International Journal of Scientific Reports
Rashmi R et al. Int J Sci Rep. 2021 Oct;7(10):509-513
http://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164

DOI: https://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20213700

Case Report

Successful treatment of dysphagia in a COVID-19 survivor

Richa Rashmi[1]*, Joyanta C. Mandal[2], Kavita Kumari[3], Shruti S. Senapati[4]

[1]Department of Audio-Vestibule, Siliguri Speech and Hearing Clinic, Siliguri, West Bengal
[2]Department of Speech Language therapeutics, Ali Yavar Jung National Institute of speech and Hearing Disability Divyangjan, RC, Kolkata, West Bengal, India
[3]Hearing Plus, Audio-vestibular Department, Kolkata, West Bengal, India
[4]Department of Speech Language therapeutics, OKTO health Care Unit, Kolkata, West Bengal

Received: 05 June 2021
Revised: 04 August 2021
Accepted: 05 August 2021

***Correspondence:**
Dr. Richa Rashmi,
E-mail: richa.avasthi94@gmail.com

ABSTRACT

This study was aimed document a successful case of dysphagia management after coronavirus disease 2019 (COVID-19) infection. COVID-19 is highly infectious disease and causes 75 million infection and 1.66 million deaths worldwide. Clinical features of COVID-19 including respiratory compromise, microvascular thrombosis and neurologic dysfunction as well as well as prolonged intensive care unit (ICU) care in severe cases yield patients particularly susceptible to mild to severe swallowing impairment which can persist for months or years after ICU discharge. A 52 years old female was diagnosed with severe pharyngo-oesophageal dysphagia after COVID-19 infection and was advised for swallowing therapy. The swallowing therapy was given thrice a week for 45 minutes including Masako, Shaker's and modified Shaker's exercise along with effortful swallow, Mendelsohn maneuvers and super-supraglottic swallow. After 2 weeks of swallowing therapy patient started taking semisolid food orally and maintain normal SpO_2 level during feeding. This study concluded early intervention is the key to boost faster recovery and helped to improve patient's quality of life. Swallowing manuvers and exercises were very effective for the management of dysphagia secondary to COVID-19 infection. This can be generalized and efficacy can be determined with large group of patients having swallowing difficulty after COVID-19 infection.

Keywords: Dysphagia, COVID-19 infection, Aspiration, Swallowing, Swallowing manuever

INTRODUCTION

On December 2019 the World Health Organization (WHO) first became aware of a cluster of pneumonia cases, and COVID-19 was declared a pandemic on March 2020. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has infected 96.1 million people worldwide and caused more than 2.05 million related deaths. COVID-19 infected patients typically present with fever, dry cough, fatigue, and lower respiratory system dysfunction including high rates of pneumonia and acute respiratory distress syndrome (ADRS); atypical symptoms of COVID-19 involve neurological signs including headaches, anosmia, nausea, dysgeusia, damage to respiratory centres, and cerebellar infarction.[1] To better understand the neurological manifestations of COVID-19, symptoms were broadly categorized into three categories: skeletal muscle injury indexes (e.g. acute cerebrovascular disease, dizziness, impaired consciousness, seizure, and ataxia), and peripheral nervous system indexes (nerve pain, impaired taste, smell, or vision).[2]

Patients with underlying comorbidities such as hypertension, diabetes, cardiovascular disorders (CVD), and cerebrovascular disease are more vulnerable to infection and exhibit a higher rate of hospitalization, admittance to the intensive care unit (ICU) and use of

ventilator. Prolonged ICU care in severe cases yield patients particularly susceptible to swallowing impairment.

