Main Article

Assessing Smell Alteration as Clinical Feature of COVID-19: A Descriptive Study in a Rural Based Tertiary Care COVID Hospital

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Aniruddha Majumder,[1] Ashis Kumar Ghosh,[1] Indranil Thakur,[2] Shoham Banerjee,[1] Debdulal Chakraborty[1]

ABSTRACT

Introduction

COVID-19 is an ongoing viral pandemic and a very contagious disease. Other than common symptoms like fever, cough and malaise; alteration in smell and taste perception may be the presenting symptoms in a significant number of patients infected with COVID-19.

Materials and Methods

Presence of smell alteration assessed among 150 mild to moderate COVID-19 positive patients admitted at our COVID hospital as well as 150 COVID-19 negative patients in May-June, 2021. Use and throw smell cards were used to detect smell alteration for all. Symptom onset and its resolution were noted. Smell alteration was also evaluated in different age group and gender.

Results

81 (54%) patients among 150 COVID positive cases had smell alteration compared to 9 (6%) patients among non-COVID arm (p value <0.0001). Overall smell alteration was more prevalent among male COVID patients. Hyposmia is more prevalent among younger age group compared to anosmia, which is more among older side. Olfactory dysfunction is seen to be developed at presentation or within 5 days from starting of infection with other symptoms. More than 90% patients regained smell perception within two months post infection.

Conclusion

54% COVID positive patients reported smell loss either at presentation or within 5 days of infection. Using smell cards for smell assessment and being cautious about smell alteration as early symptom helps us to diagnose COVID-19 early.

Keywords

COVID-19; Smell Alternation; Smell Test; Anosmia; Hyposmia.

The corona virus disease 2019 (COVID-19) is an ongoing viral pandemic that emerged from East Asia and quickly spread to the rest of the world.[1] The infection is caused by Severe Acute Respiratory Syndrome Corona virus-2 (SARS-Cov-2) and it's a beta corona virus. It was first reported in Wuhan, China on 31st December 2019 (WHO report) and spreads throughout the world creating pandemic and continues to take numerous lives. Human to human transmission is increasing at a troublesome exponential rate, which has led to steep curves of infection in many areas.[2] Most of the infected peoples develop mild to moderate symptoms, some of them being fever, malaise and non-productive cough.[2] Some people may present with changes in smell perception (anosmia) and taste sensation (dysgeusia). Alteration in smell and taste perception may be the presenting or associated symptoms in a significant number of patients infected with COVID-19. Our study

1 - Department of ENT, Diamond Harbour Govt. Medical College, West Bengal
2 - Department of General Medicine, Diamond Harbour Govt. Medical College, West Bengal

Corresponding author:
Dr Shoham Banerjee
email: i.ashisg@gmail.com

aims to evaluate how significantly the smell alteration is present among COVID-positive cases. Some other variables (age, gender) are also studied along with smell training as treatment of COVID-19 associated with smell alteration.

Materials & Methods

We have examined 150 consecutive COVID-19 patients at COVID ward of our hospital with mild to moderate COVID disease in May-June, 2021. We have also included 150 consecutive patients attending ENT OPD (all COVID-19 RT-PCR negative) during the same period. Patients with pre-existing nasal pathology, aged<18 years and >65 years and those having severe COVID disease are excluded from the study. Symptom profile of 150 COVID-19 positive patients was noted and all of them were examined for anterior and posterior nasal space with head light, nasal speculum, PNS mirror and tongue depressor.

As people are not so good in rating smell alteration, olfactory function of all patients were screened by 3 different types of use and throw smell-evaluation cards than self-reporting. It's a standardized screening test where cards containing three different fragrances (chocolate, banana and smoke) are pealed by each patient and they took smell. Patients with normal olfactory function can smell two or more cards accurately where inability to do so is counted as abnormality. Patients are anosmic if no smell is perceived and hyposmic if only one card-smell is identified. Use and throw cards are convenient in COVID situation.

