The swallowing telerehabilitation in COVID-19

Tomoo Mano, Shigeto Soyama

Submitted to: JMIR Rehabilitation and Assistive Technologies
on: August 06, 2020

Table of Contents

The swallowing telerehabilitation in COVID-19

Tomoo Mano[1] MD, PhD; Shigeto Soyama[1] MSc

[1]Department of Rehabilitation Nara Medical University Kashihara JP

Corresponding Author:
Tomoo Mano MD, PhD
Department of Rehabilitation
Nara Medical University
shijo-cho 840
Kashihara
JP

Abstract

Direct swallowing rehabilitation is not recommended for patients who is positive or suspected for the severe acute respiratory syndrome coronavirus 2?SARS-CoV-2??because SARS-CoV-2 is extremely infectious and may transmit to the individual performing rehabilitation. Some of patients in the intensive care unit and on mechanical ventilation undergo the swallowing difficulty. To feed normally again and be discharged, an assessment of dysphagia and eventual targeted swallowing training by specialized rehabilitation professionals are provided. We analysis the benefit of telerehabilitation, and we experienced the case with COVID-19 of contactless swallowing rehabilitation using video conference software on the tablet-type devices. Telerehabilitation offers the risk reduction of infection and the prevention the shortage of personal protective equipment. Protecting the medical staff from nosocomial infection of COVID-19 is therefore extremely important, and we suggest telerehabilitation as a useful approach in the swallowing rehabilitation.

(JMIR Preprints 06/08/2020:23286)
DOI: https://doi.org/10.2196/preprints.23286

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✓ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✓ **Yes, please make my accepted manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

The swallowing telerehabilitation in COVID-19

Shigeto Soyama[1], M.S.; Tomoo Mano[1, 2], M.D., Ph.D.
1) Department of Rehabilitation, Nara medical University, Nara, Japan
840 Shijo-Cho, Kashihara, Nara, Japan
Phone Number：+81-744-22-3051 Fax Number：+81-744-25-7657
2) Department of Neurology, Nara medical University, Nara, Japan

Correspondence to:
Tomoo Mano, MD., PhD.
Department of Rehabilitation, Nara medical University, 840 Shijo-Cho, Kashihara, Nara, Japan
Phone Number：+81-744-22-3051 Fax Number：+81-744-25-7657
E-mail: manoneuro@naramed-u.ac.jp

Financial Disclosures:
S.S. reports no disclosures, T.M., reports Grant-in-Aid for Scientific Research in Japan

Study funding
No targeted funding reported.

ABSTRACT

Direct swallowing rehabilitation is not recommended for patients who is positive or suspected for the severe acute respiratory syndrome coronavirus 2（SARS-CoV-2）because SARS-CoV-2 is extremely infectious and may transmit to the individual performing rehabilitation. Some of patients in the intensive care unit and on mechanical ventilation undergo the swallowing difficulty. To feed normally again and be discharged, an assessment of dysphagia and eventual targeted swallowing training by specialized rehabilitation professionals are provided. We analysis the benefit of telerehabilitation, and we experienced the case with COVID-19 of contactless swallowing rehabilitation using video conference software on the tablet-type devices. Telerehabilitation offers the risk reduction of infection and the prevention the shortage of personal protective equipment. Protecting the medical staff from nosocomial infection of COVID-19 is therefore extremely

important, and we suggest telerehabilitation as a useful approach in the swallowing rehabilitation.

Keywords: telerehabilitation, swallowing rehabilitation, dysphagia, COVID-19

ABBREVIATIONS

COVID-19, corona virus disease of 2019

SARS-CoV-2, severe acute respiratory syndrome coronavirus 2

PPE, personal protective equipment

RT-PCR, Reverse transcription- polymerase chain reaction

Background

The corona virus disease of 2019 (COVID-19) pandemic has within months turned the world upside down. Pneumonia caused by COVID-19 may be characterized as hypoxic respiratory insufficiency. In cases wherein O_2 saturation worsens, orotracheal intubation and invasive mechanical ventilation provided. Some percentage of cases can lead to post-intubation iatrogenic dysphagia.[1] To feed normally again and be discharged, clinical assessment and examinations of swallowing, oral care and eventual targeted swallowing training by specialized rehabilitation professionals.[2] The directly swallowing function assessment of patients tested positive for SARS-CoV-2 or for those suspected of having been infected is not recommended as there is a risk of aerosol-particle generation as in the case of physiotherapy for airway clearance and sputum collection.[4] Rehabilitation professionals who order swallowing therapy should confirm the COVID-19 and carefully assess the urgency of intervention. With personal distancing and shortage of personal protective equipment (PPE), directly medical care encounters are increasingly becoming the potential risk of nosocomial transmission of COVID-19. If a medical staff is an asymptomatic or pre-symptomatic carrier, the virus can be transmitted to the other patients from a medical staff through direct rehabilitation and may cause nosocomial infection, which can form in-hospital clusters. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is transmitted by means of droplets and direct contact. Furthermore, inhalation of aerosol particles increases the risk of infection. Examination of the oral cavity, pharyngeal region, and larynx of patients pose a higher risk of infection.[3] Tasks related to food intake and directly swallowing rehabilitation such as functional assessments and training, are types of activities that involve contact, and transmission of droplets and aerosol particles.

