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POST-COVID OLFACTORY DISORDERS IN PATIENTS IN UZBEKISTAN: PREVALENCE AND CLINICAL CHARACTERISTICS

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Abstract

In recent years, the COVID-19 pandemic has significantly altered the clinical landscape of respiratory diseases, including manifestations involving the otorhinolaryngological system. One of the most frequent and clinically significant complications of coronavirus infection is olfactory dysfunction—anosmia and hyposmia—which often persist for months following recovery. The aim of this study was to assess the prevalence and clinical-functional characteristics of olfactory disorders in patients who recovered from COVID-19 in the Republic of Uzbekistan. This work presents an analysis of data from patients presenting with complaints of olfactory impairment or loss during the post-COVID period. The frequency of anosmia and hyposmia was evaluated depending on age, sex, severity of COVID-19, duration of olfactory recovery, and the presence of concomitant ENT diseases. Particular attention was given to potential pathophysiological mechanisms of damage to the olfactory epithelium and neural pathways, as well as the effectiveness of applied therapeutic and rehabilitation methods.

Keywords: COVID-19; olfactory dysfunction; post-COVID syndrome; otorhinolaryngology; respiratory complications; Uzbekistan.

ПОСТКОВИДНЫЕ ОБОНЯТЕЛЬНЫЕ НАРУШЕНИЯ У ПАЦИЕНТОВ В УЗБЕКИСТАНЕ: ЧАСТОТА И КЛИНИЧЕСКИЕ ОСОБЕННОСТИ

Аннотация

В последние годы пандемия COVID-19 значительно изменила клиническую картину респираторных заболеваний, включая поражения со стороны органов оториноларингологической системы. Одним из наиболее частых и клинически

значимых осложнений коронавирусной инфекции стало нарушение обоняния — аносмия и гипосмия, которые нередко сохраняются на протяжении месяцев после выздоровления. Целью настоящего исследования явилась оценка частоты и клинико-функциональных характеристик обонятельных расстройств у пациентов с перенесённой коронавирусной инфекцией на территории Республики Узбекистан. В работе представлен анализ данных пациентов, обратившихся с жалобами на нарушение или потерю обоняния в постковидный период. Проведена оценка частоты встречаемости аносмии и гипосмии в зависимости от возраста, пола, формы течения COVID-19, сроков восстановления обоняния, а также наличия сопутствующих ЛОР-заболеваний. Отдельное внимание уделено возможным патофизиологическим механизмам поражения обонятельного эпителия и нейропроводящих путей, а также эффективности применяемых

Ключевые слова: COVID-19; обонятельная дисфункция; постковидный синдром; оториноларингология; респираторные осложнения; Узбекистан.

Introduction

Coronavirus disease 2019 (COVID-19), caused by the SARS-CoV-2 virus, has emerged in recent years as not only a global epidemiological and medical challenge but also a significant concern in otorhinolaryngological practice. The clinical course of COVID-19 is characterized by a wide spectrum of symptoms affecting both the respiratory and nervous systems. Particular attention has been directed towards olfactory dysfunction, which, according to numerous international studies, affects 40–85% of infected patients [1–3]. Olfactory disorders—including anosmia (complete loss of smell), hyposmia (reduced smell sensitivity), and parosmia (distorted perception of odors)—often present as early or isolated manifestations of the infection. In some patients, these symptoms persist for prolonged periods after recovery, forming part of the so-called post-COVID syndrome. The pathophysiological mechanisms underlying COVID-19-related olfactory dysfunction remain incompletely understood; however, it is hypothesized that the pathology involves not only inflammatory damage to the olfactory epithelium but

also neurotoxic effects of the virus on olfactory pathways and central nervous system structures [4–6].

For countries with diverse levels of medical infrastructure and unique geographical characteristics—including the Republic of Uzbekistan—conducting localized research aimed at studying the clinical course and consequences of COVID-19 is especially relevant. Despite a high disease burden in the country, systematic data on the prevalence and clinical-functional characteristics of olfactory disorders in post-COVID patients within Uzbekistan remain scarce. This gap complicates a comprehensive understanding of the problem's magnitude and hinders the development of standardized management protocols.

Therefore, the objective of this study was to investigate the prevalence, clinical manifestations, and factors influencing olfactory recovery in patients who have recovered from COVID-19 in Uzbekistan. Particular emphasis was placed on examining the relationship between disease severity, the presence of concomitant ENT diseases, and the duration of olfactory disorders, as well as analyzing therapeutic and rehabilitation approaches applied to such patients. Olfactory impairment is a key aspect of post-COVID syndrome, not only diminishing patients' quality of life but also potentially serving as a marker of central nervous system damage. Moreover, olfactory dysfunction is closely associated with taste disturbances, further exacerbating patients' nutritional status and psychological well-being, often leading to social isolation and depression [7, 8]. Failure to provide timely diagnosis and adequate treatment may result in chronic impairments and significant complications.This issue is particularly acute in Uzbekistan, where climatic conditions, ecological factors, and socioeconomic circumstances may influence the course and outcomes of COVID-19. Additionally, limited access to specialized otorhinolaryngological care in rural regions poses challenges for timely diagnosis and rehabilitation of patients with post-COVID ENT pathologies. Thus, a systematic study of this problem is crucial for optimizing diagnostic and therapeutic algorithms and developing national guidelines.Despite numerous international publications on post-COVID olfactory disorders, adapting these findings to Uzbekistan's local context requires dedicated research that takes into account

demographic, cultural, and healthcare system specifics. This approach will help identify key risk factors and improve the quality of medical care.

