

Study on Anosmia and Ageusia in COVID -19 Patients**Dweethi Jayaprakash¹, M. Raneeth Kumar², T. Keerti Santoshi³, Jadhav Rajkumar⁴**¹Assistant Professor, Department of ENT, Head and Neck Surgery, Govt Medical College, Nirmal, Telangana.²Assistant Professor, Department of General Medicine, Government Medical College, Nirmal, Telangana³Associate Professor, Department of Pathology, Kanachur Institute of Medical Sciences, Mangalore, Karnataka.⁴Assistant Professor, Department of ENT, Head and Neck Surgery, Prathima Institute of Medical Sciences, Karimnagar, Telangana.

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Abstract

Initially, acute loss of smell (anosmia) and taste (ageusia) was not considered important symptoms for coronavirus disease 2019 (COVID-19). Evidence has demonstrated that an abrupt absence of smell and taste has been observed even when other general symptoms of COVID-19 infection are not present. This may act as another gateway to the early identification of patients with COVID-19. In this study, we aim to describe the features of loss of smell (anosmia) and loss of taste (ageusia) in COVID-19 patients. This retrospective study was done in year to assess the features of loss of smell and taste sensations in Covid 19 infected subjects. 80 subjects participated in this study. Questions regarding features of loss of smell and taste sensations in covid 19 patients were asked with help of Google forms. 47.5 % had Loss of smell , 31.25 % had loss of taste . 21.25 % had Loss of both smell and taste. In conclusion, anosmia and ageusia seem to be part of important symptoms and clues for the diagnosis of COVID-19, particularly in the early stage of the disease.

Keywords: Anosmia, Ageusia, Smell, Taste, COVID-19

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Introduction

Evidence has demonstrated that an abrupt absence of smell and taste has been observed even when other general symptoms of COVID-19 infection are not present. This may act as another gateway to the early identification of patients with COVID-19. [1-3] The exact mechanism that causes patients with COVID-19 to experience such manifestations is still not clear. Zhou et al. suggested that the angiotensin-converting enzyme 2 (ACE2) receptor is used by COVID-19. ACE2 is distributed throughout the oral and nasal cavities, especially throughout the tongue, where it plays a part in the sense of taste. The COVID-19 virus influences the role of taste by acting as an inhibitor of ACE2. [4] On the other hand, Bran et al. proposed another pathway in which the COVID-19 virus activates olfactory nonneuronal cells, rather than sensory or bulb neurons, subsets of olfactory epithelium sustentacular cells expressed CoV-2 receptor and failed to detect ACE2 expression in mature olfactory sensory neurons. [5] An European multicenter study concluded that olfactory (85.6%) and gustatory (88%) abnormalities are prevalent symptoms in European confirmed COVID-19 cases, who may not have

other nasal complaints [6]. However, these cases do not meet the criteria of self-isolation or testing [7]. Anosmia and/or ageusia might present alone or in mild confirmed cases of COVID-19. It is therefore necessary to test or quarantine those individuals with these complaints. Anosmia induced by COVID-19 infection was most probably linked to damage to the neuroepithelium rich in ACE2 receptor (especially stem cells). [8] In this regard, Gupta et al performed a bioinformatic analysis of single-cell expression profiles underscored selective expression of angiotensin-converting enzyme 2 (ACE2) in a subset of horizontal basal cells and sustentacular cells of the olfactory mucosa in humans. They evaluated the expression of ACE2 transcript in 3906 olfactory mucosa originated single cells from the recent report by Durante et al and suggested that loss of smell in the infected patients is most unlikely due to the direct impairment of the olfactory sensory neurons; in particular the sustentacular cells and the horizontal basal cells are the potential cell types that are highly susceptible to viral entry. In this study, we aim to describe the features of loss of smell

(anosmia) and loss of taste (ageusia) in COVID-19 patients.

Material and Methods

This retrospective study was done to assess the features of loss of smell and taste sensations in Covid 19 infected subjects. Subjects above age of 18 years who were infected with covid 19 virus and recovered from Covid 19 infection were included in this study. Patients with proven COVID 19 infection by realtime polymerase chain reaction (RTPCR) on nasopharyngeal and oropharyngeal swabs were enrolled in the current study. This was questionnaire based study. Questions regarding features of loss of smell and taste sensations in covid 19 patients were asked with help of Google forms. Informed consent was taken from subjects and participation in this study was voluntary. 80 subjects participated in this study. Both male and female adults were included in this study. Following questions were asked to

subjects who had recovered from Covid 19. Data was analysed and expressed in tables as frequency and percentage.

