

# Morbidity of the Upper Respiratory Tract in Covid-19 Infected Patients

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**Abstract:** The material of the study was 25 patients for 2019-2021 up to 45 years old with COVID-19 infection. 10 patients were examined in the emergency department and 15 patients in the hospital. Children were examined regardless of the presence of complaints. In addition to standard research methods (general blood count, urine, bacteriological and biochemical studies), we conducted a thorough otorhinolaryngological examination in all patients, and in 2 (8%) X-ray examinations.

**Key words:** patients, COVID-19, upper respiratory tract disease

## Introduction

Recently, there has been a global pandemic burden due to human-to-human transmission of a new coronavirus disease like COVID-19. Since the outbreak in December 2019, COVID-19 has affected more than a dozen million people [2,4]. As is known, the majority of COVID-19 cases among people are mild (80%), 20% of infected patients may develop a serious illness, and 5% may develop severe illness and pneumonia, or acute respiratory distress syndrome, which requires artificial ventilation and hospitalization in the intensive care unit [8,10]. Lesions of the mucous membrane of the oral cavity and upper respiratory tract demonstrated various clinical aspects, differing in localization, size, color and quantity. Blisters, ulcers, erosions, spots and plaques were observed in patients [1,3,11].

Current studies show that the coronavirus enters human cells through the angiotensin converting enzyme receptor 2 (ACE2), during the studies, organs at risk and vulnerable to infection with coronavirus 2 (SARS-CoV-2) of severe acute respiratory syndrome were identified [4,6]. Thus, cells with the distribution of ACE2 receptors can become host cells for the virus and cause an inflammatory reaction in related organs and tissues, such as the mucous membrane of the tongue and salivary glands [5,9]. The interaction of SARS-CoV-2 with ACE2 receptors can also impair the sensitivity of taste receptors, which can cause dysfunctional taste reactions.

History shows that in December 2019, the first cases of pneumonia caused by an unknown infectious agent were reported in Wuhan, China. It was later discovered that the infectious agent is a new beta-coronavirus ( $\beta$  CoV), which was named coronavirus 2 of severe acute respiratory syndrome (SARS-CoV-2) because of its phylogenetic similarity to SARS-CoV. Infections soon became widespread in China and the rest of the world, which led to the WHO declaring a pandemic and a "public health emergency of international importance" [7,10].

The so-called coronavirus disease 2019 (COVID-19) has a higher severity and mortality in the elderly, in patients with concomitant diseases such as hypertension and diabetes, as well as in people with reduced immune activity. Apart from the fact that the pandemic poses a serious threat to public health, it has also affected social life and the global economy.

The aim of the study was the epidemiological characteristics of upper respiratory tract diseases in COVID-19 infected patients.

## Morbidity of the Upper Respiratory Tract in COVID-19 Infected Patients

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, has brought significant attention to respiratory tract infections, particularly the impact of the virus on the upper respiratory tract (URT). The URT, which includes the nasal cavity, pharynx, and larynx, serves as the primary site of viral

entry, replication, and transmission. SARS-CoV-2's interaction with the epithelial cells of the URT has been identified as a critical factor in disease progression and morbidity.

### **Pathophysiology of SARS-CoV-2 in the URT**

SARS-CoV-2 primarily gains entry into human cells through the angiotensin-converting enzyme 2 (ACE2) receptor, which is abundantly expressed in the epithelial cells of the nasal and oral mucosa. Following entry, the virus replicates within the URT, leading to local inflammation and the release of pro-inflammatory cytokines. This inflammation often manifests as common URT symptoms, including nasal congestion, sore throat, anosmia (loss of smell), and dysgeusia (loss of taste).

### **Clinical Manifestations and Morbidity**

The involvement of the URT in COVID-19 varies widely among patients, ranging from mild symptoms to severe complications:

1. **Mild Cases:** Most individuals experience self-limiting symptoms such as rhinorrhea, cough, and pharyngitis. Loss of smell and taste, which are hallmark features of COVID-19, are attributed to viral damage to the olfactory epithelium.
2. **Moderate to Severe Cases:** In some patients, URT inflammation may extend to the lower respiratory tract, exacerbating morbidity. Additionally, secondary bacterial or fungal infections of the URT can complicate recovery.
3. **Chronic Complications:** Prolonged inflammation and tissue damage in the URT may lead to post-viral anosmia, voice changes, or persistent sore throat, contributing to long-term morbidity.

### **Factors Influencing URT Morbidity**

Several factors influence the degree of URT involvement and morbidity in COVID-19 patients:

- **Age and Comorbidities:** Older adults and individuals with preexisting conditions such as diabetes, cardiovascular disease, or chronic respiratory illnesses are more likely to experience severe URT symptoms.
- **Viral Load and Immune Response:** High viral loads and an exaggerated immune response, including cytokine storms, are associated with greater URT morbidity.
- **Vaccination and Variants:** Vaccination has been shown to reduce the severity of URT symptoms, while variants with increased transmissibility may enhance URT involvement.