In light of the above, investigating the clinical characteristics and prevalence of post-COVID olfactory disorders among patients in Uzbekistan represents a valuable contribution to the fields of otorhinolaryngology and neurology, as well as to the broader efforts to address the consequences of the COVID-19 pandemic.Olfactory dysfunction resulting from COVID-19 constitutes not only a medical but also a socio-psychological problem with wide-ranging consequences. Anosmia and hyposmia significantly reduce patients' quality of life by impairing their perception of environmental odors, including food and household smells, potentially leading to decreased appetite, weight loss, and nutritional deficiencies. Furthermore, loss of smell increases the risk of accidents (e.g., inability to detect smoke, gas leaks, or spoiled food), thereby compounding health hazards. From a medical perspective, persistent olfactory disturbances indicate damage to neural structures including the olfactory epithelium and central olfactory pathways. This may reflect neuroinvasive effects of the virus and serve as a marker for more severe neurological complications such as cognitive impairment and depression. Current studies estimate that approximately 20–30% of patients experience prolonged olfactory dysfunction lasting more than one month post-infection, which qualifies as post-COVID syndrome and necessitates specialized treatment and rehabilitation.

In the context of Uzbekistan, this problem is compounded by factors such as insufficient availability of specialized ENT care in rural areas, limited rehabilitation resources, and specific climatic and ecological conditions influencing disease progression and recovery. Moreover, the absence of national protocols and clinical guidelines for managing post-COVID olfactory disorders complicates diagnosis and treatment.Consequently, olfactory dysfunction after COVID-19 is a serious complication requiring a comprehensive interdisciplinary approach involving otorhinolaryngologists, neurologists, psychotherapists, and rehabilitation specialists. Effective resolution of this issue will improve patients' quality of life and reduce the social and economic burden associated with the long-term consequences of the pandemic.

Materials and Methods

This study is a prospective observational investigation conducted at specialized medical institutions across the Republic of Uzbekistan from January 2023 to June 2024. The study included patients who had laboratory-confirmed COVID-19 infection within 1 to 6 months prior to presentation, reporting complaints of olfactory dysfunction.

Inclusion criteria:

- Age between 18 and 65 years;
- Confirmed diagnosis of COVID-19 by PCR testing;
- Complaints of decreased or lost sense of smell identified during the post-COVID period;
- Absence of acute ENT diseases at the time of examination.

Exclusion criteria:

- Pre-existing chronic nasopharyngeal diseases associated with olfactory impairment;
- Neurological disorders potentially affecting olfactory function;
- Use of medications influencing olfaction;
- Presence of psychiatric conditions interfering with objective symptom assessment.

Patient evaluation included a comprehensive medical history with particular attention to timing and severity of COVID-19, as well as clinical manifestations of olfactory dysfunction. Diagnosis of olfactory disorders was performed using standardized olfactory tests—the University of Pennsylvania Smell Identification Test (UPSIT) and a screening questionnaire adapted into Russian and Uzbek languages. Additionally, otorhinolaryngological examination with nasal endoscopy was performed to exclude concomitant pathologies such as nasal polyps, mucosal edema, and others. The severity of COVID-19 was classified according to the WHO clinical classification into mild, moderate, and severe forms. Statistical analysis employed descriptive statistics, including mean, median, and standard deviation calculations. Pearson's correlation coefficients and Chi-square (χ^2) tests were

applied to evaluate associations between COVID-19 severity and the degree of olfactory dysfunction. Statistical significance was set at $p < 0.05$. Data processing was carried out using SPSS software version 25. Ethical approval was obtained from the relevant regional ethics committee. Informed consent was secured from all participants, and confidentiality of personal data was ensured in accordance with international and national standards. To enhance the objectivity of functional assessment of the olfactory analyzer, psychophysical methods were used alongside subjective questionnaires. Threshold olfactory testing involved phenylethyl alcohol solutions at varying concentrations to determine the minimal detectable odor threshold. This test was standardized and adapted for local conditions.

All patients underwent mandatory neurological examination, including cognitive assessment via the Mini-Mental State Examination (MMSE), to exclude cognitive impairments that could influence perception and self-assessment of olfactory function.To identify potential concomitant allergic processes, a subset of patients underwent skin prick tests for the most common regional allergens, as well as measurements of total and specific immunoglobulin E (IgE) levels. For analysis of olfactory recovery dynamics, patients were stratified into groups based on the duration post-COVID-19 recovery: 1–3 months, 3–6 months, and more than 6 months. Therapeutic efficacy (anti-inflammatory drugs, agents improving microcirculation, B vitamins, physiotherapy) was monitored via repeated olfactory testing at 1, 3, and 6 months of follow-up.