A significant portion of critically ill patients with COVID-19 are at high risk of developing ICU-acquired swallowing dysfunction (neurogenic dysphagia) as a consequence of requiring prolonged mechanical ventilation.[3] Prolonged ICU stay especially prolonged duration of mechanical ventilation coupled with medication, sedation and bed rest is associated with neurological disorders due to a reduction in afferent sensitivity; consequently, there is a high risk of dysfunction of the swallowing musculature making the patient susceptible to aspiration of saliva and secretions. It can persist for months or years after ICU discharge. Dysphagia is associated with adverse health outcomes, such as poor nutritional intake, dehydration, aspiration pneumonia and death, and can negatively affect a person's social, psychological, and quality of life. COVID-19 can also manifest with other neurologic symptoms, myopathy as well as myositis, which aggravate post-extuation dysphagia (PED).[3]

Need of study

Documentation of assessment and management is very rare in patients with dysphagia after COVID-19 infections. After infection patients may experience swallowing difficulty and can be dependent on Ryle's tube for feeding. So, it is important to document and notice evidence of improvement of dysphagia by course of swallowing therapy caused by COVID-19 infection or other neurological condition associated with COVID-19 infection.

Aim

This study was aimed to document a successful case of dysphagia management after COVID-19 infection. And the objective was to document the perceptual assessment of dysphagia and therapeutic management with different carry over tasks to see prognosis in a COVID-19 survivor.

CASE REPORT

A patient 52 years/female came to the diagnostic department of Ali Yavar Jung National Institute of Speech and Hearing Disabilities (AYJNISHD), Regional Centre (RC), Kolkata on 08 September 2020 with difficulty in swallowing and severe risk of aspiration. She has been intubated with nasogastric feeding tube for nutritional support after COVID-19 infection. She was kept in ICU and undergone heavy medication due to breathing difficulty. The patient was under conservative treatment. She was under-coverage antibiotic injection meropenem, injection doxycycline, steroid injection solu-medrol, injection remdesivir, nebulisation with duolin and budecort. Receive bilevel positive airway pressure (BiPAP). Upon initial assessment, the patient demonstrated fever, loss of smell, taste, vomiting and severe shortness of breath with a restless SPO_2 -92% with full O_2, so the patient was transferred to the ICU and intubated. Laboratory tests revealed typical biomarkers of the COVID-19 disease. Confirmation of SARS-CoV-2 was done through polymerase chain reaction (PCR) out of a nasopharyngeal swab. She was discharged after 14 days when she was haemodynamically stable. After discharge she was advised home isolation for 14 days then repeat reverse transcription (RT)-PCR COVID-19 test, showed negative result. Agnetic resonance imaging (MRI) report revealed chronic infarcts in bilateral cerebellum, few discrete chronic ischemic foci in subcortical and deep white matter bilateral frontal and parietal lobes and defused cerebral atrophy. Computed tomography (CT)-scan showed defused cerebral and cerebellar atrophy. Physiological calcification was noted in bilateral basal ganglia penial reason and choroid plexus and mild deviated nasal septum (DNS) toward right side.

Assessment

Dysarthria assessment showed no such significant difficulty in oral peripheral structure or functions, and Frenchay's dysarthria assessment (FDA) documented the absence of swallow reflex, slight dysfunction of soft palate and mild laryngeal dysfunction. Cranial nerve assessment revealed the affected functioning of glossopharyngeal nerve (IX) and vagus nerve (X). Perceptual voice assessment revealed slight gurgly voice although instrumental voice assessment interpreted as normal voice quality.

Subjective swallowing assessment (Lagemann's four finger test) suggested delayed pharyngeal trigger and slow laryngeal elevation with pooling of saliva on bilateral pyriform fossa, aspiration, and coughing. The oral transit time was recorded as 02 seconds, changes in vocal quality and throat cleaning habit after swallow and also delayed pharyngeal transit time (6 seconds) indicated dysfunction in pharyngeal phase of swallowing. Esophageal stage of swallowing also affected as there was presence of aspiration and continuous coughing/choking after swallow. Reduction in peripheral capillary oxygen saturation was 92%. Mann assessment for swallowing ability (MASA) was administered and score showed 131, suggestive of severe dysphagia and aspiration. Abrupt fluctuation of SpO_2 (2-3 SpO_2 %) value in pulse oximeter was also noted during swallowing (pre feeding 97 SpO_2 %, post feeding 95 SpO_2 %).