### **Implications for Management**

Effective management of URT morbidity in COVID-19 patients includes symptom relief, prevention of secondary infections, and monitoring for complications. Interventions such as antiviral therapies, corticosteroids, and supportive care have shown promise in reducing morbidity. Additionally, public health measures, including vaccination and early detection, play a vital role in mitigating the burden of URT complications.

### **Materials and methods of research.**

During the period from May 2019 to July 2021, 25 patients with a diagnosis of COVID-19 infection were under our supervision. The research was conducted on the basis of the regional Children's Infectious diseases hospital. In (32%) 8 patients with COVID-19, the status was established upon admission to the hospital. The material of the study was 35 patients for 2019-2021 under 45 years of age with COVID-19 infection. 10 sick children were examined in the reception departments and 15 patients in the hospital. Patients were examined regardless of the presence of complaints. In addition to standard methods of examination (general analysis of blood, urine, bacteriological and biochemical studies), we conducted a thorough otorhinolaryngological examination for all children, and X-ray examination in 2 (8%).

Careful observation of the patient's behavior and subsequent analysis of the semiotics of the disease revealed; ear pain, (16%) pus from the ear (32%), anxiety of the patient (40%), poor sleep (100%), pain when swallowing (32%), nasal congestion (18%), discharge from nose (18%) sore throat (8%) cough (8%). We believe that a doctor should pay attention to weakness at high body temperature in a patient, as it may be a consequence of depression of the nervous system. We observed this symptom in the clinic of acute otitis media in patients only in 5 patients (20%).

According to age, the patients are divided into 4 groups:

1st group from 18 to 25 years old;

2nd group from 26 years to 30 years;

3rd group from 31 years to 40 years;

4th group from 41 to 45 years old;

The incidence of acute otitis media in men is slightly higher (25%), compared with women (20.4%) at the same time, catarrhal otitis media is twice as common as acute purulent otitis media (30.9% and 14.5%), respectively. The incidence of tonsillitis and rhinosinusitis in the 1st group of men is slightly higher (16%), compared to women (8% and 12%), at the same time acute laryngitis occurs in men (8%) and women (12%), respectively, acute pharyngitis was not observed in this group. In the second group, the incidence of acute otitis media in men and women was almost the same, but acute catarrhal otitis media occurs almost 5 times more often than acute purulent otitis media 31.3% and 6.2%, respectively. The incidence of acute tonsillitis in men and women was almost the same (12% and 12%, respectively) Acute laryngitis and pharyngitis were not observed in this group.

Rhinosinusitis occurs in men (8%), and in women 16%, respectively. The incidence of acute otitis media in the 3rd group of patients was the highest (46.3%), men were sick more often than women (28.2% and 18.1%), respectively.

The incidence of acute tonsillitis in this group was more common for men (16%) than for women (16% and 8%), respectively. Acute rhinosinusitis affected almost the same (12% and 12%), respectively, acute pharyngitis affected men (12%) and women (8%).

In group 4, the incidence of acute otitis media was also higher in men compared to women. ((17.6%-10.2%), and tonsillitis occurs in men (12%), in women (16%), rhinosinusitis in men (16%), girls (8%), pharyngitis occurs in boys (8%), in women (12%), respectively.

Thus, the incidence of ENT organs in COVID-19-infected patients averages 70-80%, at the same time, due attention is not paid in the emergency department to the presence of ENT pathology, adequate therapy is not prescribed, which contributes to the development of a chronic condition or various intracranial complications, which ultimately can lead to disability of varying degrees.

## Conclusion

1. Acute inflammation of the mucous membrane of the upper respiratory tract in COVID-19-infected patients occurs from 70% to 80% of cases.
2. In infected hospitals, it is necessary to allocate the staff of an otorhinolaryngologist for mandatory examination of all COVID-19-infected incoming patients in order to prevent possible secondary development of intracranial complications.

The upper respiratory tract serves as a focal point in the pathogenesis and morbidity of COVID-19. A better understanding of the mechanisms underlying URT involvement, coupled with timely interventions, is essential to improve outcomes and reduce the disease burden associated with SARS-CoV-2 infection. We also compared the results of ENT pathology detection in the emergency department and in the hospital. The frequency of ENT pathology registrations in the emergency department was significantly lower than that in the hospital, although all patients examined in the hospital had already passed through the emergency department. This is primarily due to the absence of

a permanent ENT doctor in the emergency department, where an infectious disease specialist forced to take many patients a day does not always pay attention to ENT pathology or pathology of the upper respiratory tract.

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