Utility of hyposmia and hypogeusia for the diagnosis of COVID-19

Early and accurate diagnosis of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection is key to the management of the coronavirus disease 2019 (COVID-19) pandemic. Following its emergence in China in December, 2019, SARS-CoV-2 has spread in the northern hemisphere during the winter season, when other respiratory viruses, including influenza, co-circulate. This epidemiological conjunction complicates clinical diagnosis of COVID-19 because patients often present with influenza-like illness (ILI). Consequently, the definite diagnosis of COVID-19 mostly relies on positive RT-PCR on respiratory samples, although discriminant features have been reported on thoracic CT scan.[1] However, access to these diagnostic tests is limited in the context of this large-scale pandemic. Distinctive clinical features would be welcome to better select patients who require investigations. During the early phase of the COVID-19 outbreak in France, we noticed that many patients reported loss of smell (hyposmia) and taste (hypogeusia). We aimed to investigate the diagnostic value of these symptoms.

Rennes, Angers, and Nantes are referral centres for emerging infectious diseases in western France (population catchment area includes 5 million inhabitants). The study was done from March 15–18, 2020, at which time there was no public awareness of the potential link between taste or smell disorders and COVID-19 (the first report[2] was on March 21). All patients who underwent tests for SARS-CoV-2 by RT-PCR on nasopharyngeal samples since Feb 16 were invited by e-mail or telephone to complete a web-based questionnaire comprised of four questions: Have you been diagnosed with COVID-19 following diagnostic screening? Did you notice a loss of smell during your disease? Did you notice a loss of taste? Do you regularly suffer from ear, nose, and throat (ENT) disorders? The study was approved by the Rennes University Hospital institutional review board. Informed consent was waiived.

Of the 452 patients contacted, 259 (57%) replied, of whom 68 (26%) reported a positive test for SARS-CoV-2. Hypogeusia was reported by 63 patients (24%), hyposmia by 51 patients (20%), both hypogeusia and hyposmia by 43 patients (17%), and ENT disorders by 82 patients (32%). Hypogeusia and hyposmia were strongly associated with COVID-19 diagnosis, separately and combined, in patients with and without a medical history of ENT disorders (appendix p 2). The best performance was obtained with the combination of hypogeusia and hyposmia in patients with no medical history of ENT disorders, with a sensitivity of 42% (95% CI 27–58) and a specificity of 95% (90–98; appendix p 2).

To our knowledge, this is the first report of discriminant clinical features that might be used for the diagnosis of COVID-19 in patients with ILI. Taste and smell disorders have been associated with herpes zoster and HIV.[3,4] The neuroinvasive potential of SARS-CoV-2 might have a role in the pathophysiology of hypogeusia and hyposmia.[5] As the olfactory mucosa is located in the upper region of the nasal cavity, a direct or indirect effect of SARS-CoV-2 in situ might be another explanation for these symptoms. The prevalence of taste and smell disorders in patients with COVID-19 was estimated to be 5% in a previous study;[6] however, the data were retrospectively collected from medical files, which might have led to underestimation of the real prevalence. Indeed, these symptoms might not be spontaneously reported if not searched for.

This study has limitations. First, data were retrospectively collected through a web-based questionnaire, and we collected no data on age, sex, or other symptoms. Second, data were collected anonymously, so we could not check the accuracy of the diagnosis reported by patients. Third, the sample size was small and the response rate suboptimal. Finally, as the diagnosis relied on detection of SARS-CoV-2 by RT-PCR on naso-pharyngeal samples, suboptimal sensitivity of this test (as low as 60% in some reports) might have led to misclassification and diagnostic bias.[7] However, this preliminary report of an association between hypogeusia or hyposmia and COVID-19 diagnosis in patients with ILI suggests that these symptoms might be a useful tool for initial diagnostic work-up in patients with suspected COVID-19. These symptoms, which are easy to collect, could be used for mass screening, by professionals with limited medical knowledge, and through telemedicine. Larger prospective studies are required to confirm these preliminary findings.

We declare no competing interests.

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See Online for appendix

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