Covid 19 Associated Smell Disturbances

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Abstract

Background: Smell disturbances are associated with wide range of viral infections. Viral upper respiratory tract infections may cause acute Smell loss due to viral damage to the olfactory epithelium or central nervous system involvement is a possible causes of smell disturbances but, the exact pathogenesis unknown.
Aim of the study: assess the Covid 19 associated smell disturbances.
Method: This is a prospective study consisted of 200 patients with a confirmed COVID-19 infection, who treated in Al-Diwanyah pandemic hospital in Al-Diwanyah city, Iraq, between July 2020 and May 2021.They were 115 males and 85 females. The age range from 20-80 years. The inclusion criteria were symptomatic patients with positive polymerase chain reaction (PCR) test for COVID-19 infection. Exclusion criteria were any physical, neurological or mental diseases preventing cooperation of the patients, use of central nervous system suppressing drugs.
Results: We found that 36 % of patients developed smell disturbances. Most of those affected patients are above 60 years old and majority are females (58.3%). 33.3 % of patients present with isolated smell disturbances without any other features. The time for recovery of smell disturbances ranged from 7- 21 days, and the median time for recovery was 7 days. 8.3 % of patients develop persistent smell problems.
Conclusion: Smell abnormalities are common symptoms in COVID-19 patients. It may be the only manifestation of COVID-19.

Key Words: Smell Disturbances, Cause Infection, Angiotensin-converting Enzyme.
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Introduction

The coronavirus 2019 is pulmonary infection caused by the novel coronavirus 2 (SARS-CoV-2) (WJ et al., 2020; JHUM, 2020; Zhang et al., 2020; Zaki et al., 2012). COVID-19 was started in Wuhan, China at the end of 2019 (Xia et al., 2020). It spread across the world and became a pandemic disease as on March, 2020 as declared by World Health Organization (Cucinotta et al., 2020). Smell disturbances are associated with wide range of viral infections. Viral upper respiratory tract infections may cause acute anosmia due to viral damage to the olfactory epithelium (Riel et al., 2015; Hummel et al., 2011), while central nervous system involvement is a possible causes of Smell disturbances but the exact pathogenesis still unknown (Yamagishi et al., 1994, Hummel et al., 2017). Two genes are important for COVID-19 to enter the body, angiotensin-converting enzyme 2 (ACE2) and transmembrane serine protease 2 (Brann et al., 2020). Fever, cough and fatigue are the most common features of the disease (Huang et al., 2020; XW et al., 2020; Liu et al., 2020). Dysnea, loss of appetite and myalgia are reported in about 20%. Headache, nasal secretions, and diarrhea are less frequent (Huang et al., 2020). Throat discomfort, cervical lymphadenopathy are also reported. Many studies reported that significant number of patients had smell disturbances and the disease can present with only anosmia without any other symptoms. Those considered a carriers of the virus and can cause infection (Hopkins et al., 2020).

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Aim of the Study

Is to assess the Covid 19 associated smell disturbances.

Methods

This is a prospective study consisted of 200 patients with a confirmed COVID-19 infection, who were treated and followed in Al-Diwanyah pandemic hospital in Al-Diwanyah city, Iraq, between July 2020 and May 2021. They were 115 males and 85 females. The age range from 20-80 years. The inclusion criteria were symptomatic patients with positive polymerase chain reaction (PCR) test for COVID-19 infection. Exclusion criteria were any physical, neurological or mental diseases preventing cooperation of the patients, use of central nervous system suppressing drugs. All patients met the eligibility criteria and agreed to participate gave a signed informed consent.

Results

This study consisted of 200 patients with COVID-19 infection. They were 115 males and 85 females. The age range from 20-80 years. Table (1) show the age and sex distribution of patients.

Table 1. Show the age distribution of the study population

Age	Male	Female	Total
20-30	6	4	10
31-40	8	16	24
41-50	12	7	19
51-60	13	8	21
61-70	32	19	51
71-80	44	31	75
Total	115	85	200

We found that 72 patients (36 %) developed smell disturbances in form of hyposmia, anosmia and parosmia. Most of those affected patients are above 60 years old and majority are females 42 patients (58.3%) compared to males 30 patients (41.7 %). Table (2) show the age and sex distribution of patients with smell disturbances.

