

Letter to Editor

Sudden Olfactory and Gustatory Dysfunctions: Important Red Flags in COVID-19

INTRODUCTION

Coronavirus disease-19 (COVID-19) is an emerging, contagious viral disease presently declared a pandemic by World Health Organization. It was first reported in Wuhan, China in 2019.^[1] Coronaviruses are envelope-single-stranded RNA viruses that are zoonotic in nature and cause symptoms ranging from mild upper respiratory tract infections to more severe respiratory, enteric, hepatic, and neurological diseases. A study reported neurological symptoms in 36.4% of patients with COVID-19 mainly in severe cases.^[2] Clinical, social, and epidemiological studies on COVID-19 are on-going and at the preliminary stages in different parts of the world. The disease can readily be transmitted from man-to-man through droplets from infected individuals. The notable symptomatology of COVID-19 is similar to those of severe acute respiratory syndrome (SARS).^[1-3] A sudden loss of smell and taste has been noted to be the strongest predictor of early COVID-19 infection in mild-to-moderate cases.^[3,4]

Early diagnosis of symptomatic and asymptomatic cases is key to prompt intervention, breaking-chain-of-transmission, and flattening of the epidemiological curves of the disease. Widespread community testing in defining the epidemiology of the disease is a corollary to adequate intervention but this is unaffordable. To this end, precautionary measures are put in place to control, prevent, and curtail spread of coronavirus infection. In addition, early case definition is a powerful tool within the disposal of nations, most especially the developing countries toward containment and eradication of the disease. This is why detailed attention should be paid to early pointers of this disease such as sudden loss of smell and taste. Sudden loss of smell and taste has been identified as an important early symptom (red flag) of COVID-19 even in asymptomatic patients. Consequently, some professional medical bodies have called for its recognition as red flag or important marker of the disease. Incidentally, there is dearth of published reports on the pathophysiology of loss of smell and taste in COVID-19; hence, this search is aimed at reviewing existing documents and providing preliminary information on the mechanism of loss of smell and taste in COVID-19.

PATHOPHYSIOLOGY OF LOSS OF SMELL AND TASTE IN COVID-19

Loss of smell and taste is known to be related to a wide range of factors and about 40% of cases are

attributed to viral infections.^[5-7] In a mice model, SARS-CoV have demonstrated a transneuronal penetration through the olfactory bulb.^[8] Angiotensin-converting enzyme (ACE)-2 receptors, which are used by SARS-CoV-2 to bind and penetrate into the cell, is widely expressed on the epithelial cells of nasal, oral, and pharyngeal mucosa.^[9] Patients with severe hyposmia or anosmia usually complain of loss in taste. This is due to loss in contribution of smell to their perception of flavor. One could argue that hypogeusia in COVID-19 is due to hyposmia or anosmia rather than true pathologic hypogeusia. These pieces of evidence could as well explain the underlying pathogenetic mechanism of smell and taste loss in coronavirus infection.

The exact pathophysiology of the loss of smell in coronavirus infection is yet to be fully understood. However, the three major mechanisms by which viruses impede on smell functions have been suggested. Viral infection of nasal mucosa could trigger inflammation of nasal tissue including olfactory mucosa, thereby creating an obstructive barrier between odor chemicals and olfactory receptors. In addition, direct damage to olfactory receptors could prevent odor signals from being transmitted.^[10,11] Third, the virus, being neurotropic, could penetrate through cribriform plate to infect the olfactory bulb and follow the olfactory nerve's pathway to attack the region of the brain responsible for smell.^[12,13] Loss of smell may actually be a sequela of brain tissue edema and partial neuronal degeneration seen at autopsy in deceased COVID-19 patients.^[14] Any or all of these three mechanisms may be possible for loss of smell and by extension taste in the COVID-19 though subject to further investigation.

Preliminary reports have continually shown that sudden loss of smell and taste could be early symptomatology in mild-to-moderate cases of COVID-19.^[3,15] Giacomelli *et al.* in a cross-sectional study reported that 20.3% of cases of COVID-19 in Italy had earlier symptoms of anosmia and ageusia before hospital admissions while this figure rose to 33.9% during hospital admission.^[15] The App studies of 579 Covi-19 positive patients in the United Kingdom also corroborated early presenting symptoms of anosmia.^[3] Clinicians in America, Australia, and United Kingdom have recommended the addition of loss of smell and taste to the list of screening tools for possible COVID-19 infection.^[7,16,17] These results were much stronger in predicting a positive COVID-19 diagnosis than self-reported fever and

cough.^[3] In Germany, it was reported that about 2 in 3 confirmed cases of Coronavirus infections have anosmia. In South Korea, 30% of patients that tested positive for the infection have anosmia.^[18] ENT Society of United Kingdom has raised the red flag of patients with only anosmia as being hidden carriers or “vectors” that can potentially facilitate rapid spread of COVID-19 in the community.^[7] The American Academy of Otorhinolaryngology Head and Neck Surgery proposed self-isolation for fourteen (14) days for individuals with sudden anosmia, hyposmia, and dysgeusia in the absence of other respiratory disease.^[17]

In conclusion, there are enough pieces of evidence that COVID-19 patients can present with sudden anosmia and ageusia alone without other recognized symptoms of the infection. We recommend inclusion of the symptoms in the list of the screening tools for the disease in sub-Saharan region and indication for self-isolation which require further investigations. However, in order to ascertain the place of anosmia and ageusia as early indicator or marker of COVID-19, scientific studies with objective tests of olfaction and gustation are critical and essential. This should be done with caution and personal protective equipment worn to avoid being infected by the virus.

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