

Smell and Taste Abnormalities due to COVID-19

Raid M. Al-Ani*

Department of Surgery/Otolaryngology, College of Medicine, University of Anbar, Ramadi, Anbar, Iraq
(Received : 7 May 2020; Accepted : 9 May 2020; First published online: 10 May 2020)

DOI: [10.33091/amj.2020.170924](https://doi.org/10.33091/amj.2020.170924)

© 2020, Al-Anbar Medical Journal



The COVID-19 infection is caused by SARS-CoV-2 and it is considered by the WHO as a pandemic disease since February 2020. It is still an evolving disease, with new symptoms being discovered as time progresses. A peculiar and interesting symptom that has been frequently investigated by researchers across the globe is anosmia (loss of smell) and ageusia (loss of taste), as some subjects complain of diminution in the sense of smell and taste. Moreover, these symptoms may be the only or first clinical findings of the disease. Therefore, it is of utmost importance to isolate at home the individuals with recent smell and taste abnormalities (STA) without any other features of COVID-19 to prevent the transmission of the infection to healthy people [1].

Viral infection can result in anosmia in a significant number of adults. Common cold viruses and more than 200 other viruses that cause upper respiratory infections are well-known agents causing loss of smell [2]. Post-viral infection is a leading cause of anosmia in around 40% of the adult population. As mentioned in the literature, coronaviruses can result in anosmia in 10-15% of patients. So, the new COVID-19 virus is not an exemption to other viruses in the causation of anosmia in infected cases [2]. Also, COVID-19 infection differs from other coronaviruses in that the chemosensory dysfunction is more prevalent, and not associated with other rhinitis features like nasal obstruction and rhinorrhea [3].

The strategy for preventing the spread of COVID-19 infection can be by detecting and isolating the infected cases. However, this is not an easy job, therefore in most countries, the priority is to test those people with the symptoms of the disease like fever, dry cough, fatigue, STA, etc. [4]. Moreover, there is a growing belief that STA may be present in individuals with asymptomatic COVID-19 infection.

According to the recent studies in various countries, the STA is a common clinical finding in confirmed cases of COVID-19 disease with a range of frequency from 19.4% to 88% of individuals [1, 3, 5, 6]. Wee et al. from Singapore have been using the self-reported STA as characteristic criteria for suspicious cases of COVID-19 disease [7]. While Mao et al. reported 11 (5.1%) with anosmia and 12 (5.6%) with ageusia in their studied samples of 214 cases with confirmed COVID-19 disease [8]. There is a 6-10 times positivity of the COVID-19 test in the patients with flu-like symptoms and loss of smell [3, 4]. There is a great difference in self-reported olfactory loss between outpatient (59-86%) [3-5] and inpatient positive COVID-19 cases (5-35%) [8-10]. Moein et al. [9] have used the University of Pennsylvania Smell Identification Test (UPSIT) for identification of smell dysfunction in 60 cases of inpatient COVID-19 and 60 normal individuals. They concluded that quantitative smell dysfunction is considered a major marker for COVID-19 and they suggest using this subjective test in the identification of COVID-19 disease for early treatment or quarantine. In a preliminary study by Bagheri et al. from Iran reported a significant number of recent onset anosmia since the COVID-19 pandemic crisis [11]. Only four cases of COVID-19 infection were reported in our province Anbar, Iraq, none of them complain of STA. However, the accurate incidence of STA is underestimated. This is due to two reasons, firstly, the current emergency condition doesn't allow the Otolaryngologists to register the real incidence of these disorders, secondly, these manifestations are not usually evaluated [1].

The exact mechanisms of STA are still obscure. There is no prior scientific research that studied the possible association between coronavirus and the appearance of taste dysfunction. Zhou et al. have been confirmed that COVID-19 uses the cellular angiotensin-converting enzyme 2 (ACE 2) receptor which is also used by SARS-CoV [12]. This enzyme is distributed in the oral cavity (mainly on the tongue). It is, therefore, possible that the virus affects the taste function

* Corresponding author: E-mail: med.raed.alani2003@uoanbar.edu.iq
Phone number: +9647711699289

similar to the ACE2 inhibitors [13]. Other possible reason for taste alteration in the presence of smell dysfunction is that both senses are intimately correlated [14]. The possible pathogenesis of the smell dysfunction as Brann et al. study results, they suggest that the COVID-19 virus affects the non-neuronal olfactory cells causing loss of smell and the associated taste alterations [15]. This is the most acceptable mechanism because most of the COVID-19 cases are of the mild type, outpatient subjects, and most of the STA resolve within weeks [3, 5]. However, a large number of a cohort study with long term follow-up is needed to evaluate the exact resolution rate of STA in confirmed cases of COVID-19 infection.

