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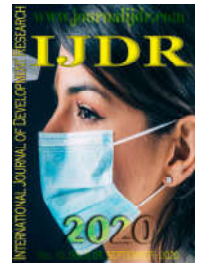
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RESEARCH ARTICLE

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POSSIBLE REINFECTION BY SARS-COV-2 (COVID-19), IN TERESINA (PIAUÍ), A CASE REPORT

¹Marhesca Carolyne de Miranda Barros Gomes, ²Alyne Pereira Lopes, ³Karla Joelma Bezerra Cunha, ⁴Teresa Raquel de Carvalho Castro Sousa and ⁵Mariana de Fátima Barbosa de Alencar

¹Specialist Nurse in Obstetrics, Nurse in Hospital São Paulo, Teresina-PiauÍ, Brasil

²Nurse. Master degree in Pharmacology from UFPI, Teresina-PiauÍ, Brasil.

³Nurse. Master in Nursing from UFPI, Professor of the Bachelor of Nursing course at UNIFSA Teresina-PiauÍ, Brasil

⁴Nurse from college UNINASSAU Teresina-PiauÍ, Brasil

⁵Nurse from Uninovafapi University Center, Teresina-PiauÍ, Brasil

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*Corresponding author:

Alyne Pereira Lopes

ABSTRACT

Severe Acute Respiratory Syndrome Corona virus-2 (SARS-CoV-2) is caused by a virus that infects the epithelial cells that express the angiotensin-converting enzyme receptor 2 (ACE2). This virus has a special tropism for lung tissue and the ability to trigger severe clinical conditions, including symptoms such as fever, dry cough, pleural effusion and acute pneumonia, however, there are several scientific reports that show the ability of this virus to infect other organs as human brain. The pandemic caused by Sars-Cov 2, coronavirus-19, has deeply impacted the Brazilian territory, being responsible, until now, for infecting more than 3 million Brazilians and causing more than 122 thousand deaths in Brazil. In view of this, the absence of specific vaccines and medications available, coupled with nonspecific supportive treatments, for the treatment of people infected with SARS-CoV-2, the recent discussion on reports of cases of reinfection by this virus has provoked a series of questions by part of society. Thus, the present study aimed to report the cases of two patients possibly reinfected by Covid-19. It is known that the scientific literature on the subject is still limited, and these reports are strategic to help elucidate the viral behavior of SARS-CoV-2 in humans.

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INTRODUCTION

Coronaviruses are enveloped RNA viruses distributed among mammals, including humans and birds, that cause respiratory enteric, liver and neurological diseases. They originate from infections in animals, and when transmitted to humans they cause epidemics and pandemics, with potentially serious infections and high mortality rates. The first coronavirus to cause an epidemic occurred between 2002 and 2003, originating in China and became known as SARS-CoV, because it causes a severe acute respiratory syndrome, similar to severe influenza, with acute and progressive respiratory failure [Lana, 2020; Weiss, 2011; Brasil, 2020]. In 2012 another coronavirus caused a new epidemic, the MERS-CoV or Middle East respiratory syndrome in which the intermediate host, between humans and the bat, was a dromedary.

In December 2019, China alerted the World Health Organization (WHO) to cases of pneumonia of unknown etiology in the city of Wuhan. On January 7, 2020, Chinese authorities identified a new type of coronavirus (SARS-CoV-2) that quickly spread to other countries, prompting WHO to declare a pandemic in March [Lana, 2020; Weiss, 2011]. Biologically, the strategy of entry of the SARS-CoV-2 virus into human cells occurs through cellular infection through receptors for the angiotensin-converting enzyme 2 (ACE2), which are highly expressed in the pulmonary epithelium [Singal, 2020; Wang, 2020], which may explain the reason for the high tropism of this virus, for this tissue. However, it is worth noting that symptoms of gastrointestinal disorders, observed in patients infected with SARS-CoV-2, such as diarrhea and vomiting, evidence the susceptibility of intestinal