Data collection and processing adhered to the principles of evidence-based medicine. Special attention was paid to minimizing potential biases related to subjective symptom reporting and controlling for confounding factors such as smoking, chronic upper respiratory diseases, and occupational exposures. The comprehensive approach to data collection allowed for a representative patient sample reflecting the clinical features of post-COVID olfactory disorders within Uzbekistan, ensuring high validity and applicability of the study findings.

Discussion

The data obtained in this study demonstrate a high prevalence of post-COVID olfactory dysfunction among patients who recovered from COVID-19 in the

Republic of Uzbekistan. The proportion of individuals experiencing anosmia and hyposmia reaches significant levels, aligning with international research findings and confirming the global trend of persistent olfactory impairment in the post-COVID period [9, 10].Particular importance is attributed to the identified risk factors influencing the severity and duration of olfactory disorders. Specifically, severe clinical course of COVID-19, concomitant chronic upper respiratory diseases, and advanced age were found to be statistically significant predictors of prolonged olfactory recovery. These findings are consistent with established concepts regarding the pathophysiological mechanisms of olfactory epithelial and neuroanatomical damage, where inflammatory processes and viral neurotoxicity are exacerbated by underlying comorbidities and age-related changes [11, 12].

A critical clinical observation is the demonstrated association between post-COVID olfactory dysfunction and reduced quality of life, underscoring the necessity for early detection and comprehensive management of these conditions. Literature highlights that inadequate attention to this issue may lead to chronic olfactory deficits, depression, and social maladaptation [13, 14]. In the context of Uzbekistan, where access to specialized medical care is limited, particularly in rural areas, such complications represent a significant challenge for the healthcare system. Analysis of therapeutic efficacy revealed that a multidisciplinary approach, incorporating pharmacological agents aimed at reducing inflammation and promoting regeneration of the olfactory epithelium, along with physiotherapeutic interventions, contributes to significant improvement in olfactory function within the first six months post-recovery. However, despite positive trends in most patients, a subset continues to exhibit persistent dysfunction, indicating the need for the development of novel and more effective rehabilitation strategies.

These results emphasize the necessity of implementing national protocols for the diagnosis and treatment of post-COVID olfactory disorders, taking into account the regional characteristics and healthcare resources of Uzbekistan. Future directions should include multicenter studies with larger sample sizes and extended follow-up periods to better elucidate prognostic factors and optimize therapeutic approaches. Thus, this study makes a substantial contribution to understanding post-COVID ENT complications and highlights the importance of an interdisciplinary approach

in patient management, which will improve healthcare quality and reduce the burden of pandemic-related sequelae.

Results

The study included 150 patients who had laboratory-confirmed COVID-19 within 1 to 6 months post-recovery. The mean age was 42.7 ± 12.4 years, with females comprising 58% and males 42%. According to clinical classification, 45% of patients experienced mild COVID-19, 40% moderate, and 15% severe forms. Olfactory dysfunction was detected in 88 patients (58.7%). Among them, 54 (36%) exhibited pronounced anosmia, and 34 (22.7%) had hyposmia. The average duration of olfactory disturbances was 2.8 ± 1.4 months. In 22 patients (24.7%), symptoms persisted for more than three months, indicating the development of a chronic post-COVID syndrome.

Analysis of the relationship between COVID-19 severity and olfactory impairment revealed a statistically significant correlation ($r = 0.62$, $p < 0.01$), with patients suffering from severe disease showing more pronounced and prolonged dysfunction. Additionally, patients older than 55 years exhibited delayed olfactory recovery ($p = 0.03$).Comorbid chronic ENT diseases, primarily chronic rhinosinusitis, were found in 28% of patients with olfactory disorders, correlating with worsened clinical presentation and extended recovery periods ($p < 0.05$). Comparative analysis of treatment efficacy demonstrated that comprehensive therapy—including anti-inflammatory drugs, B vitamins, and physiotherapy—resulted in olfactory function improvement in 70% of patients within the first three months of follow-up. However, 30% of patients showed insufficient response, indicating the need for further research and implementation of innovative rehabilitation approaches. Thus, the study results confirm the high prevalence and clinical significance of post-COVID olfactory dysfunction within the Uzbek population and identify key factors influencing symptom severity and duration.

Conclusion

This study established a high frequency of post-COVID olfactory dysfunction among patients in the Republic of Uzbekistan, underscoring the relevance of this

issue for otorhinolaryngological practice. Olfactory impairment, detected in more than half of the examined patients, significantly affects quality of life and necessitates early diagnosis and comprehensive treatment. Identified risk factors, including severe COVID-19 course, advanced age, and concomitant chronic ENT diseases, serve as significant predictors of prolonged olfactory recovery. A multidisciplinary therapeutic approach demonstrated effectiveness in improving olfactory function in the majority of patients; however, a substantial portion requires the development of novel rehabilitation methods. The findings emphasize the urgent need for implementing national standards and protocols for managing post-COVID ENT complications, as well as further research to optimize diagnosis and therapy. An interdisciplinary approach and timely intervention will help reduce the pandemic's long-term burden and enhance patients' quality of life.

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