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Case Series

Intensive Dysphagia Rehabilitation Program Post Covid-19: Case Series Report

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ABSTRACT

Dysphagia often occurs in the most severe cases of Covid-19 infection and has an impact on clinical outcomes and patients' quality of life.

Objective: This study aimed to describe the effects of intensive speech rehabilitation in cases of post-Covid-19 dysphagia in a hospital environment.

Methods: This is a series of five patients admitted to a medical ward between May and August 2021. They were dysphagic, underwent orotracheal intubation and were submitted to evaluation and intensive speech therapy for five consecutive days. The intervention involved myofunctional exercises and in three cases electrical stimulation were also associated. The outcomes were: evolution of the Functional Oral Intake Scale (FOIS) and Penetration-Aspiration Scale (PAS) - according to videofluoroscopy - degree of dysphagia according to the Dysphagia Outcome and Severity Scale (DOSS) and improvement in quality of life (SWAL-QOL).

Results: After therapy, one patient remained with severe dysphagia, two evolved to mild dysphagia, and two to functional deglutition. In four cases, there was an evolution of the PAS to level 1, showing reduction of aspiration episodes and laryngotracheal penetration, FOIS level 6 and improvement in the quality-of-life questionnaire scores.

Conclusion: The therapy promoted an increase in the levels of oral intake, a reduction in the degree of severity of dysphagia and episodes of penetration and laryngotracheal aspiration, in addition to an improvement in the quality of life index in four of the five patients in this series.

Introduction

The World Health Organization (WHO) declared the Covid-19 pandemic, caused by the SARS-CoV-2 virus, in March 2020, a disease that caused millions of deaths around the world. Characterized as a flu syndrome, it presents in varying intensity, with symptoms that may include fever, cough, dyspnea, headache, fatigue, ageusia, among others [1]. When in its most severe form, it can cause various lung damage and result in severe acute respiratory syndrome (SARS), sometimes requiring invasive ventilatory support in intensive care units (ICU). Exposure to prolonged periods in this condition leads to an increased risk

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of complications such as critically ill polyneuropathy, difficulty in weaning from ventilation and impairment of the structures involved in swallowing, leading to dysphagia [2].

Dysphagia - alteration of one or more swallowing phases - when associated with the intubation process, may result from mechanical causes, residual effects of medications and/or sedation [3, 4]. The contact of the orotracheal tube with the structures of the oral cavity, pharynx and larynx can cause alterations in the mucosa of these organs, thus reducing laryngeal sensitivity and contributing to the appearance of edema, paresis and/or paralysis of the vocal folds. As a result, the risk of malnutrition, dehydration and pneumonia due to the entry of food and/or saliva into the lower airway becomes high, which can further prolong the length of hospital stay, negatively impact the quality of life and increase death rate [5]. Rehabilitation of oropharyngeal dysphagia involves aspects such as adaptation of food consistency, posture maneuvers to protect the lower airways and speech therapy training aimed mainly at recovering muscle functionality. In addition, in order to accelerate the hospital discharge process, intensive therapeutic programmes can be used, in addition to resources such as electrostimulation, with the aim of promoting sensory and motor responses [6, 7].

The intensive approach involves care with greater proximity and frequency and bets on the potential of motor and cognitive learning, through neural connections, to enable the brief automation of what is addressed in therapy. This technique allows the therapist to offer greater assistance to the patient, enabling the correct maintenance of therapeutic techniques [8]. Electrostimulation is a non-invasive method, based on the use of electric currents, which can be used, among other purposes, to trigger muscle contraction during a functional task, helping to strengthen muscles, prevent muscle atrophy and neuromuscular re-education [9]. Given the severity and complexity of dysphagia in the context of Covid-19, it is important to study therapeutic approaches with the potential to aid in rehabilitation. In addition, given the scarcity of literary data on the approach to therapy in relation to speech therapy in this population, the objective of this study was to describe the effects of intensive speech therapy rehabilitation in cases of post-Covid-19 dysphagia in a hospital environment.