All patients with smell alteration were encouraged for smell training. They were asked to sniff four different types of smell (eucalyptus, lemon, coffee and garlic) twice a day for at least 20second for each smell. They were asked to be attentive to find out the exact smell. All patients were asked to continue this technique till smell sensation returns.

Those patients were contacted biweekly after COVID-19 infection for two months to know the status of smell alteration (hyposmia and anosmia).

Results

Other than common symptoms of COVID-19, 81 patients (54%) had complained smell alteration.

Among them 21patients had scored zero (=0) using smell-card test and 60patients had scored one (=1) in

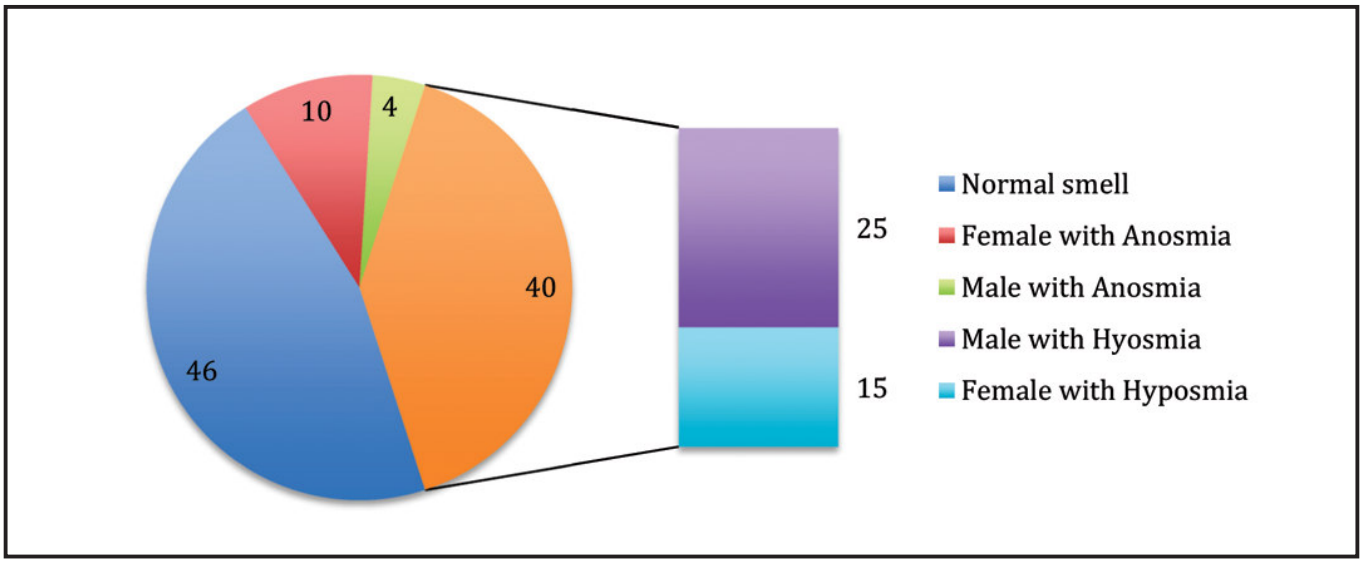

Fig. 1. Smell status and gender distribution among COVID positive patients

smell test. So, 26% had anosmia and 74% had hyposmia among 81 patients who had smell alteration.

Among the non-COVID patients none had scored zero and nine (=9) patients had scored one. 6% people among non-COVID patients had hyposmia.

Using two-tailed unpaired t test (Graph pad Prism), it was found that loss of smell is significantly present in COVID positive patients than COVID negative patients (p value <0.0001).

Among 150 COVID positive patients, 94 (~63%) were male and rest 56 (~37%) were female patients. Among non-COVID patients 80 (53%) were male and 70 (47%) were female. So, male patients were predominant than the female patients among COVID-19 positive as well as negative patients.

Among the 60 COVID positive patients with some smell alteration (hyposmia), 38 were male where as 22 were female patients. Among 21 COVID positive patients with complete smell loss (anosmia), 6 were male and other 15 were female (Fig. 1).

