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Cognitive Deficits in Patients Who Recovered from Critical Covid-19: Unexpected Results of Follow-Up Patients

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Abstract

To identify the presence of cognitive sequelae in patients who underwent prolonged orotracheal intubation and who received a speech therapy assessment and rehabilitation during hospitalization due to COVID19. Participants of the study were 50 individuals, 24 females (43.55%) and 26 males (56.45%), with a mean age of 57.8 years (±14.35), who received treatment at Hospital das Clínicas of the School of Medicine of the University of São Paulo, Brazil (HCFMUSP) due to critical COVID-19. Demographic and clinical data were collected using Addenbrooke's Cognitive Examination - Revised Version (ACE-R) [1]. Results indicated the presence of cognitive deficits in 75% of the participants for all of the tested skills. The results of the present study indicated the presence of cognitive deficits in all of the tested parameters. Future studies should include new analyzes correlating patient severity at hospital admission, demographic data and cognitive abilities.

Keywords: *neurons; Malignant diseases, Iraq, patterns*

Introduction

This study was developed from the observation of unexpected results regarding memory and cognition complaints during the follow-up of post-covid patients who presented dysphagia during their hospital stay.

Coronavirus (SARS-CoV-2) is the pathogen responsible for the 2019 coronavirus disease pandemic (COVID-19), which has resulted in a major global health crisis and overburdened health care services [1]. Therefore, the understanding of the health implications that occur during and after the onset is imperative. For patients who have acquired the severe form of the disease, there are indications of sequelae within a broad spectrum of manifestations [2].

The clinical manifestations of SARS-CoV-2 infection are diverse, can result in acute respiratory distress [3] and encompass common symptoms such as fever, cough, fatigue, myalgia and dyspnea, as well as less frequent symptoms such as diarrhea, rhinorrhea, nausea and vomiting [3,4]. The most severe cases of COVID-19 require hospitalization [5] and are mostly associated with advanced age (≥ 65 years) and preexisting chronic conditions such as obesity, hypertension, diabetes, and liver, heart, and lung diseases [6,7]. The sequelae may originate from multiple factors associated not only to the infection, but also to intensive care interventions, especially mechanical ventilation, performed in order to alleviate the conditions of those with the more severe forms of the infection [8].

There is reference in the literature that patients affected by COVID-19 may present symptoms of cognitive sequelae after hospital discharge and during follow-up assessments [9,10]. The term "long COVID" defines the persistence of the clinical manifestations after the acute phase of the disease. One of these manifestations, cognitive decline, involves concentration difficulties, memory deficits, as well as receptive language, disorders and deficits involving the executive functions [11].

Thus, the purpose of the present study was to identify possible cognitive sequelae in patients who were submitted to prolonged orotracheal intubation and who received a speech-language assessment and rehabilitation during their hospital stay. These sequelae have been described has having a direct impact on the individual's functionality and overall well-being.

Methods

The research was approved by the Research Ethics Committee of the Institution (CAPPesq Process no. 3.992.554). The research was characterized as a cross-sectional prospective study. Data gathering only began after all patients signed the informed consent form.

Individuals included in the study were 50 patients (24 female and 26 male, mean age of 57.8±14.35 years), undergoing follow-up for post-covid dysphagia, between 6 to 12 months after hospital discharge, at the Division of Oral Myology of Hospital das Clínicas, School of Medicine, Brazil. For the characterization and identification of the mental and cognitive status of the patients, the Addenbrooke's Cognitive Examination - Revised Version (ACE-R) (1) was applied. The areas assessed by the test are: attention and orientation; memory; verbal fluency; language and visual spatial abilities; and language and visual skills.

Results

Demographic characteristics of the study:

1. Participants presented a mean age of 57.5 years (±14.4);

2. Regarding gender, sample distribution was 24 males (48%) and 26 females (52%);

3. Regarding the level of education, we observed the following: 18 individuals with incomplete basic education (36%); 6 with complete basic education (12%); 3 with incomplete average education (6%); 14 with complete average education (28%); 2 with incomplete higher education (4%); 5 with complete higher education (10%) and 2 with less than one year of education (4%).

Findings from the application of the Addenbrooke's Cognitive Examination - Revised Version (ACE-R) protocol:

1. Attention and orientation: 12 patients presented results within the normal range, representing 24% of the sample;

2. Memory: 9 patients presented results within the normal range, representing 18% of the sample;

3. Verbal fluency: 7 patients presented results within normal ranges, representing 14% of the sample;

4. Language: 25 patients had results within the normal limits, representing 50% of the sample;

5. Visual and spatial abilities: 15 patients presented within normal limits, representing 30% of the sample;

6. The number of patients who presented overall ACE-R results within normal limits were 5, representing 10% of the sample.

Demographic data of individuals who presented ACE-R results within normal limits:

1. Age: The mean age of the subjects was 57 years (+/- 8.23).
2. Gender: 4 males (8%) and 1 female (2%).
3. Education: 4 individuals with incomplete basic education (8%) and 1 individual with complete basic education (2%).

Discussion

The main finding of the study was that 75% of the sample presented mental and cognitive status below expectations. The length of hospitalization and severity of the patient's condition did not seem to interfere with the results of the ACE-R, which is in agreement with recent findings described in the literature [10], indicating little or no significant association between clinical severity in the acute phase of SARS-CoV-2 infection and neuropsychiatric impairment after 6 to 9 months. Post-covid language deficits have been described in some studies as similar to those present in cognitive-communicative disorders observed in adults with traumatic brain injury, right hemisphere damage, and neurodegeneration [12]. Such finding is consistent with that observed in the tested population, according to the low number of patients with results within normal limits of the ACE-R, a test sensitive to signs of dementia.

Among the areas analyzed by the ACE-R, verbal fluency was the most affected in participants of the present study, with only 7 individuals presenting results above the limit considered as normal, while language was the least affected, with half the sample (n = 25) showing results within the normal limits of the test. Verbal fluency, attention and orientation (n = 9), memory (n = 12), and visual-spatial skills (n = 15) had low numbers of patients presenting results within the normal range. These results are in agreement with what has been discussed in recent studies on post-covid syndrome, or long covid, in which cognitive deficits and brain fog have been significantly appearing in patients' charts [13-15]. Preliminary results indicate the need for greater attention to

neurological deficits, such as verbal fluency, memory, attention and orientation, in patients with post-covid syndrome and its association with cognitive decline.

One of the limitations of the present study was the divergence between the mean age of the patients evaluated and the age range targeted by the ACE-R, the mean being lower than the age evaluated by such protocol (>60). For better correlation of the data regarding these findings and studies on the same subject, further analyses will be necessary in order to standardize the reference values for different age groups, gender and education.

Conclusion

The results of applying the ACE-R to evaluate of post-covid patients indicate a cognitive impairment in all of the assessed areas. Further analysis will allow correlation of the data found with the severity of the conditions during hospitalization, with demographic variability and with cognitive specifications.

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