Case Presentation

This is a series of cases of patients diagnosed with Covid-19, admitted to a ward bed in a high-complexity hospital, from May to August 2021. The patients grouped in this study underwent prolonged orotracheal intubation (OTI) due to complications from Covid-19 and had moderate to severe dysphagia classified by swallowing videofluoroscopy. The description of this study adopted the checklist items proposed by the Case Report Guidelines - Care (2013) manual regarding the items that could be applied to this series of cases [10].

I Evaluation Flow

All individuals underwent clinical speech-language evaluation, according to the institution's protocol in relation to tonus, mobility, sensitivity, vocal quality and swallowing for classification regarding the level of oral intake, according to the Functional Scale of Oral Intake (FOIS) [11]. The objective evaluation took place through the videofluoroscopy of deglutition exam (VFD) in which, in addition to the evaluation of the biomechanics of swallowing, the severity of dysphagia was graded using the Dysphagia Outcome and Severity Scale (DOSS) and the episodes of penetration and/or aspiration, according to Rosenbek's penetration and aspiration scale (PAS) [12, 13]. Food consistencies were evaluated: liquid, slightly thickened (if necessary according to the patient's performance for liquid consistency), moderately thickened and soft and chopped (bread) according to the International Dysphagia Diet Standardization Initiative (IDDSI) [14].

The patient was asked to perform the test independently, and in view of some motor limitation, the family member/caregiver offered the food. All foods were offered with contrast, using 100% dilutions of Barium Sulfate (BS), mineral water or sugar-free juice and, if necessary for thickening, ThickenUp Clear was used (one sachet for each 100 mL of liquid). Four consistencies were evaluated: liquid in 5 mL (2.5 mL of water and 2.5 mL of BS), 10 mL (5 mL of water and 5 mL of BS) and 20 mL (10 mL of water and 10 mL of BS); slightly thickened consistency in 5 mL BS, 10 mL BS, and 20 mL BS; and moderately thickened consistency in 5 mL (with 5 mL BS and 1.2 g thickener), 10 mL (10 mL BS and 2.4 g thickener), and 20 mL (20 mL BS and 3.6 g of thickener).

As for the utensil offered, for thin and slightly thickened liquid, a conventional glass was used and for moderately thickened liquid, a dessert spoon. When possible to progress the evaluation to the soft solid (in the absence of abundant pharyngeal stasis and without efficient clearance), the patient was asked to perform spontaneous collection of three portions. Quality of life was assessed using the Quality of Life in Swallowing Disorders questionnaire (SWAL-QOL), consisting of 44 questions related to eleven domains with individual scores. The social domain was not considered in this research, as it comprised questions that could not be answered by hospitalized patients. The questionnaire was answered by the patient with the help of a family member, but the therapist remained available to clarify possible doubts [15]. Clinical speech-language evaluation, videofluoroscopy of swallowing and application of the SWAL-QOL questionnaire were performed pre and post-intervention for reclassification of FOIS and PAS scales, degree of dysphagia and quality of life scores.

II Speech Therapy Rehabilitation

Patients received intensive speech therapy for five consecutive days. Rehabilitation consisted of 10 sessions supervised by the speech therapist (2x/day), lasting 30 minutes, and 10 sessions (2x/day) unsupervised. In unsupervised sessions, that is, without the presence of the speech therapist, the patient had the help of a family member or caregiver who participated in the consultation with the professional. The exercises, as well as the number of sets and repetitions, were adapted to each patient's tolerance, as signs of tiredness appeared after a short period of therapy. The same exercises performed in the session were oriented to the moment without supervision. All patients received written instructions for performing the exercises and a table that should be filled in whenever they performed the therapeutic programmes without supervision. At the end of the fifth day, the form was returned and the responses were counted to measure the adherence of each patient, being considered non-adherence (0%), partial adherence (50 - 75%) and total adherence (100%).

In cases where there were no contraindications, such as skin alterations in the region where electrotherapy was applied, use of a pacemaker or any other devices or alterations that made the use of electric current impossible, electrostimulation was used simultaneously with the exercises performed in the standard intervention. The Functional Electrical Stimulation (FES) mode was used, with parameters of 50Hz, 150 us, 3 seconds of ascent ramp and 3 seconds of descent ramp, on time of 5 seconds, off time of 10 seconds and intensity regulated according to patient's tolerance, always aiming at the highest tolerated intensity. The electrodes were placed in the infrahyoid and suprahyoid regions and the patient was instructed about the possible sensations caused by the electric current. Five cases were included, with variability in relation to the reported initial symptoms of Covid-19 and associated comorbidities (Table 1). None had a previous complaint regarding swallowing difficulties.