After putting 150 COVID positive patients in 6 age groups; 17 were in 18-25 years age group, 30 were in 26-33 age group, 36 were in 34-41 age group, 31 were in 42-49 age group, 20 were in 50-57 age group, 16 were in 58-65 age group.

Among 81 patients with smell alteration, 8 (5=hyposmic, 3=anosmic) were in 18-25 age group, 12 (7=hyposmic, 5=anosmic) were in 26-33 age group, 21 (12=hyposmic, 9=anosmic) were in 34-41 age group, 17 (15=hyposmic, 2=anosmic) were in 42-49 age group, 13 (12=hyposmic, 1=anosmic) were in 50-57 age group, 10 (9=hyposmic, 1=anosmic) were in 58-65 age group (Fig. 2). So it is evident that hyposmia is more in younger side where as anosmia is more prevalent in older age groups.

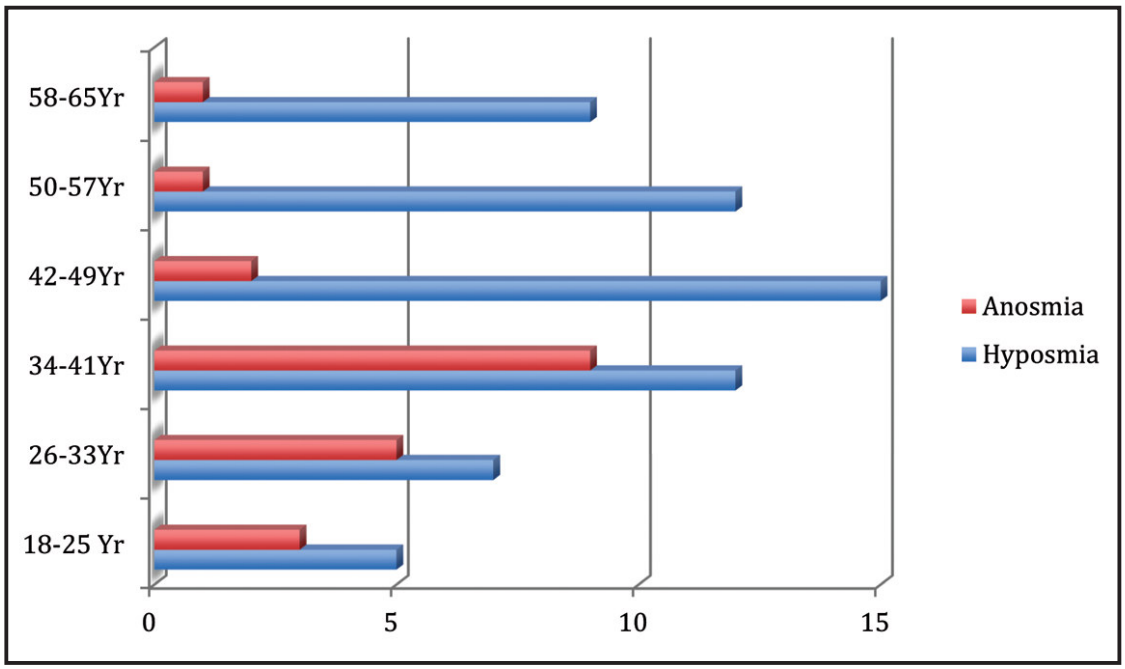

Fig. 2. Anosmia and hyposmia among different age groups

Among 81 patients with smell alteration, 14(17%) had complained smell alteration as first symptom whereas 67 (83%) other patients had developed smell alteration within 5 days of onset of other symptoms. Most of them (74 patients = ~91%) had regained their loss of smell sensation between 2nd and 3rd week post-infection. Rest 7 (9%) patients had reported persistent hyposmia even after 2months of post infection. None were anosmic.

