cases where there is a shortage of material, therapy must be suspended^{6,8,21,22}.

There are different interventions for swallowing therapy. The risk of transmission of COVID-19 involved depends on the way in which they are carried out, dividing them into direct and indirect exercises (Fig. 1)^{17, 21, 29-45}.

Conclusions

In patients with dysphagia due to COVID-19 infection, it is important to take into account that most of the conventional evaluation and treatment procedures involve closeness to the patient, as well as the generation of aerosols. This is why it is necessary to decide what is the risk-benefit of using most of the instruments used for diagnosis and assess which exercises help to maintain social distancing.

Updates regarding recommendations should be consulted frequently, and as it is a new virus, investigations continue and new recommendations are constantly published; besides that with the passage of time. It is imperative to be able to carry out clinical studies with

high levels of evidence that allow us to generate Clinical Practice Guidelines for the benefit of our patients.

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Conflict of interests

The authors do not declare having any conflict of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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