Table 2. Show the age and sex distribution of patients with smell disturbances

Age	Male	Female	Total
20-30	1	3	4
31-40	2	5	7
41-50	1	4	5
51-60	2	3	5
61-70	14	11	25
71-80	10	16	26
Total	30	42	72

24 patients (33.3 %) present only with smell disturbances without any other features. The maximum time for recovery of smell disturbances was 21 day, and the median time for recovery was 7 days. 6 patients (8.3 %) develop persistent smell problems in form of anosmia or parosmia while the remainders had complete recovery.

Discussion

COVID 19 clinical picture range from no symptoms to multiple organs failure (Cascella M et al., 2020). Viral infection is the most common cause of permanent smell loss. Smell abnormalities in upper respiratory tract infection caused by many factors. (Butowt et al., 2020). COVID-19 enters the body by a cell surface receptor called angiotensin converting enzyme type 2 (ACE2), that present in cells of airway epithelium, lung tissue, vessels endothelial cells, renal cells, and intestinal cells (Li et al., 2020). Angiotensin converting enzyme 2 receptor binds to the S1 spike glycoprotein in the viral coat. Virus then enter the cell by process of endocytosis. The virus need another protein called protease serine 2 (TMPRSS2) that divide the S1 spike glycoprotein, allowing viral envelope fusion to the endosomal region of

Human cell (Hoffmann et al., 2020). Older Studies conclude that corona virus is neuro invasive and neurotropic, that can enter the central nervous system and infect neural and glial cells and induce an stimulation of immune system (Desforges et al., 2014). The exact mechanism of smell abnormalities in COVID-19 was unknown, theories are, First, direct damage of the virus to the olfactory receptors (Vaira et al., 2020). Second, COVID-19 causes inflammation and damage to sustentacular cells the olfactory epithelium. The epithelium contains sustentacular cells that provide nutrition, and homeostasis of sensory neurons leading to smell abnormalities (Brann et al., 2020). Third, mechanical obstruction that prevent odor transmission to the olfactory epithelium caused by mucosal edema and inflammation (Akerlund et al., 1995). In our study we found that 36 %of patients developed smell disturbances. Different results described by many authors. Menni et al. found that smell disturbances found in 59% of PCR positive patients compared to 18% of patients with negative PCR test (Menni et al., 2020). Varia et al. reported that 14.4% present with smell abnormalities (Vaira et al., 2020). Lechien et al. found that 85.6% of COVID-19 patients present with smell abnormalities. Kaye et al. reported smell

abnormalities in 73% of patients, and the anosmia was the early symptom in 26.6% (Kaye et al., 2020). Mao et al. reported that loss of smell in 5.1% of COVID-19 patients (Mao et al., 2020). Müge Özçelik Korkmaz et al. describe hyposmia/anosmia in 37.9% of patients (Korkmaz et al., 2020). Giacomelli et al found that 34% of patients had loss of smell (Giacomelli et al., 2020). In our study we found that most of those affected patients are above 60 years old but, this disagreed with the results of Yonghyun Lee, who found that smell abnormalities are more common in younger individuals (Lee et al., 2020). Also we found that smell abnormalities are more common in females (58.3%), this agree with results of Yonghyun Lee and Danny Kit Chung Wong (31,32). Also we found that the duration of recovery ranged from 7 to 21 days and median time for recovery was 7 days. This agree with results of Yonghyun Lee (2020) but, disagree with results of Danny Kit Chung Wong in who reported the period of recovery was 7 to 14 days (Wong et al.,2020; Tahmasebi et al., 2021; Shabgah et al., 2021).

Conclusion

Smell abnormalities are common symptoms in COVID-19 patients. It may be the only manifestation of COVID-19. Time for recovery of smell disturbances ranged from 1 to 3 weeks. It is more common in females and older age group.

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