Results

80 subjects participated in this study. 47.5 % had Loss of smell , 31.25 % had loss of taste . 21.25 % had Loss of both smell and taste 31 % had loss of smell for less than 5 days , 50 % had loss of smell for 5 to 12 days . 18.42 % had loss of smell for more than 12 days.32 % had loss of taste for less than 5 days , 48 % had loss of taste for 5 to 12 days . 20 % had loss of taste for more than 12 days. 35.29 % had Loss of both smell and taste for less than 5 days. 47.05 % had Loss of both smell and taste for 5 to 12 days . 17.64 % had Loss of both smell and taste for more than 12 days.

Table 1: Number of Covid 19 subjects with loss of smell and taste sensation

	Total subjects n=80	Percentage
Loss of smell	38	47.5 %
Loss of taste	25	31.25 %
Loss of both smell and taste	17	21.25 %

Table 2: Duration of loss of smell and taste sensation

Duration in days	Loss of Smell n= 38	Loss of Taste n =25	Loss of both smell and taste n = 17
<5 days	12 (31 %)	08 (32 %)	06 (35.29 %)
5-12 days	19 (50 %)	12 (48 %)	08 (47.05 %)
>12 days	07 (18.42 %)	05 (20 %)	03 (17.64 %)

Discussion

Damage to the olfactory nerve during invasion and multiplication of SARS-CoV-2 may explain anosmia observed in the early stage of COVID-19. Therefore, anosmia or ageusia may be more frequently observed in the COVID-19 patients than other respiratory viral infections. Ageusia may be a secondary result of olfactory dysfunction. However, the angiotensin converting enzyme 2 receptor, which is the main host cell receptor of SARS-CoV-2 for binding and penetrating cells, is widely expressed on epithelial cells of the oral mucosa. [9] Damage of mucosal epithelial cells of the oral cavity may explain ageusia observed in the early stage of COVID-19. This evidence may explain the pathogenetic mechanism underlying anosmia and ageusia in COVID-19. Smell and taste disorders are related to a wide range of viral infections. [10,11] Infection of the upper respiratory tract can cause acute-onset anosmia or ageusia because of viral damage to the olfactory epithelium. Moreover, viruses that can use the olfactory nerve as a route into the central nervous system include influenza A virus, herpesviruses, poliovirus, rabies virus, parainfluenza virus, adenoviruses, and Japanese

encephalitis virus. In mouse models, SARS CoV demonstrated transneuronal penetration through the olfactory bulb and its infection resulted in the rapid, transneuronal spread of the virus to connected areas of the brain. [12] Damage to the olfactory nerve during invasion and multiplication of SARS-CoV-2 may explain anosmia observed in the early stage of COVID-19. Therefore, anosmia or ageusia may be more frequently observed in the COVID-19 patients than other respiratory viral infections. Ageusia may be a secondary result of olfactory dysfunction. However, the angiotensin-converting enzyme 2 receptor, which is the main host cell receptor of SARS CoV-2 for binding and penetrating cells, is widely expressed on epithelial cells of the oral mucosa. [13,14] Damage of mucosal epithelial cells of the oral cavity may explain ageusia observed in the early stage of COVID-19. This evidence may explain the pathogenetic mechanism underlying anosmia and ageusia in COVID-19. High transmissibility of COVID 19 before and immediately after symptom onset was reported with a recent epidemic study. [15] Early diagnosis is important for the control of COVID-19, recognition of early signs such as anosmia or ageusia might be

very helpful for the diagnosis COVID-19 and isolation of the patients.

Conclusion

In conclusion, anosmia and ageusia seem to be part of important symptoms and clues for the diagnosis of COVID-19, particularly in the early stage of the disease. The acute anosmia or ageusia need to be recognized as important symptoms of the COVID-19 infection. Among patients with asymptomatic-to-mild disease severity, the presence of anosmia or ageusia may be an important differential presentation for the suspicion and diagnosis of COVID-19. And these symptoms may recover within 3 weeks.

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