Table 1: General characterization of the sample.

Variables	
Gender	4(female) - 1(male)
	Average Average± standard deviation*
Age	50, ±11,8
Days of hospitalization	77,2 ±35,6
Intensive care unit days	58,4 ± 28,1
Days of orotracheal intubation	17,2 ± 8,9
Tracheostomy days	39,2 ± 32,9
Feeding	**Patient(P)**
Enteral Nutrition(EN)	P1,P2,P3,P4,P5
Associated oral route	P2, P4
Symptoms	
Fever	P2,P4
Cough	P2
Dyspnoea	P2,P3,P5
Fatigue	P4
Anosmia and Ageusia	P4
Previous illnesses	
Hypertension(HAS)	P1,P2,P3,P5
Diabetes(DM)	P1,P2
Asthma	P5
SLE	P4
APS	P4
Degree of Dysphagia	
Moderate	P2,P3
Moderate to severe	P5
Severe	P1,P4

P: Patient; EN: Enteral Nutrition; SLE: Systemic Lupus Erythematosus; APS: Antiphospholipid Antibody Syndrome.

Patient 1 (P1): Man, 55, Diabetes Mellitus (DM) and Systemic Arterial Hypertension (SAH). Subjected to 28 days of hospitalization in the intensive care unit (ICU), 16 days of orotracheal intubation (OTI) and 14 days of tracheostomy. Initial assessment: Decannulated, ostoma in the closing phase, EN and nothing orally (FOIS 1). VFD showing Severe Dysphagia (DOSS level 1), with the presence of penetration and silent laryngotracheal aspiration, contrast passes to the glottis with residue in the subglottis, but the patient does not respond (PAS 8). Therapy: Electrostimulation; Against Tongue Resistance: 2 series with 10 repetitions; Tongue Hold: 3 sets of 5 reps; Push technique: 1 set of 10 repetitions. The patient could not tolerate extended periods of therapy, as well as the entire proposed electrostimulation time due to positioning discomfort (90º headboard). At the moment without supervision, the patient did not adhere to therapy (0%). Outcome: There was no change in the swallowing pattern compared to the initial exam, maintaining the FOIS 1.

Patient 2 (P2): Male, 63 years old, Diabetes Mellitus and Systemic Arterial Hypertension. Subjected to 69 days of ICU, 19 days of OTI and 53 days of tracheostomy. Initial assessment: Decannulated, with ostoma in the closing phase, diet by EN, dependent on an alternative route with minimal oral intake of food or liquid (FOIS 2). VFD showing Moderate Dysphagia (DOSS level 3), with presence of penetration and absence of laryngotracheal aspiration, contrast enters up to above the vocal cords, without residue (PAS 2). Therapy: Electrostimulation; against Tongue resistance: 2 series with 10 repetitions; Tongue Hold: 3 sets of 5 reps; push technique: 2 sets of 10 repetitions. At the time without supervision there was total adherence to therapy (100%). Outcome: Total oral intake with multiple consistencies, without the need for special preparation or

compensation, but with restrictions for some foods (FOIS 6); Mild dysphagia (DOSS level 5), Contrast does not enter the airway (PAS 1).

Patient 3 (P3): Male, 49 years old, SAH. Subjected to 96 ICU stays, 29 days of OTI and 83 days of tracheostomy. Assessment: Ventilating through a tracheostomy with a metallic cannula, with a medium volume of secretion, EN and nothing orally (FOIS 1). VFD showing Moderate Dysphagia (DOSS level 3), with presence of penetration and absence of laryngotracheal aspiration, contrast enters up to above the vocal cords, without residue (PAS 2). Therapy: Electrostimulation; against tongue resistance: 3 series with 5 repetitions; Tongue Hold: 3 sets of 5 reps; pushing technique: 3 sets with 5 repetitions; Sustained beak for lip sealing: 2 series of 10 repetitions; popped kiss: 2 series of 10 repetitions of each. There was partial adherence (50%) at the time without supervision. Tracheostomy occlusion protocol was performed and decannulation was performed by the medical team. Outcome: Total oral intake with multiple consistencies, without the need for special preparation or compensation, but with restrictions for some foods (FOIS 6); Functional swallowing (DOSS level 6); Contrast does not enter the airway (PAS 1).