epithelial cells to infection by the SARS-CoV-2 virus, which may indicate the occurrence of high expression of ACE2 receptors present in these cells [Matthai, 2020]. COVID 19 is a respiratory disease caused by the SARS-CoV-2 virus and its main symptoms are dyspnea, cough and fever. Other symptoms that are not very common are diarrhea, anosmia, agony, myalgia, sore throat and fatigue. Initially, infected people may manifest mild symptoms and others may manifest severe symptoms, eventually dying [Lana, 2020; Weiss, 2011; Brasil, 2020; Phan, 2020]. This disease is a global public health emergency, has a high contagion power, being transmitted, mainly, from one person to another through respiratory droplets (dispersed during speech, coughing or sneezing), both through direct and indirect contact. Infected people through contaminated hands, objects or surfaces; in addition to transmissibility through aerosols, which are smaller and lighter particles generated from specific procedures [Anvisa, 2020]. There are still no vaccines or specific drugs available, treatments are supportive and nonspecific. Just as it is not yet known about immunity in cases of cure [Brasil, 2020; Anvisa, 2020].

Objective

Case report of two patients diagnosed with COVID 19 in two situations (confirmed by the RT-PCR method), both released as cured after treatment, and presented new symptoms with confirmation of a new positive test.

METHODS

Information on these clinical cases was obtained through interview / anamnesis and medical record review.

CASE REPORT

The first case: Patient EVM, 39 years old, health professional working in a sector with patients with COVID 19, went to the emergency room of a hospital located in Teresina-PI, on June 24 with a 5-day report of fever associated with weakness, myalgia, nausea and postural hypotension. He had had a complete blood count four days ago, which showed mild thrombocytopenia (102,000), hemoconcentration and elevated transaminases (TGO 67 and TGP 63). He did not report any respiratory symptoms, normal pulmonary auscultation, did not show a drop in saturation and even stated effective treatment for COVID 19, with clinical improvement without previous control of imaging tests. The confirmation method was performed by means of RT PCR collected with nasopharyngeal swab on 27 of april of 2020. The patient was admitted on the same day with suspected arbovirus with alarm signs. New blood count with worsening of thrombocytopenia (84000), slightly elevated PCR (37.7).

Laboratory tests of 25 of june de 2020 maintain platelet drop (79000), rise in PCR (66.90) and transaminases (TGP 66 and TGO 78). Serology for arboviruses (dengue, zika and chikungunya) was requested, a new test for COVID 19, X-ray and chest tomography due to a change in the pattern of pulmonary auscultation with crackling crackles in the bases. Antibiotic therapy (levofloxacin) was started to expand measures for bacteria by pulmonary sensitization due to the convalescence of recent viral pneumonia. Serology for dengue (IgG and IgM not reactive by the immunogromatographic

method). NS1 antigen for negative dengue. Negative Zika and Chikungunya serologies. Chest X-ray with slight bilateral interstitial infiltrate. Chest tomography showing opacities with attenuation in ground glass, somewhat nodular, tending to confluence, sometimes associated with thickening of the interlobular septa, consolidative foci and laminar atelectasis of bilateral and predominantly peripheral distribution, involving about 50% of the pulmonary fields. On 26 of june PCR with significant elevation (184.50), low platelets (93000). Rapid test (antigen) reagent; serology for COVID (lateral assay immunochromatographic method) IGM reagent and IgG reagent. A naso oropharyngeal swab collection was performed and sent to Lacen, with detection of SRAS-CoV2 Coronavirus. FIOCRUZ's opinion was requested for culture of the sample and positioning of possible reinfection by COVID 19. On 27 of June, the patient progresses with dyspnea on minimal effort, without satisfactory improvement with a high flow catheter, reaching a maximum saturation of 93%, being transferred to the UTI. Expanded antibiotic coverage with piperacillin + tazobactam and associated with corticosteroids (dexamethasone, maintained until D10), with good clinical response, falling PCR and platelet elevation. After 48 hours, he showed significant improvement in dyspnea and gas exchange, with chest X-ray showing improvement in congestion. Discharge from the ICU on 06/30, in room air, maintaining a good respiratory pattern and satisfactory saturation. Discharged on 01 of July of 2020.

