

ORIGINAL ARTICLE

ENT Manifestation of Covid-19: An Experience at a Tertiary Care Medical Teaching Institute of Khyber Pakhtunkhwa

KHURSHID ANWAR*, ADNAN YAR MUHAMMAD*, FAZALREHMAN**

*Associate Professor of ENT, Head & Neck Surgery Department, KGMC/MTI HMC, Peshawar.

**Assistant Professor of ENT, Head & Neck Surgery Department, KGMC/MTI HMC, Peshawar.

Correspondence to Dr. Adnan Yar Muhammad, Email: adnanhmc@gmail.com, Cell: 0333-9114909**ABSTRACT****Aim:** To determine the frequency of ear, nose and throat related disorders of covid disease in PCR proven positive Covid-19 patients.**Methods:** This prospective study included 320 Covid-19 positive patients and was conducted at ENT Department of MTI Hayatabad Medical Complex, Peshawar from May 1, 2021 to April 30, 2022. The acute phase of covid-19 was taken as the time interval between the onsets of symptoms as day 1 today 30th post infection. Questions were asked about the following symptoms; flu, sore throat, sinus involvement, taste disturbances, smell disturbances, hoarseness and hearing loss. Clinical examination and relevant investigations were carried out to make a diagnosis. The data was documented on a proforma & analyzed using SPSS 26.0 for windows to determine the frequencies of signs & symptoms related to ENT.**Results:** A total of 320 patients were included in the study. The ages ranged from 18-50 years with mean age of 33.96 years. The age group 18-25 years mostly presented with symptoms related to ENT. Upper respiratory tract infection was the commonest symptom (60.6%) followed by sore throat (57.5%). Smell and taste disturbances accounted for in 46.3% & 15.3 % of the patients respectively. Fungal rhinosinusitis was observed in 6.9% of the patients. As there is a wide variation of the ENT symptoms in covid disease, it is important to know the predictive symptoms so that appropriate measures can be adopted. Identification & isolation of patients will prevent spread of disease and focused therapy and investigations.

Practical implication

Conclusion: The portal of entry for the SARS-CoV-2 is through the upper airway. It is important to know the symptoms related to ENT to make an early diagnosis and therefore, institute measures for management and prevention of further spread of the disease.**Keywords:** Covid-19, Anosmia, Dysosmia, Dysgeusia, Mucormycosis, Sore Throat**INTRODUCTION**

Corona virus disease is an infectious disease caused by SARS CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2). It was first identified in Wuhan, China in December 2019 wherefrom it spread rapidly to other cities of China & rest of the world. The WHO declared it a 'Public health Emergency of international Concern' on January 30, 2020 and advised all countries to reduce exportations and take measures for the disease's containment including active surveillance, early detection and case management. In keeping with its rapid spread and associated morbidity and mortality, the WHO declared it a 'Pandemic' on March 11, 2020¹. According to the WHO Coronavirus dashboard, as of July 21, 2022, there have been 564,126,546 confirmed cases of covid 19 with 6,371,354 deaths reported to WHO.

The principal methods by which people are infected with SARS CoV-2 is through exposure to respiratory fluids. Exposure occurs in 3 principal ways; 1. Inhalation of very small respiratory droplets and aerosole particles that contain the virus. 2. Deposition of respiratory droplets and particles on exposed mucous membranes in the mouth, nose or eyes. 3. Touching mucous membranes with hands soiled secretions containing the virus. People release respiratory fluids during exhalation in the form of droplets of varying sizes. These droplets carry virus and transmit infection^{2,3}.

SARS CoV-2 relies on its receptor, angiotensin converting enzyme inhibitor (ACE2) to enter cell using its spike (S) protein for attachment^{4,5}.

The ACE2 receptors are found abundantly in the ciliated epithelium of respiratory tract, apical lungs, bronchi, intestines, kidneys and cardiac muscles. These receptors are also found in the sustentacular cells of olfactory neuroepithelium and tongue. However they have not been found in taste receptors^{6,7,8}.