The association between the COVID-19 and STA may be affected by patient factors like the age (more in younger age) [10], gender (more in females) [10], geographical location (more in Europe than Asia) [2], and smoking habit (more in non-smoker) [9], and disease course (more in milder type than a moderate or severe course) [5].

Although the association between the COVID-19 infection and STA studies have many limitations like lack of objective measures of these dysfunctions and short term follow-up. These investigations are opening the door to the Rhinologists to further studies to determine the exact mechanism and management of these disturbances in particular and the clinical outcome of the COVID-19 disease in general.

REFERENCES

- [1] L. A. Vaira, G. Salzano, G. Deiana, and G. De Riu. Anosmia and ageusia: common findings in covid-19 patients. *Laryngoscope*, 2020.
- [2] C. Hopkins and N. Kumar. Loss of sense of smell as marker of covid-19 infection. *ENT UK* [[https://www.entuk.org/sites/default/files/files/Loss sense smell as marker COVID. pdf](https://www.entuk.org/sites/default/files/files/Loss%20sense%20smell%20as%20marker%20COVID.pdf)] Date accessed, 26(3):2020, 2020.
- [3] C. H. Yan, F. Faraji, D. P. Prajapati, C. E. Boone, and A. S. DeConde. Association of chemosensory dysfunction and covid19 in patients presenting with influenzalike symptoms. in *International Forum of Allergy & Rhinology*, 2020.
- [4] C. Menni *et al.* Loss of smell and taste in combination with other symptoms is a strong predictor of covid-19 infection. *medRxiv*, 2020.
- [5] J. R. Lechien *et al.* Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (covid-19): a multicenter european study. *Eur. Arch. Oto-Rhino-Laryngology*, pages 1–11, 2020.
- [6] G. Zehender *et al.* Genomic characterisation and phylogenetic analysis of sarscov2 in italy. *J. Med. Virol.*, 2020.
- [7] L. E. Wee *et al.* The role of self-reported olfactory and gustatory dysfunction as a screening criterion for suspected covid-19. *Eur. Arch. Oto-Rhino-Laryngology*, pages 1–2, 2020.
- [8] L. Mao *et al.* Neurologic manifestations of hospitalized patients with coronavirus disease 2019 in wuhan, china. *JAMA Neurol.*, 2020.
- [9] S. T. Moein, S. M. R. Hashemian, B. Mansourafshar, A. Khorram-Tousi, P. Tabarsi, and R. L. Doty. Smell dysfunction: a biomarker for covid19. *International Forum of Allergy and Rhinology*, 2020.
- [10] A. Giacomelli *et al.* Self-reported olfactory and taste disorders in patients with severe acute respiratory coronavirus 2 infection: A cross-sectional study. *Clin. Infect. Dis.*, 2020.
- [11] S. H. R. Bagheri *et al.* Coincidence of covid-19 epidemic and olfactory dysfunction outbreak. *medRxiv*, 2020.
- [12] P. Zhou *et al.* A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*, 579(7798):270–273, 2020.
- [13] J. Suliburska, G. Duda, and D. Pupek-Musialik. The influence of hypotensive drugs on the taste sensitivity in patients with primary hypertension. *Acta Pol Pharm*, 69(1):121–127, 2012.
- [14] D. M. Small and J. Prescott. Odor/taste integration and the perception of flavor. *Exp. brain Res*, 166(3-4):345–357, 2005.
- [15] D. Brann, T. Tsukahara, C. Weinreb, D. W. Logan, and S. R. Datta. Non-neural expression of sars-cov-2 entry genes in the olfactory epithelium suggests mechanisms underlying anosmia in covid-19 patients. *bioRxiv*, 2020.