Discussion

Our study says loss of smell is present among COVID positive cases in a significant way. In a Meta analysis of 27,492 Patients for Prevalence of Olfactory Dysfunction in Coronavirus Disease 2019 by Saniasiaya et al, olfactory dysfunction was seen in 31.39% of Asian patients where 35.39% had anosmia and 36.15% had hyposmia.[3]

In another Meta-analysis by Benezit et al, 3739 participants were included from 15 studies where the rate of smell disorder reported was 61% among COVID positive cases.[4]

In a study by Mercante et al, 41.7% patients presented with smell alteration among 204 patients. Symptom like nasal obstruction that might cause smell distortion was not there.[5]

In a study on 'loss of smell and taste in combination with other symptoms is a strong predictor of COVID-19 infection', 59% had loss of smell and taste sensation among 579 COVID positive cases in comparison to 18% among 1123 COVID negative cases.[6]

In another study done in Tamilnadu, India; 41.3% patient had olfactory limitation on objective smell test among 230 COVID positive patients. 70.5% of them had hyposmia and rest had anosmia.[7]

Our study also had higher incidence of smell dysfunction including anosmia and hyposmia like above studies. Some studies had also shown lower prevalence.[8] The difference in the results may be due to different geographic and temporal characteristics. COVID patients from Europe and America based countries had higher incidence of olfactory dysfunction. Chinese population with COVID -19 infection, on the contrary, reported lesser incidence of olfactory dysfunction.[9,10]

Frequency of anosmia in COVID-19 positive patients is very significant. The possible mechanism is still not clear though several speculations are suggested. First of all, SARS-CoV2 virus shares similar structure like other neuro-invasive corona viruses. It affects mainly olfactory and trigeminal nerves. There was a report of acute demyelinating encephalomyelitis developed after COVID-19 infection. The olfactory nerve is directly exposed to the environment, resulting damage from infections, chemicals, toxic substances or inflammatory agents.[11]

Viral infection causes inflammatory changes in nasal mucosa producing allergic rhinitis like symptoms. Reduced inspiratory airflow due to nasal blockage may present as olfactory dysfunction. Decline of olfactory neurons as well as effect of excessive pro-inflammatory cytokines from ACE2 expressing cells by SARS CoV2 virus may cause olfactory sensorineural loss.[12]

It's seen in our study that male COVID-19 RTPCR positive patients complained of smell alteration more where as complete smell loss were more common in female COVID positive patients.

Our study goes in accordance with study of Shah et al[8] who found males are more affected by olfactory dysfunction than females though the prevalence of olfactory dysfunction is only 18.47% (11.6%=anosmia and 6.87%=hyposmia).

Meng et al reviewed multiple cross-sectional studies and found olfactory dysfunction was more among female COVID positive patients.[13]

Olfactory dysfunction with female predominance was also noted by Amer et al.[14] as well as Lee et al.[15]

It's evident in our study that hyposmia is more frequent among younger age group whereas anosmia is more present among older patients.

Lee et al found prevalence of loss of smell and taste more among female and younger individual.[15]

The average duration of onset of smell alteration along with other symptoms and the pattern of its persistence seen in our study goes in accordance with below studies:

Klopfenstein et al found that anosmia began in 4.4 days from starting of infection. Almost 98% of anosmia resolved in 4 weeks' time, whereas the average duration of anosmia was 8.9 days.[9]

According to Lee et al, median resolution time for anosmia is 7 days, whereas most patients recovered within 3 weeks of infection. Young patients have more tendencies for delayed recovery.[15]

Santos et al evaluated many studies and found that onset of anosmia is 3-4 days and the symptom usually lasts for 1-2weeks.[16]

Conclusion

Smell alteration is a frequent symptom of SARS-Cov-2 infection. Smell loss was reported by 54% of the COVID patients, either at onset or within 5 days of diagnosis. Olfactory dysfunction was more prevalent among male COVID patients. Hyposmia is more prevalent among younger age group compared to anosmia, which is more among older side. More than 90% patients regained smell perception within two months post infection. As an otolaryngologist we should be aware of the symptom of smell alteration in our day-to-day practice so as not to delay the diagnosis of COVID-19. Smell cards may be used as a tool for early diagnosis of COVID-19.

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