Second case: Patient M.A.R., 37 years old, health professional working in the sector with patients with COVID 19, reports baseline sinusitis and denies allergies. He developed on 25 of April of 2020 with persistent cough, dyspnoea, diarrhea, sore throat, severe headache and myalgia, requiring hospitalization on 26 of April of 2020. RT-PCR was performed with results on 30 of april of 2020 as detectable for Coronavirus SRAS-CoV2. There was a need for an antibiotic regimen (azithromycin + ceftriaxone) associated with corticosteroids. Pulmonary tomography with attenuation in ground glass with impairment of less than 10%, complete blood count without leukocytosis, PCR (44,0). After 6 days of hospitalization, he was discharged, fulfilling the remaining quarantine days at his residence. To return to his work activities, on 10 of may of 2020, a new RT-PCR collection was performed, resulting on 13 of may of 2020 of Not Detectable for SARS-CoV2 coronavirus. The patient also underwent a rapid test with only IgG reagent. On July 23, 2020, the patient reports symptoms of sore throat, anosmia, cough and diarrhea, a new RT-PCR collection was performed on 27 of July of 2020 with detectable results for SARS-CoV2 coronavirus on 28 of July of 2020 , again away from her daily activities, due to a new manifestation of symptoms and confirmation in a gold standard exam. There was no need for hospitalization, tomography was performed which did not show pulmonary involvement and normal laboratory tests.

DISCUSSION

Viruses have a great capacity to subvert the immune system, mainly through mutations that cause genetic alterations in the antigens of their viral capsule, which blocks the action of antibodies previously formed by the organism. In the case of Dengue, for example, the appearance of different serotypes is observed, which makes it difficult to form an effective immune response. The WHO has been concerned with the viruses emerging since 2003 with the emergence of SARS and

Influenza type A, since the immune response is inefficient and the disease is almost always fatal, which by genetic recombination generates virulent lineages responsible for major pandemics [Coelho-Castelo, 2020]. Research from around the world has led WHO to declare that there is a drop in antibody titers between 1 to 3 months after infection by SARS-CoV2, that is, recovered patients have shown that although neutralizing antibodies can be found in the blood, in some cases they disappear quickly and even become undetectable three months after infection. Many lines of research on immunity after contagion with COVID 19 focus on the performance of T lymphocytes in the body [Who, 2020; Juno, 2020; Editorial, 2020]. Lymphoid cells originate in the bone marrow that generate lymphocytes, such as types T and B. T cells are responsible for cellular immunity and B cells are responsible for antibody-mediated immunity [Mesquita Júnior, 2010]. There is a study that has resulted in T cells being able to act in the presence of the virus after 17 years of contagion. This study looked at people recovered from the pandemic caused by the Severe Acute Respiratory Syndrome - SARS between 2002 and 2003 [Sekine, 2020]. Understanding adaptive immunity to SARS-CoV-2 is crucial for vaccine development and interpretation of the pathogenesis of COVID-19. A study published in May in Cell Magazine showed that SARS-CoV-2 specific CD8+ and CD4+ cells in 70% and 100% of convalescent patients with COVID-19 were identified; and SARS-CoV-2 reactive T CD4+ cells were also found in 40% to 60% of unexposed individuals. This fact suggests the recognition of reactive T cells crossed between circulating coronaviruses that cause a common cold and SARS-CoV-2 [Sekine, 2020].

Conclusion

There is insufficient evidence on the effectiveness of antibody-mediated immunity to guarantee that SARS-CoV-2 cannot be reinfected. It is known that, of the six known human coronaviruses, four cause the common cold and have wide circulation, most people are infected with common coronaviruses throughout their lives, with children being more susceptible to becoming infected. The other two types of coronavirus cause SARS and Middle East Respiratory Syndrome. People previously infected with one of these viruses can produce antibodies that cross-react with antibodies produced in response to infection with SARS-CoV-2 through T cell responses. There is no understanding of the responses of human T cells to SARS-CoV2, due to the rapid emergence of the pandemic. There is an urgent need for basic information about T cell responses to this virus, as this knowledge can guide the selection of appropriate immunological endpoints for clinical trials of the COVID-19 vaccine. WHO continues to review the evidence on antibody responses to SARS-CoV-2 infection. On 24 August of 2020, it declared the first confirmed case of reinfection by SARS-CoV-2 detected in Hong Kong by analyzing the virus's genetic code. It is noteworthy that the present study also aimed at encouraging and guiding the production and dissemination of scientific knowledge, related to the subject studied, based on the production of scientific articles in the study area.

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