Patient 4 (P4): Female, 31 years old, history of systemic lupus erythematosus (SLE) and antiphospholipid antibody syndrome (APS). Subjected to 33 days of ICU stay and 18 days of OTI. Initial assessment: Use of O2 catheter, receiving diet of EN, dependent on alternative route with minimal oral intake of food or liquid (FOIS 2). VFD showing Severe Dysphagia (DOSS level 1), with the presence of penetration and silent laryngotracheal aspiration, contrast passes to the glottis with residue in the subglottis, but the patient does not respond (PAS 8). Therapy: against tongue resistance: 3 series with 10 repetitions; Tongue Hold: 2 sets of 10 repetitions; pushing technique: 2 sets with 10 repetitions; tongue protrusion and retraction: 2 sets of 10 repetitions each. There was total adherence (100%) to therapy at the time with and without supervision. It was not possible to associate electrical stimulation because the patient had skin eruptions in the active phase of Lupus. Outcome: Total oral intake with multiple consistencies, without the need for special preparation or compensation, but with restrictions for some foods (FOIS 6); Functional swallowing (DOSS level 6); Contrast does not enter the airway (PAS 1).

Patient 5 (P5): Male, 52 years old, asthma and SAH. Subjected to 66 days of ICU, 4 days of OTI and 46 days of tracheostomy. Initial assessment: In tracheostomy occlusion training, use of EN and nothing orally (FOIS 1). VFD showing Moderate to Severe Dysphagia (DOSS level 2), with the presence of laryngeal penetration and absence of laryngotracheal aspiration, contrast enters up to above the vocal cords, without residue (PAS 2). Therapy: against tongue resistance: 3 series with 10 repetitions; Tongue Hold: 2 sets of 10 repetitions; Shaker: 3 sets of 5 reps; pushing technique: 2 sets with 10 repetitions; tongue protrusion and retraction: 2 sets of 10 repetitions each. There was partial adherence (75%) to therapy at the time without supervision. It was not associated with electrostimulation because the patient had skin allergy, preventing the adhesion of the electrodes. Outcome: Total oral intake with multiple consistencies, without the need for special preparation or compensation, but with restrictions for some foods (FOIS 6); Mild dysphagia (DOSS level 5); Contrast does not enter the airway (PAS 1).

In the initial clinical evaluation, carried out according to the institution's protocol, common characteristics were observed for all cases, mainly regarding the reduction of strength of phono articulatory organs, especially of the tongue, which was also added to the reduction of mobility in two patients. The predominant vocal characteristics were breathiness and roughness, identified in the auditory perceptual analysis. Regarding VFD, it was possible to identify in the initial evaluation (pre-therapy) food leakage into the valleculae, predominantly for pasty and solid consistencies, and for the piriform recesses, predominantly, for thin liquids and thick liquids. Episodes of laryngeal penetration, PAS scale level 2, were observed during swallowing for thin liquid consistency in three of the cases and for slightly thickened liquid in two (Table 2).

Posterior escape episodes into the valleculae persisted in all cases. Escape into the piriform recesses also persisted, but with less consistency in three of the cases, with a predominance of occurrence for thin liquids. The occurrence of stasis in the valleculae remained in four cases after the protocol, however with a decrease in volume in some cases and efficient whitening (Table 2). Adaptations were still necessary for feeding in four cases, classified in the reassessment as FOIS level 6, where the oral route is complete with multiple consistencies, without the need for special preparation or compensation, but with restrictions for some foods. The restriction basically related to very dry or hard foods.

With regard to adherence when the volunteers were away from direct supervision, P1 did not adhere at any time, P3 adhered in 60% of the sessions and the other subjects fully adhered, according to data obtained from the control table filled in by the patients themselves. or caregivers. The electrical stimulation intensity was linearly increased over the session time, from 0 milliamps (mA) to the patient's maximum comfort level. The average value of the maximum intensity of the electrical current tolerated, among the ten sessions, was for P1, P2 and P3 respectively 43.9 ± 5.8 mA, 23.8 ± 2.6 mA and 25.7 ± 2.7 mA.

