Original Research Article

Prevalence and Recovery of Olfactory Dysfunction in COVID-19 Patients

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Abstract

Background: The altered sense of smell or taste has been noted among patients with COVID-19 and might be a useful early symptom of COVID-19 which can be used for screening purposes among the population. The study aimed to describe the prevalence and recovery of new-onset anosmia in patients with confirmed COVID-19 in the Indian rural population. **Materials and methods:** The prospective, cross-sectional study was conducted at a tertiary care rural teaching hospital, with 600 subjects of RT PCR confirmed COVID-19. Results were analysed for the study using standardized questionnaires to study the onset, characteristics, and recovery of olfactory dysfunction and associated taste disturbances.**Results:** 52 out of 350 COVID-19 patients who met the inclusion criteria had symptoms of anosmia. The prevalence of anosmia in COVID-19 patients was 8.6%. Among 52 subjects, 17 (32.6%) were female and the remaining 35 (67.4%) were male. The mean age of the study group was 48 years (range 19–72 years). Among these patients, 73% (38/52) of recovery from olfactory dysfunction started within the first week of diagnosis, compared with 19% (10/52) of whom recovery started between the 1st and 2nd weeks after onset. In 6% of patients, recovery started between 2 and 3 weeks after the onset, and the remaining cases started to recover after 3 weeks.**Conclusion:** We believe that this study will contribute to the increase in clinical suspicion of COVID-19 in patients with symptoms of sudden onset of anosmia, allowing for the early isolation of the suspected patients and consequently aiding in the effective control of the spread. Furthermore, the details of the disease course and recovery of anosmia can guide the clinical management of cases with COVID-19 related olfactory dysfunction. Furthermore, it will guide the treating physician in counseling the patient regarding the prognosis.

Keywords: RT PCR; COVID 19; Anosmia; Olfactory dysfunction.

Introduction

The SARS-CoV-2 COVID-19 pandemic has spread globally since December 2019. Ever since the first report was published, the clinicians are encountering a variety of symptoms and risk factors that can also be used for screening and risk stratification purposes[1]. The typical spectrum of clinical presentations of COVID-19 has been reported as ranging from asymptomatic infection to severe respiratory failure, with the main symptoms being fever, dry or productive cough, fatigue, myalgia, and dyspnoea[2].

The altered sense of smell or taste has been first anecdotally and then more robustly reported in COVID-19 patients across Europe and Asia[3-5]. The identification of a comprehensive set of symptoms associated with SARS-CoV-2 infection is of great clinical interest to identify infected patients for early isolation where access to testing is restricted or to facilitate early targeted testing where possible. For this purpose, it is of primary importance to define symptoms that patients can identify by themselves without needing to visit healthcare facilities.

Therefore, the purpose of this study is to systematically assess the prevalence of olfactory dysfunction or taste disturbances in patients with confirmed SARS-CoV-2 infection. Thus, during the pandemic, individuals with these symptoms should be tested for COVID-19 and even when testing facilities are not available. Isolation of such patients should be considered till the patient is subjected for the testing.

It should also be noted that olfactory dysfunction significantly influences the physical well-being, quality of life, safety, and nutritional status of those affected and becomes a greater problem when permanent[6]. Little is known about the duration and recovery of olfactory dysfunction in COVID-19 cases. Thus, this particular study will also focus on the recovery of anosmia in SARS COVID-19 cases.

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Materials and methods

This study was conducted at a tertiary care teaching hospital in rural Karnataka with ethical approval obtained from the institutional ethics committee of Adichunchanagiri Hospital and Research Center. The patients who have been diagnosed with COVID-19 using the RT-PCR test and admitted to our hospital were enrolled in this study.

The exclusion criteria included subjects younger than age 18 and pregnant women. In addition, the exclusion criteria included subjects with pending results and subjects who had to remain in an intensive care unit for a prolonged period. Discharged patients were called seven days (± 7 days) after the first symptoms and every week until recovery to monitor clinical outcome.