Cervical auscultation of swallowing heard as weak, unclear, and gurgly. Also, changes in the sounds of respiratory cycle of swallow before and after the swallow were heard, suggestive of presence of secretions in the airway post an attempt of swallow that indicated presence of aspiration and SPO_2 value had also been checked before and after intake of little amount of water trial which showed fluctuations of SPO_2 concentration.

Finally, the patient was diagnosed as "severe pharyngo-esophageal dysphagia with severe aspiration" and referred for swallowing therapy.

Management

The goal of therapy was to achieve normal swallow without aspiration and removal of nasogastric feeding tube. The therapy techniques like oromotor exercises included Masako or tongue hold, Shaker's, and modified Shaker's exercises along with muscle strengthening maneuvers, which were used to change the timing and strengthen the particular movement of swallowing. The swallowing maneuvers included Mendelsohn maneuver and super-supraglottic swallow, laryngeal manual therapy was provided to reduce the stiffness of muscles. The therapy was provided thrice in a week for the duration of 45 minutes.

Mendelsohn manuever was used to prolong the hyolaryngeal excursion during swallow and thus prolong the duration of opening of upper esophageal muscle. The patient was instructed to swallow and clinician held the larynx at the lifted position for seconds without dropping it. Clinician repeated the activity for 5-10 times.

Shakers and modified shakers exercise help to relax and open the upper esophageal sphincter muscle. The patient was said to lie down in supine position and raise her head and tilt to look at her toes. Modified Shaker's technique was also used for hyolaryngeal excursion and opening of upper esophageal sphincter, and he was asked to sit comfortably on a chair. Clinician applied resistance on the client's forehead and he extended the head against the resistance applied on the forehead.

Super-supraglottic maneuver help to close the entrance of the airway voluntarily by tilting the arytenoid cartilage anteriorly to the base of epiglottis before and during the swallow and closing the false vocal fold tightly. For this patient was instructed to take deep breath and hold breathing during make an attempt to swallow. Cough immediately after swallow and breathe normally.

Masako exercise help to propel food and is a successful tool in improving strength of muscle movement of base of tongue and thus reduce pooling. The patient was said to protrude the tip of the tongue and hold between teeth and make an attempt to swallow while keeping the tongue between the teeth.

Prolonged mechanical ventilation and Ryle's tube feeding also cause stiffness in neck and laryngeal region. Laryngeal manual therapy (LMT) was used to relax the tension in laryngeal musculature. The therapist massaged the laryngeal area from behind using circular and descending movements to knead and stretch each muscle group. Starting from the least-tensed area of sternocleidomastoid, massage was done along the length of the sternocleidomastoid. Suprahyoid muscles were kneaded (upward and backward from midpoint of the mandible) using clinician's dominant hand and other hand cradles the patient's occiput. Bilateral pressure was applied to thyroid-hyoid muscle.

After consecutive therapy cranial nerve assessment suggested normally functioning glossopharyngeal (IX) and vagus nerve (X). Dysarthria assessment suggested no dysarthric components in speech showed normal swallow reflex and laryngeal function and adequate tongue strength.

After 10 sessions of therapy, patient was able to swallow safely and efficiently and the nasogastric feeding tube (Ryle's tube) was removed on the 15th session. Post therapy assessment of swallowing suggested adequate pharyngeal trigger, proper laryngeal elevation, and smooth swallowing in all consistencies of food. MASA score was 184, suggesting no abnormality in swallowing. The oral transit time and the pharyngeal transit time were within normal a limit which was within 1 second. Stable SpO_2 value at around 98% in pre and post feeding also achieved and that suggested no aspiration during swallowing. Cervical auscultation during swallowing was assessed with stethoscope and adequate click and clunk sound, and respiratory sounds were heard before and after swallow which is associated with normal swallow. The type of diet for safe swallowing was slowly changed from liquid diet to puree to soft food and dry food consistencies. Oral intake was sufficient for nutritional need of her body.

DISCUSSION

In all patients with COVID-19 infection reportedly 62% of patients with severe COVID-19 requiring mechanical ventilation and are high risk of aspiration and dysphagia. Dysphagia mainly results of ICU stay and mechanical ventilation that causes severe muscle weakness. Brain areas and peripheral nerves and muscles, which are responsible for normal deglutition, are often impaired as a consequence of the COVID-19 disease. These conditions make dysphagia management difficult and sometimes dysphagia remain for longer duration and thud causing other consequences.