There is high incidence of smell and taste disturbances in the acute phase of Covid-19. The first reports estimated the chemosensory dysfunction at 60%. However worldwide the

prevalence of olfactory deficit was estimated at 44.1%, the prevalence of taste deficit was 43.3% and the prevalence for any chemosensory deficit was 49%. Several researchers have noticed differences in prevalence of chemosensory deficit in East Asia and Western countries⁸.

A review of cases from 18 countries, Martin Hoenigl and colleagues found that the frequency of Covid-19 associated mucormycosis has been increasing since early 2021 particularly in uncontrolled diabetics and those with hyperglycemia and receiving systemic corticosteroid therapy. The rhino-orbito-cerebral mucormycosis is the most frequent form with 49% mortality. Those who survive are left with severe life changing morbidities such as loss of vision⁹.

As there are wide variations in prevalence of the ear, nose and throat manifestations of Covid-19, it is important to know the predictive symptoms.

The aim of this study is to determine the frequency of these features in our local setting and to highlight the serious ENT related problems that are associated with SARS CoV-2 infection.

METHODS**Place and duration of study:** ENT Department Medical Teaching Institution, Hayatabad Medical Complex, Peshawar from May 1, 2021 to April 30, 2022**Study Design, Sampling Size and Technique:** This is a prospective and descriptive study. The study includes 320 PCR proven positive patients of Covid-19 with complaints related to the speciality of ENT. The sampling technique was "convenient sampling technique"**Inclusion Criteria**

1. Patients belonging to both genders and aging 20-50 years.
2. Patients with PCR proven positive evidence of covid-19 infection.
3. Patients diagnosed in other centers with PCR proven positive covid-19 evidence and presenting with symptoms related to ENT.

Exclusion Criteria

1. Patients with obstructive nasal diseases.

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2. Patients with pre-existing ENT symptoms due to any cause even if PCR+.
3. Patients with psychological disturbances.
4. Critically ill patients who required ventilator support.

Ethical approval was sought from the institutional ethical review board. Patients were included in the study after taking informed consent. All the covid-19 positive patients with symptoms related to Ear Nose & Throat reporting to ENT ward, OPD and institutional based private practice were included in the study. Detailed history was obtained. Enquiries were made regarding the onset and nature of symptoms and a thorough clinical examination including endoscopies was carried out. Baseline investigations were carried out in all patients to help arrive at a diagnosis and determine the patients' fitness for any subsequent surgical procedure that may be required. The endoscopic examination included direct laryngoscopy & nasendoscopy. X-ray paranasal sinuses occipitontal view was carried out in patients suspected of having sinusitis. Radiological evidence haziness, opacification and fluid level in any of the paranasal sinuses was taken as proof of sinusitis. Pure tone audiogram and impedance audiometry were performed to assess hearing loss in the indicated patients. Prior CT scanning of the nose and paranasal sinuses was carried out in the high risk diabetics & immunocompromised patients and those presenting with swelling cheek, nasal mass or proptosis. Any mass or discolored mucosa was excised or debrided and the specimen submitted for histopathology and fungal studies. A proforma was used to document various clinical features related to the ENT during the acute phase of covid-19 infection. The acute phase of covid-19 was taken as the time interval between the onsets of symptoms as day 1 to 30 days post infection. Specific questions were asked about the following symptoms; sore throat, taste disturbances, URTI, fungal rhinosinusitis, smell disturbances, swelling cheek, proptosis and hearing loss. The term 'smell & taste disturbances' shall encompass the whole range of smell and taste abnormalities and the patients' statement regarding the presence or otherwise of these symptoms was considered adequate. The patients were labeled to have fungal rhinosinusitis when the histopathology and fungal studies confirmed the presence of "invasive" fungal infection. The laterality or bilaterality of the symptoms and the type of fungal infection was ignored for the purpose analysis.

Statistical analysis: The information obtained was recorded on a proforma. Descriptive statistics for variables like gender, age, various ENT manifestations of Covid-19 were analyzed to determine the frequencies. Cross tables were used to find out the observed relationships of gender and ages of the patient with ENT manifestations of Covid-19. Chi-square test was performed and p-value determined to determine the significance of the observed ENT manifestations of Covid-19 to specific gender. The data was analyzed using SPSS for windows.