We experienced a case of COVID-19 with swallowing difficulty after ventilator weaning and tracheostomy were performed. The medical staff considered methods for swallowing rehabilitation while minimizing the risk of infection. At this time, we were concerned about the shortage of PPE because an increase in patient numbers was expected. We decided to use video conferencing software to perform functional assessment of swallowing from outside the patient's room. A primary care nurse in complete protective gear entered the patient's room while the rehabilitation professionals were stationed outside the room. FaceTime ® was used to provide remotely to patients from outside the room using the tablet-type devices. Rehabilitation professionals provided instructions and directly to the patient by verbal communication. The patient's oral cavity and larynx were observed and assessed using a live camera. A rehabilitation professional with full PPE undergo the repetitive saliva swallowing tests (RSST) and cervical auscultation, which can be performed even if the patient is wearing a mask, as the risk of infection related to coughing and sputum is low. In order to avoid aerosol generating procedures, basic oral cavity functions and repetitive training of the gross-motor

movements of the oral cavity and pharyngeal movements were assessed using camera application.

Real-time assessment and feedback to patients

After the patient tested negative for SARS-CoV-2, and subsequently a ST directly performed assessment and training procedures.

Overview

While there are many rehabilitation therapy methods and programs based on telerehabilitation, which used by electronic communication technologies, they typically involve the medical staff checking the compliance and condition and showing rehabilitation therapy examples to the patient or their guardian. Telerehabilitation is implemented remotely without the physician and patient meeting in person, it could be provided the infection to physician. The video conferencing facilitates communication between medical professionals and patients and is therefore, used as a tool to deliver real-time rehabilitation services, enabling remote care with the same quality as face-to-face care.[5,6] Nevertheless, telerehabilitaion of swallowing including contactless assessment and training via video conferencing has some limitations. Micro aspiration may be overlooked and silent aspiration may not have been detected. However, it offers a high level of safety and can be used for early intervention.

Conclusion

Telerehabilitation is a valuable example that demonstrates the ease with which swallowing rehabilitation can be performed during the COVID-19 pandemic. Further research into telehealth interventions and stroke management in home care is crucial.

ACKNOWLEDGEMENT

The patient was informed about, and consented to, the publication of the case details.

Conflicts of Interest

None declared.

REFERENCE

[1]. Wujtewicz M, Dylczyk-Sommer A, Aszkiełowicz A, Zdanowski S, Piwowarczyk S, Owczuk R. COVID-19 - what should naethesiologists and intensivists know about it? Anaesthesiol Intensive Ther 2020;52(1):34-41.

[2]. Brugliera L, Spina A, Castellazzi P, et al. Rehabilitation of COVID-19 patients. J Rehabil Med 2020;15:52(4).

[3]. Mattei A, Amy de la Bretèque B, Crestani S, et al. Guidelines of clinical practice for the management of swallowing disorders and recent dysphonia in the context of the COVID-19 pandemic. Eur Ann Otorhinolaryngol Head Neck Dis 2020;137(3):173-175.

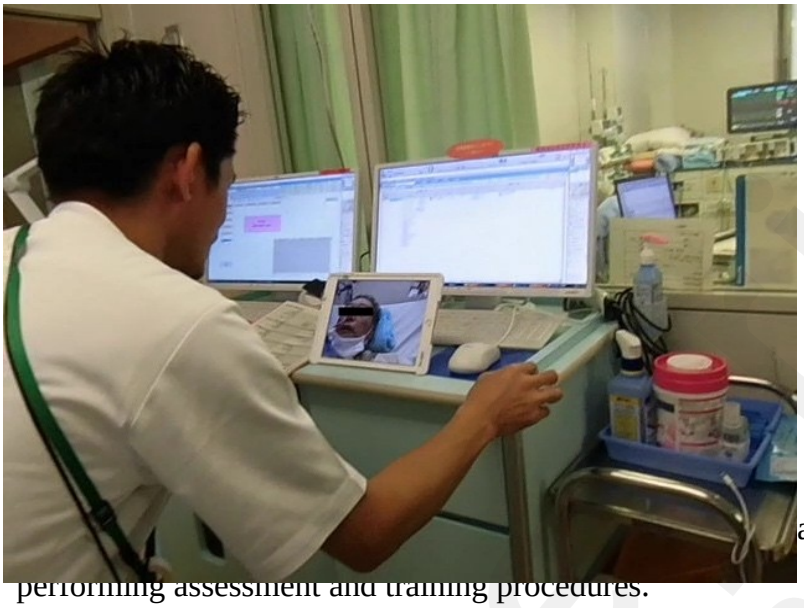
[4]. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet 2020;395Issue10229:1054-1062.

[5]. Winters JM. Telerehabilitation research: emerging opportunities. Annu Rev Biomed Eng 2020;4:287-320

[6]. Kushalnagar P, Paludneviciene R, Kushalnagar R. Video Remote Interpreting Technology in Health Care: Cross-Sectional Study of Deaf Patients' Experiences. JMIR Rehabil Assist Technol 2020;11: 6(1)-e13233.

FIGURE LEGENDS

Figure 1A. Swallowing function assessment under the guidance of rehabilitation professionals for contactless execution of telerehabilitation from outside the patient's room.



al protective equipment directly performing assessment and training procedures.