Ref: Ro J Infect Dis. 2024;27(1)
DOI: 10.37897/RJID.2024.1.7

Dysphagia and upper airway obstruction in COVID-19 without pulmonary complications

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ABSTRACT

Dysphagia and upper airway obstruction may be post-acute complication of COVID-19. The studied case showed that in people newly infected with SARS-CoV-2, the two mentioned clinical complications probably occur due to the strong immune response and cytokine storm in the throat which can be prevented from oropharynx obstruction by using corticosteroids and antihistamines.

Keywords: COVID-19, dysphagia, obstruction

INTRODUCTION

Widespread illegal wildlife trade has increased the risk of transmission of viral pathogens between wild animals and humans. A prominent example is COVID-19, which was caused by Sever acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) [1].

This virus can attach to its receptors called Angiotension-converting enzyme 2 (ACE2), which are abundantly present in mouth, tongue, nasal, nasopharyngeal, oropharyngeal cells through the crowns and enter the cells and infect humans [2]. At the beginning of the disease, COVID-19 usually causes various symptoms of the upper respiratory tract, such as sore throat, rhinorrhea, nasal congestion, headache, and fever and then it causes symptoms of the lower respiratory tract such as cough, sputum production, dyspnea and chest tightness [3].

Clinical presentation is very different among people, so that it is asymptomatic in 80% of people and causes pneumonia in about 16% of them, but in 4%, the disease is more severe and can progress to (ARDS) Acute respiratory distress syndrome and cause multiorgan failure [4]. In severe forms of the disease, more pro-inflammatory cytokines are produced and a cytokine storm occurs [5]. It seems that the creation of a cytokine storm and a strong immune response in a person for any reason can threaten the patient's life, even if the patient does not have a risk factor for contracting the severe form of COVID-19.

In this article, we report a case with severe congestion of the Oropharynx that made it difficult for the person to breathe, so that by treating rare cases of the disease, severe damage and possibly death of the person with COVID-19 can be prevented.

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Article History:
Received: 10 February 2024
Accepted: 30 March 2024

CASE REPORT

A 59-year-old male patient showed clinical symptoms of infection on August 15, 2022, while receiving four doses of the vaccine until July 14, 2022. On the first day, he had fever, lethargy, and headache, after which chills, sore throat, runny nose, pharyngeal erythema, and sputum secretions were added. The next day, hoarseness, severe cough, nasal congestion, hypogeusia, dysphonia, stridor, erosion, edema and tonsil enlargement were added. On the fifth day, the patient had a severe sore throat and had difficulty swallowing. Severe inflammation of the tonsils caused narrowing of the patient's airway. In the patient, fever was 38.5, heart rate was 98 beats per minute, oxygen saturation was 95%, and respiratory rate was 23 breaths on room air per minute. There were no complications such as chest tightness. By administering Betamethasone 4mg/ml and Chlorpheniramine maleate intramuscularly along with other common treatments including Acetaminophen 500 mg, Vitamin D 50000, Naproxen 250, Famotidine 40 mg, Diphenhydramine and N-acetyl cysteine, the patient's condition improved.

DISCUSSION

The strategy to deal with COVID-19 is to use a vaccine to prevent the disease [6] and in case of the disease, antivirals and immune system enhancers/modulators are used, in which the use of corticosteroids is controversial. In people with a severe form of the disease, when exposed to the virus, there is an inappropriate regulation of innate immunity and type 1 interferons (IFN-I) are produced less, which is accompanied by more viral load, which leads to more production of Interleukin-6 (IL-6) and Tumor necrosis factor-α (TNF-α) in the place and finally it will cause more inflammation [7].

It should be noted that severe cases of COVID-19 are generally observed with lung tissue damage and non-pulmonary manifestations are usually considered mild.

Inflammatory markers in the blood such as erythrocyte sedimentation rate (ESR) and ferritin increase during COVID-19 [8]. If the epithelial cells of lingual, palatine, tubal and pharyngeal (adenoid) tonsils are affected by SARS-CoV-2, the virus will multiply in these cells and cause pharyngitis.

The pathophysiology of acute pharyngitis in vaccine recipients infected with SARS-CoV-2 is likely to be immune-mediated through a cytokine storm.

The mechanism of cytokine storm in these people probably happened in such a way that when a large number of viruses enter the mouth and nose of a person who has a high expression of ACE2 in the epithelial cells of the tonsils, severe infection occurs in these cells and causes tissue damage. Following tissue damage in the throat and immunological processes, the mast cells in the tissue release histamine, which also causes dilation of local vessels and leakage of inflammatory mediators, production of chemotactic factors, and absorption of inflammatory cells.

Thus, it can be said that the severity of infection caused by SARS-CoV-2 is related to the large number of mast cells at the site of infection and their degranulation. Histamine has also been effective in pharyngeal narrowing and edema by acting on H1 receptors [9].

Dendritic cells have produced IFN-γ and IL-2 cytokines with significant processing of SARS-CoV-2 antigens and their presentation to T helper 1 (Th1) lymphocytes that these cytokines have activated T lymphocytes, macrophages and natural killer cells (NK cells). These activated cells by producing pro-inflammatory cytokines IFN-α and IL-6 have led to a cytokine storm [10] which has caused erythema, congestion and edema in the pharynx, which has reduced immune responses and disease complications by receiving corticosteroids and antihistamines. By reducing the number of leukocytes in the throat and their function, corticosteroids have caused a decrease in the amount of inflammatory cytokines and chemokines, such as interleukin 1, TNF-α, and IL-6, and also reduced the activity of the enzyme cyclooxygenase 2 and finally reduced the inflammatory effects [11]. The prescribed antihistamine has also reduced the influx of inflammatory cells by reducing the dilation of local blood vessels and ultimately reduced the congestion in the patient's throat.

Complications of dysphagia and dysphonia usually occur after respiratory failure in COVID-19 patients who have prolonged intubation [12,13], which is considered a post-acute complication of COVID-19. In the treatment of COVID-19, it should be noted that the strong immune response of the host and the cytokine storm are the main factors in causing the complications of this disease, so it seems that taking the help of corticosteroids and antihistamines is useful in this regard.

Of course, it should be noted that people with a severe type of COVID-19, who usually have underlying diseases such as diabetes, blood pressure, or coronary artery disease [14], the possibility of developing rhincerebral mucormycosis increases when taking cortone [15].

CONCLUSION

It can be concluded that even in people receiving the vaccine, SARS-CoV-2 can cause a strong immune response through cellular immunity by infecting

the tonsil tissue and create a cytokine storm, and finally by causing severe inflammation, edema and the obstruction of the respiratory tract threatens the patient's life.

Acknowledgments: this study was supported by Tabriz University of Medical Sciences

Competing interests: all of the authors declare they have no conflict of interest

Ethical aspects: ethical issues have been completely observed by the authors

Consent: The patient had signed an informed consent form

Financial support: none declared

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