The questionnaires were used to assess the onset, characteristics, and recovery of anosmia and dysgeusia. The respondents were asked to participate personally in the hospital or over the phone. Data required for the study was collected from the medical files of patients: age, sex, comorbidities, features of anosmia (date of admission since symptom onset, duration of anosmia), other symptoms, physical signs, and outcome. Descriptive statistics were used for the analysis. The questionnaire was checked for validity and precision. The database was checked for duplicate replies, but all entries appeared unique and complete (Figure 1).

Results

In total, 600 subjects with RT-PCR confirmed COVID-19 cases were screened for the study. Out of 600 subjects, 350 patients met the inclusion criteria and were further screened. Only those patients with a history of anosmia were studied in detail for the characteristics of anosmia, which included 52 patients who were finally selected for the study.

Thus, 52 out of 350 positive patients had symptoms of anosmia, and the prevalence of anosmia in COVID-19 patients was 8.6% in our study. Among 52 subjects with anosmia, 17 (32.6%) were female and the remaining 35 (67.4%) were male subjects. The mean age of the study group was 48 years (range 19–72). In the majority of the subjects, the anosmia developed 2.8 days after the diagnosis of COVID-19 in some of the patients, i.e., about 35% of the patients, noticed anosmia as an initial symptom.

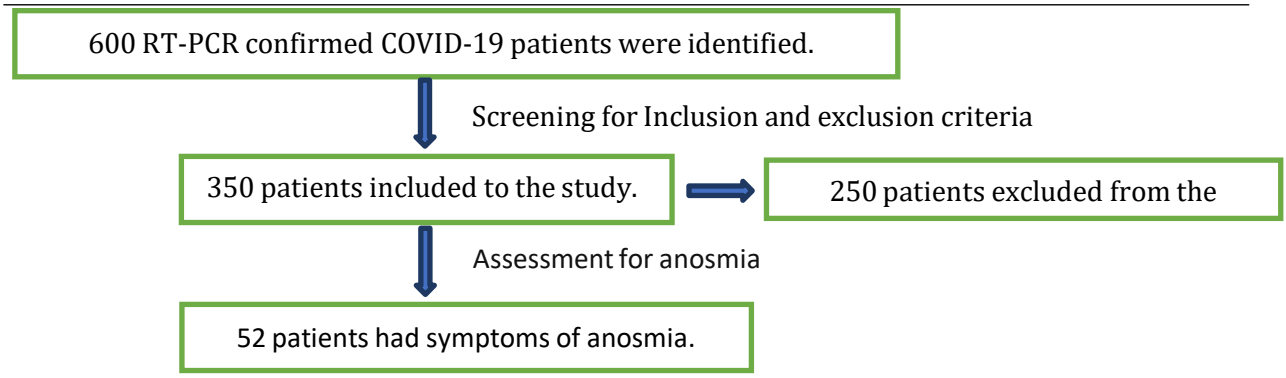

Fig.1: Synopsis of the anosmia caused by COVID-19

In 73% (38/52) of patients, the onset of recovery from anosmia started in the first week compared to 19% (10/52) of patients in whom recovery started between the 1st and 2nd week after onset. In 4% of the patients, recovery was noticed between 2 and 3 weeks, and in some cases, patients started to recover after 3 weeks. Among the 52 patients, the mean duration of anosmia was 8.6days. Duration was ≥ 7 days in 53% (28/52) and ≥ 14 days in 25% (13/52); one patient (1/52) had not recovered at the end of the follow-up period (after 28 days). There appears to be significant improvement in the first 2 weeks but then the recovery rate appears to plateau after that (Figure 2).