This case study documented the improvement of pharyngo-oesophageal dysphagia achieved by a course of swallowing therapy using combination of swallowing manoeuvres and oromoter exercises. The patient had undergone mechanical ventilation due to COVID-19 infection dependent on feeding tube until complete recovery. Initially, the patient had severe rate of aspiration and coughing, she used to cough out the saliva and sputum spontaneously and simultaneously at a very rapid period of time. Hence Swallowing therapy was started and the maneuvers were performed and practiced using dry swallow at the initial phase of therapy followed by sterile water, thick liquid and then solid food. The number of therapy sessions required for achieving safe and efficient oral intake of solid food was 25 in totality, by the

frequency of thrice per week and the duration of the sessions was 45 minutes. For first 3 sessions, the patient was asked to make attempts of dry-swallow, that is, by saliva only, using the swallow maneuvers. After 6 sessions, food of thick liquid consistency of amount 2.5 ml was introduced and continued for 12 sessions and the amount was increased from 2.5 ml to 5 ml. After 12 sessions, semisolid food was given, liquid consistencies of food were given from 18th session and finally solid consistency of food was given after 21st sessions onwards. The level of consistencies of food and their amounts is shown in Table 1.

Table 1: The level of consistencies of food and their amounts throughout sessions.

Number of sessions	Consistency of food	Amount of food	Examples
1-3	Dry swallow	Nil	Saliva
4-6	Sterile water	2-3 ml	Sterile water
7-12	Thick liquid	5 ml	Vegetable soup
13-17	Semisolid	5ml	Dalia, Curry
18-21	Thin liquid	Sip from cup	Water, Tea
22-25	Solid	4-5 pieces/bite	Apple, papaya, roti, rice

Ryle's tube was removed after 15th sessions, she was discharged after 25th session, and the patient could swallow safely and efficiently using the maneuver. To date there have been no research explaining disease and recovery profile for COVID-19 patients with dysphagia and its prevalence is also unknown. In patients intubated for more than 48 h, the prevalence of dysphagia increases by 56%, of which 25% patients aspirate silently.[4] Neurological complications such as stroke, encephalitis, skeletal muscle injury and Guillain–Barré syndrome have also been reported in COVID-19.[5] Estimates of exact prevalence vary, but it seems that roughly 50% of patients diagnosed with SARS-CoV-2 – the virus responsible for causing the illness COVID-19 have experienced neurological problems.[5] Most researchers believe the neurological effects of the virus are an indirect result of either oxygen starvation to the brain, or the by-product of the body's inflammatory response.[6] Inter-neuronal propagation and axonal transport may also favour viral invasion to central nervous system (CNS). The act of swallowing is coordinated and executed by a widely distributed network that incorporates cortical, subcortical and brainstem structures as well as downstream peripheral nerves and muscles. Complications of COVID-19 target this network at deferent levels and critically ill patients are therefore prone to dysphagia. Although this goes unnoticed and is of less relevance during the period of mechanical ventilation, dysphagia and related complications enter the scene when patients have been extubated.

Infected patients requiring mechanical ventilation, dysphagia is secondary to several comorbidities associated with intubation and consequent alterations in the sensory-motor swallowing mechanism. Due to prolonged oro-tracheal intubation and the high rates of re-intubation in patients with COVID-19, the presence of laryngeal complications may decrease laryngeal sensitivity while impairing airway protection.[7] 30% of infected patients require critical care admission with respiratory support.[8] Heavy sedation needed for prolonged intubation increases the risk of pharyngeal dysfunction and uncoordinated breathing and swallowing.[9] Hence, result in swallowing difficulty ranging from mild to severe degree.

Swallowing is coordinated and executed by a widely distributed net-work that incorporates cortical, subcortical and brainstem structures as well as downstream peripheral nerves and muscles. As summarized in Figure 1, all mentioned complications of COVID-19 target this network at different levels and critically ill patients are therefore prone to dysphagia swallowing is coordinated and executed by a widely distributed network that incorporates cortical, subcortical and brainstem structures as well as downstream peripheral nerves and muscles.