With regard to the quality of life questionnaire, in a view of total scores in relation specifically to the domain of symptoms, most of the initial notes were in relation to choking on liquids, coughing and the presence of thick saliva or secretion. Scores related to mental health initially showed that the swallowing problem left most patients depressed and discouraged. In the domain of fatigue, there was a complaint of weakness, tiredness and exhaustion in all patients, with a more expressive improvement in relation to exhaustion after the intervention period. In isolation, P1 maintained the same pre and post intervention indices. P4, on the other hand, showed the highest rates of improvement in quality of life pre and post intervention for almost all domains, especially in communication, eating duration, swallowing as a burden, frequency of symptoms and food selection (Table 3).

Table 2: Videofluoroscopy findings of swallowing.

Aspects evaluated	***Oral Phase***									
	Before					***After***				
	P1	***P2***	***P3***	***P4***	***P5***	***P1***	***P2***	***P3***	***P4***	***P5***
Oral preparation, organization and ejection force	Reduced in all consistencies tested	Reduced in all consistencies tested	Reduced in all consistencies tested	Reduced in all consistencies tested	Reduced in all consistencies tested	Reduced in all consistencies tested	Adequate	Reduced to pasty and solid	Adequate	Reduced in all consistencies tested
Posterior escape to valleculae / consistency	Slightly and moderately thickened liquid	Pasty and solid	Pasty and solid	Moderately thick liquid, pasty and solid	Pasty and solid	Slightly and moderately thickened liquid	Pasty and solid	Pasty and solid	Pasty and solid	Pasty and solid
Escape to piriform recesses/consistency	Slightly and moderately thickened liquid	Liquid and thickened liquid	Liquid and thickened liquid	Liquid and thickened liquid	Liquid and thickened liquid	Slightly and moderately thickened liquid	Liquid	Liquid	Liquid	Liquid and thickened liquid
	Fase Faríngea									
	Before					***After***				
Hyolaryngeal elevation and anteriorization	Reduced	Reduced	Reduced	Adequate	Adequate	Reduced	Reduced	Reduced	Adequate	Adequate
Food stasis in valleculae	Present/ abundant	Present/ abundant	Present/ abundant	Present	Present/ abundant	Present	Present/discrete	Absent	Present	Present
Whitening	Inefficient	Partially	Partially	Efficient	Partially	Inefficient	Efficient	Efficient	Efficient	Efficient
Laryngeal Penetration	Slightly and moderately thickened	Present for thin liquid	Present for thin liquid	Pasty and slightly thickened liquid	Present for thin liquid	Present	Absent	Absent	Absent	Ausente
Laryngotracheal aspiration	Slightly and moderately thickened	Absent	Absent	Present/ Silent	Absent	Present	Absent	Absent	Absent	Absent

P: Subject; Before: Before therapy protocol; After: After therapy protocol.

Table 3: Swal-qol quality of life questionnaire.

Comparison of domains before and after speech therapy												
Domain	**P1**	**P2**	**P3**	**P4**	**P5**	**Pre***	**P1**	**P2**	**P3**	**P4**	**P5**	**Post***
Swallowing as a Burden	25	75	87,5	12,5	62,5	**52,5±32,4**	25	100	100	75	87,5	**77,5±31,1**
Eating Desire	66,6	91,6	66,6	62,5	50	**67,5±15,1**	66,6	100	91,6	100	75	**86,6±15,2**
Eating Duration	0	75	62,5	0	372	**34,9±34,7**	0	87,5	87,5	87,5	62,5	**65,0±37,9**
Symptoms Frequency	60,7	82,1	76,7	51,7	62,5	**66,7±12,4**	60,7	94,6	87,5	92,8	87,5	**84,6±13,7**
Food selection	12,5	100	35	12,5	100	**52,0±44,8**	12,5	100	100	75	100	**77,5±37,9**
Communication	50	100	30	12,5	25	**43,5±34,4**	50	100	100	100	100	**90,0±22,4**
Fear of Eating	100	100	30	37,5	25	**58,5±38,1**	100	100	35	37,5	37,5	**62,0±34,7**
Mental Health	100	80	20	15	60	**55,0±37,1**	100	100	50	65	80	**79,0±21,9**
Fatigue	0	50	41,6	0	33,3	**45,0±36,0**	0	75	50	25	50	**50,8±30,3**
Sleep	25	37,5	75	87,5	0	**25,0±23,6**	37,5	41,6	75	87,5	12,5	**40,0±28,5**

P: Subject; Pre: Before therapy protocol; Post: After therapy protocol. *: Average ± standard deviation.