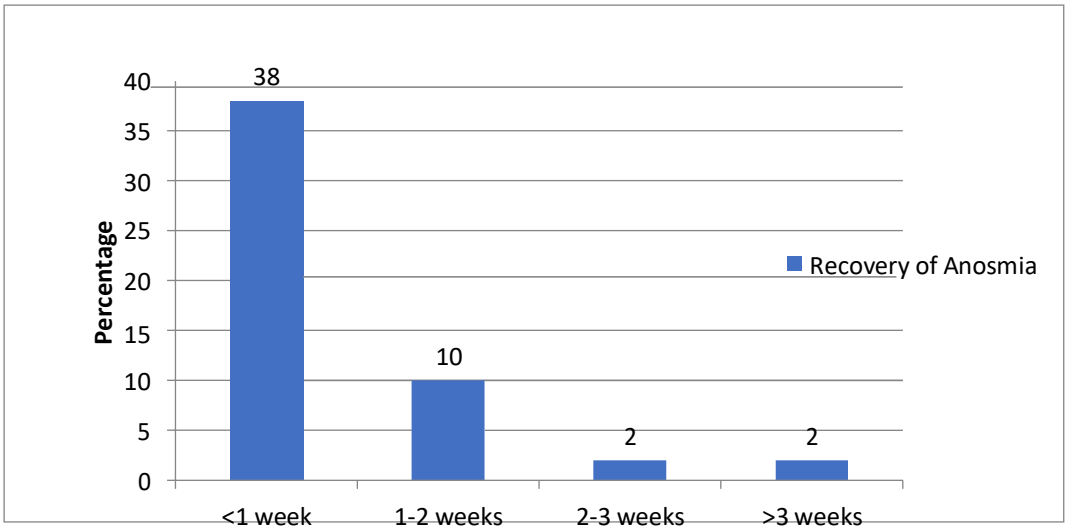

Fig. 2: Recovery of Anosmia

In our study, the majority of the patients (about 96% of them) also reported the symptom of altered taste sensation along with anosmia, but some of the study group patients still differentiated between common tastes, suggesting the predominant issue being reduction in sense of smell rather than hypogeusia, although true taste disturbances also should be considered.

Discussion

The incidence of anosmia in human respiratory viral diseases including corona virus is not uncommon[7]. First clues of an association between altered sense of smell or taste and the SARS-CoV-2 infection came from anecdotal reports describing an increase in reports of these symptoms occurring at the outset of the COVID-19, so much so that the British Association of Otorhinolaryngologists[8] and the American Academy of Otolaryngology-Head and Neck Surgery issued[9] warnings to consider the diagnosis of SARS-CoV-2 with isolated lost or altered sense of smell or taste.

Gane et al. reported the first case report of isolated sudden onset anosmia in a confirmed case of COVID-19 infection as well as a small case series[10]. The pathophysiological mechanism for the occurrence of smell disturbances in SARS-CoV-2 is still unclear. Angiotensin-converting enzyme 2 (ACE-2) was recently identified as the receptor for SARS-CoV-2 and ACE -2 receptors are present in abundance in nasal respiratory epithelium leading to likely target for viral infection and anosmia[11].

In the present study, 350 patients were evaluated for the presence of anosmia, and 52 patients reported the features of anosmia with a prevalence of 8.6% anosmia in COVID-19. The study conducted by Klopfenstein[12] reported the prevalence of anosmia in 47% of their patients. Further, Lechien et al. reported a much higher prevalence of anosmia in 86% (n = 357/417) of their patients. However, only limited data is available related to the prevalence of anosmia in Asian and, in particular, Indian populations. In one study conducted by Mishra et al[13] in an Indian population, the prevalence of anosmia was 14.8% (n = 11/74).

The incidence and prevalence of anosmia among Covid-19 patients in European studies is much higher. This difference in the incidence of anosmia between European and Asian populations should be discussed. Several assumptions have been made. The first possible mechanism is that there might be a theoretical possibility of a mutation of the SARS-CoV-2 viral genome providing stability to the virus, preventing its entry into the human cell[14]. The variation in incidence of anosmia in COVID-19 among different ethnic groups can also be explained by the difference in the degree of expression of

ACE-2 receptors and the affinity of SARS Cov-2 towards ACE-2 receptors among various ethnic groups[15].