The speech, language and swallowing therapist has a responsibility to achieve best outcome of dysphagia therapy and implement appropriate intervention strategies as per the need of patient's condition.

CONCLUSION

The early intervention is the key to boost faster recovery. We are presenting a case report of a COVID-19 patient with ICU-acquired dysphagia dependent on Ryle's tube for nutrition. Recovery of this case has been achieved by combination of swallowing therapy and compensatory strategy that include texture modified food.

Although there are very few studies and researches on the occurrence and incidence of dysphagia in COVID-19 disease and till date literature does not review any studies on detailed therapeutic management of dysphagia in such cases and hence lacks record on course of treatment nature and duration of improvement. This study concluded that early initiation of swallowing therapy played a significant role in triggering the rate of improvement and helped the patient to experience an improved quality of life.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. World Health Organization. Naming the coronavirus disease (COVID-19) and the virus that causes it.

2020. Available at: https://www.WHO.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it. Accessed on 24 March 2021.
2. Chen T, Wu D, Chen H, Yan W, Yang D, Chen G, et al. Clinical characteristics of 113 deceased patients with coronavirus disease 2019: retrospective study. BMJ. 2020;368:1091.
3. Brodsky MB, Pandian V, Needham DM. Post-extubation dysphagia: a problem needing multidisciplinary efforts. Intensive Care Med. 2020;46(1):93-6.
4. Caso V, Federico A. No lockdown for neurological diseases during COVID19 pandemic infection. Neurol Sci. 2020;41(5):999-1001.
5. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382(18):1708-20.
6. Frajkova Z, Tedla M, Tedlova E, Suchankova M, Geneid A. Postintubation Dysphagia During COVID-19 Outbreak-Contemporary Review. Dysphagia. 2020;35(4):549-57.
7. Murry T, Carrau R. The abnormal swallow: conditions and diseases. Clinical management of swallowing disorders. San Diego: Plural Publishing. 2006;2:17-32.
8. Fritz MA, Howell RJ, Brodsky MB, Suiter DM, Dhar SI, Rameau A, et al. Moving Forward with Dysphagia Care: Implementing Strategies during the COVID-19 Pandemic and Beyond. Dysphagia. 2021;36(2):161-9.
9. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382(18):1708-20.
10. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Cheng Z. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The Lancet. 2020;395(10223):497-506.
11. Li YC, Bai WZ, Hashikawa T. Response to Commentary on "The neuroinvasive potential of SARS-CoV-2 may play a role in the respiratory failure of COVID-19 patients". J Med Virol. 2020;92(7):707-9.
12. Logemann JA, Kahrilas PJ, Kobara M, Vakil NB. The benefit of head rotation on pharyngoesophageal dysphagia. Arch Phys Med Rehab. 1989;70(10):767.
13. Murry T, Carrau R. The abnormal swallow: conditions and diseases. Clinical management of swallowing disorders. San Diego: Plural Publishing. 2006;2:17-32.
14. Vergara J, Skoretz SA, Brodsky MB, Miles A, Langmore SE, Wallace S, Freitas SV. Assessment, diagnosis, and treatment of dysphagia in patients infected with SARS-CoV-2: A review of the literature and International guidelines. Am J Speech-language Pathol. 2020;29(4):2242-53.
15. Xydakis MS, Dehgani-Mobaraki P, Holbrook EH, Geisthoff UW, Bauer C, Hautefort C, Herman P, Manley GT, Lyon DM, Hopkins C. Smell and taste dysfunction in patients with COVID-19. Lancet Infect Dis. 2020;20(9):1015-6.
16. Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, et al. Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in Wuhan. China. JAMA Neurol. 2020;77(6):683-90.

Cite this article as: Rashmi R, Mandal JC, Kumari K, Senapati SS. Successful treatment of dysphagia in a COVID-19 survivor. Int J Sci Rep 2021;7(10):509-13.