Discussion

In this study, it was possible to report the effects of speech therapy on the levels of oral intake, level of food safety and quality of life in dysphagic individuals after complications of Covid-19. There was an improvement in these parameters assessed by the FOIS and PAS scales over a period of five consecutive days, in four of the five reported cases. Regarding the epidemiological characteristics of this series, it was observed that age, length of stay in the ICU and days of hospitalization were higher when compared to another Brazilian study dedicated to investigating these variables. Conducted with 510 patients, the study showed a mean age of 39.9 years, mean length of stay in the ICU of 15.25 days and mean total length of stay of 22 days [16]. It is not possible to define the influencing factor of these variables, but such a difference can be explained by the reduced sample size.

The predominance of diabetes and hypertension found corroborates most of the studies already carried out. Research dedicated to investigating factors associated with the period of intubation in cases of covid, demonstrated that the presence of these comorbidities does not influence the time to extubation, which was on average 19.6 days, a period close to that found in this series of cases. In contrast, the history of isolated diabetes is directly related to the evolution to the need for intubation in patients infected with the coronavirus [17, 18]. The slowing of the oral preparatory and oral phases of swallowing was a present alteration, with emphasis on the difficulty in preparing and ejecting the food bolus, leading to the need to adapt to softer consistencies. The presence of complications in the oral phase of swallowing is a common finding in this population and seems to be directly related to fatigue, commonly associated with the disease [19]. In the context of prolonged ICU stay and extensive exposure to neuromuscular blocking agents, the presence of fatigue can also be justified by disuse atrophy, myopathy or polyneuropathy of critically ill patients [20].

In the videofluoroscopic evaluation of pre-intervention swallowing, the presence of laryngeal penetration was prevalent, especially for thin liquid, while laryngotracheal aspiration was observed in two patients and it happened silently . These data corroborate the literature related to laryngeal findings in patients admitted to the ICU, whether due to COVID-19 or other pathologies, which demonstrate high rates of laryngeal penetration in objective evaluations. These results can be attributed to generalized muscle weakness, injuries and hyposensitivity in the larynx or hypopharynx caused by orotracheal intubation and incoordination of the swallowing-breathing process [5, 21].

The presence of the orotracheal tube, which often occurs for prolonged periods, alters the action of chemoreceptors and/or mechanoreceptors, located in the pharyngeal and laryngeal mucosa, and which are responsible for generating sensory input and motor response - cough reflex - necessary to protect the lower airways. The cough reflex is a brainstem-derived response that involves the superior laryngeal nerve as sensory input mainly from the supraglottic region, and the inferior laryngeal nerve as a motor response for glottic closure. The location of the orotracheal tube and the cuff can promote laryngeal desensitization and when this process is inhibited, it is common for episodes of silent aspiration to occur, where the patient does not cough or have a protective reaction. Associated with the sensory impact of OTI after COVID-19, there is a reduction in the strength and resistance of the peripheral and respiratory muscles, which also has an impact both on the ability to safely promote swallowing apnea and on the volume of airflow subglottic necessary for cough strength [22, 23].

The comparison of the results obtained from videofluoroscopy and the FOIS scale pointed to the effectiveness of intensive speech therapy for post-extubation patients due to COVID-19 [11]. Such findings corroborate a recently conducted randomized clinical trial, which identified evolution in oral intake levels and improvement in oropharyngeal dysphagia in post-extubation patients submitted to speech therapy for 10 days, with one day care [6]. Similar results were obtained, but with a shorter intervention time in the population of this study, which can be explained by the greater number of daily sessions and the use of electrostimulation as a complementary technique. The use of the technique in the rehabilitation of dysphagia, in different etiologies, has a potential additive effect on the evolution of aspects such as oral feeding and reduction of episodes of penetration and laryngotracheal aspiration [7].