Other reasons for the lower prevalence of anosmia in our study when compared to the majority of studies include a rural background and a low socioeconomic status. Since the rural population has given less importance to smell disturbances, some of the anosmia cases might go unreported.

In our study, about 63% of the subjects reported smell disturbances before the diagnosis, indicating that anosmia can be a presenting symptom with good positive predictive value for COVID-19. In the majority of the subjects, the anosmia developed 2.8 days after the diagnosis of COVID-19 in some of the patients, i.e. about 35% of the patients, noticed anosmia as an initial symptom. According to a study conducted by Klopfenstein et al., anosmia developed 4.4 (+/-1.9 days) after the onset of infection.

Furthermore, the loss of taste more likely reflects loss of flavour perception due to loss of retro-nasal olfaction rather than the loss of the sense of taste per se. There appears to be significant improvement in anosmia in the first 2 weeks, but then the recovery rate appears to plateau afterwards. There are limited studies that have been undertaken to study the recovery of anosmia in COVID-19. In one of the studies, the mean time for improvement of anosmia was 7.2 days[3]. In our study, the mean time for the onset of improvement of anosmia was 7.5 days. The recovery rates reported by *Lechien* and colleagues suggested a short-term recovery rate of 44% in 59 patients who had clinically recovered from COVID-19, which is lower than the 73% that was reported by Levinson and colleagues[16]. The lower recovery rate may be due to short-term follow-up and, at times, recovery may happen over a longer duration.

In our study, only one patient did not recover at the end of the study follow-up period (after a follow-up of 28 days); 80% of our patients recovered within 14 days, which is consistent with recently reported data from a large cohort of Korean patients[17]. The prognosis for olfactory dysfunction in COVID-19 is excellent, but while the majority of patients may experience recovery within 2 weeks, there is also a sizeable group of patients who require over a month for recovery. Thus, anosmia has an excellent recovery, and our results suggest that patience and conservative management may be key factors for the management of anosmia in COVID-19 patients.

The recovery from anosmia in COVID-19 patients is much faster than it takes to recover from anosmia caused by other subsets of viral infections that are known to directly damage olfactory sensory neurons. In addition, many viruses, including COVID-19, cause temporary loss of smell by triggering upper respiratory issues such as nasal mucosal congestion. However, some COVID-19 patients experience anosmia even without any nasal obstruction. Thus, the reason for the rapid recovery of anosmia is not well understood.

According to a study conducted by Harvard Medical School for COVID-19, viral load is a key factor in determining if COVID-19 patients are more susceptible to long term anosmia, so recovery time is related to how long the surrounding cells will take time to heal depending on the supply of stem cells within the olfactory lining.

We believe that the current study and other rapidly evolving evidence supports an urgent need to add anosmia to the list of symptoms used as screening tools for possible COVID-19 infection. The symptoms of anosmia should be included with other symptoms in community screening and selecting the patients for RT PCR testing to contain the spread of COVID-19 infection at the community level. It is untenable for public health organizations to disregard this symptom any longer. Use of loss of smell and taste as a marker for infection will be a very useful weapon in the COVID-19 fight, especially in countries where access to testing will be greatly limited.

Conflict of Interest: Nil Source of support: Nil

Conclusion

In conclusion, we believe that its presence should be included in the screening of patients for COVID-19 because of its strong positive predictive value and straightforward and convenient method of assessing anosmia. This enables for the isolation of the suspected patient, assisting in the control of the pandemic, particularly in rural areas where COVID-19 testing is limited.

While anosmia has a high possibility of recovery, those who have lost their sense of smell and taste can be reassured that they will recover in the majority of cases.

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