Electrostimulation is based on the use of electrical currents that can be used for analgesia, relaxation and to trigger muscle contraction. The electric current is transmitted through electrodes, positioned on the target muscle area, which promote stimulation with the aim of generating new synapses. This process helps brain neuroplasticity, thus impacting the behaviour of the affected muscle group [7]. The current is applied peripherally, promotes integration of motor and sensory cortex functions and aims at gaining strength, resistance and mobility of the recruited muscles. Electrostimulation applied to dysphagia is closely related to gains in hyolaryngeal excursion, and to the obstacle promoted by the stimulus when associated with swallowing. This technique can promote the maintenance of muscle function in patients who are unable to perform active exercises, as well as promote increased proprioception, with greater frequency and speed of swallowing and reduction of residues in the oral cavity and pharynx. Increased airway safety and progression of oral intake levels are aspects described in the literature regarding the use of this technique in dysphagic patients when associated with swallowing exercises [9].

Therapy based on myofunctional and glottic closure exercises, performed intensively, was the basis used for rehabilitation in this research. The use of exercises for rehabilitation of dysphagia aims at a greater range of motion and strength for the laryngeal structures and stimulation of the sensory system. Studies carried out with a similar approach to this series, including exercises for the tongue and lips, thrusting, shaker and tongue-hold techniques in their protocols, identified a reduction in clinical signs of dysphagia, such as wet voice, coughing, choking and noisy cervical auscultation, and improvement of the scores of the swallowing functionality scales [24, 25]. Unlike the other individuals, P1 showed no evolution regarding the degree of dysphagia, oral intake or quality of life. Such results may be related to the psychosocial issues that impacted motivation and, consequently, adherence to therapy. More specifically, the patient's previous diagnosis of depression probably influenced adherence. P1 may also have experienced a process of prolonged denial of the dysphagia diagnosis, suffering direct interference in the ability to follow the therapeutic proposal [26].

As for oral intake based on FOIS, it was possible to identify a significant change in the number of consistencies included in the diet. Only one patient (P1), whose adherence to the strategies was not favourable to rehabilitation, did not change the scale, remaining with an exclusive alternative route until the end of treatment. All other patients went from FOIS 1 or 2 to 6, which means that they went from no or minimal volume of food oral intake to an exclusive oral diet and in multiple consistencies, safely. This scenario configures a positive effect on the quality of life and on the dehospitalization process [11].

Regarding post-therapy quality of life scores, improvement in the communication domain, as well as a reduction in complaints of coughing and choking for liquids at the time of feeding were observed in four of the cases. Considering that breathiness was a characteristic present, in different degrees, in the voice of all patients, it can be inferred that these findings are related to the improvement in glottic closure, which, consequently, positively influenced the vocal and swallowing condition, due to the balance of aerodynamic forces and myoelastic of the larynx. Adding the improvement of this aspect with the increase in the strength of the phono articulatory organs and the progress of the process of adapting the biomechanics in the different phases of swallowing, the reduction of episodes of penetration and/or laryngotracheal aspiration evidenced by the videofluoroscopic examination can also be justified [27].

A case series study is limited in terms of the possibility of generalizing the data. In this study, it was impossible to follow up the patients after hospital discharge, which did not allow for the assessment of the maintenance of long-term gains. On the other hand, in view of literary data, which concentrated on characterizing the dysphagic events of patients infected with the coronavirus to the detriment of therapy, the content constructed in this work points to perspectives regarding intensive speech therapy for the rehabilitation of dysphagia in the population affected by Covid-19 [19, 20].

Therefore, it is concluded that intensive speech therapy promoted an increase in oral intake levels, a reduction in the degree of severity of dysphagia and episodes of penetration and laryngotracheal aspiration, in addition to an improvement in the quality of life index in four of the five dysphagic patients post COVID 19 included in this study.

Conflicts of Interest

None.

Funding

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Ethical Approval

This study was approved by the Research Ethics Committee under opinion 4,646,138.

Informed Consent

All patients received and signed the Informed Consent Form (ICF), according to Resolution 466/12 CNS/MS.

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