RESULTS

A total of 320 patients were included in the study with a male: female ratio of 1.32:1. The age range of the patient was 18-50 with mean age of 33.96 years and a standard deviation of ±11.5. The age group 18-25 years mostly presented with symptoms related to ENT. Details of the genders & age groups are given in Table 1.

Table 1. Age groups gender of patients crosstabulation

Count		Gender of Patients		Total
		male	female	
Age Groups	18-25	61	41	102
	26-30	18	15	33
	31-35	25	21	46
	36-40	18	8	26
	41-45	20	15	35
	46-50	40	38	78
Total		182	138	320

Upper respiratory tract infection (URTI) was the commonest symptom (60.6%) followed by sore throat (57.5%) (Table 2). Smell and taste disturbances were the observed in 46.3% & 15.3% of the patients respectively (Table 3). Both the smell and taste disturbances were common in the younger (18-25 yrs) and older (46-50 yrs) age groups. The age groups wise details of smell and taste disturbance are given respectively in Table 4 & 5. Invasive fungal rhinosinusitis was common in 46-50 years age group. The age group wise distribution of fungal rhinosinusitis (Table 6).

Table 2: The frequencies of sore throat, flu & sinusitis.

		Count	Column
Sore Throat	positive	184	57.5%
	negative	136	42.5%
URTI	positive	194	60.6%
	negative	126	39.4%
Paranasal sinusitis	positive	47	14.7%
	negative	273	85.3%
Fungal Rh-sinusitis	positive	22	6.9%
	negative	298	93.1%

Table 3: The frequency of neurosensory, voice & hearing disturbances

		Count	Column
Smell disturbances	positive	148	46.3%
	negative	172	53.8%
Taste Disturbances	positive	49	15.3%
	negative	271	84.7%
Hoarseness	positive	42	13.1%
	negative	278	86.9%
Hearing Loss	positive	25	7.8%
	negative	295	92.2%

Table 4. Age Groups * Smell Disturbances Crosstabulation

Count		Smell disturbances		Total
		positive	negative	
Age Groups	18-25	50	52	102
	26-30	16	17	33
	31-35	16	30	46
	36-40	8	18	26
	41-45	13	22	35
	46-50	45	33	78
Total		148	172	320

Table 5. Age groups * taste disturbances crosstabulation

Count		Taste Disturbances		Total
		positive	negative	
Age Groups	18-25	15	87	102
	26-30	5	28	33
	31-35	9	37	46
	36-40	3	23	26
	41-45	7	28	35
	46-50	10	68	78
Total		49	271	320

Table 6. Age Groups * Fungal Rh-sinusitis Crosstabulation

Count		Fungal Rh-sinusitis		Total
		positive	negative	
Age Groups	18-25	0	102	102
	26-30	0	33	33
	31-35	0	46	46
	36-40	3	23	26
	41-45	6	29	35
	46-50	13	65	78
Total		22	298	320

DISCUSSION

After identification of Covid-19 disease in Wuhan, China, the number of affected patients rapidly rose to alarming proportions both in China and the outside world. The morbidity and mortality associated with Covid-19 disease was frightening and urged the

WHO to declare it a pandemic. Simultaneously efforts were started to try to find out an affective antiviral therapy and a vaccine to treat the patients and prevent further spread of the disease.

The disease has diverse symptomatology ranging from asymptomatic to severe disease & multiple organs failure. Initially, in the Chinese admitted patients the features included fever, sore throat, fatigue, headache, cough, shortness of breath, tightness in the chest, myalgia, diarrhea, vomiting, anorexia, dizziness, palpitations, and, chest pain^{10,11}.

Chemosensory dysfunctions are common complaints in patients with SARS-Cov-2 infection. In conjunction with hypogeusia, smell deficits were the among the earliest ENT symptoms. The characteristics of olfactory dysfunction attributed to covid-19 include sudden onset, transient duration and in most cases a rapid resolution. Olfactory dysfunction was identified in a substantial proportion of covid-19 patients with a worldwide prevalence of 47.85%. Moreover smell disturbance may be present as the only symptom without the occurrence of nasal congestion and rhinorrhoea^{8,12}.

Qiu C et al reported that smell and taste disturbances were the first and the only symptoms in 10% of the patients, 19% had smell and taste disturbance before other symptoms of covid-19 and 25% of children had only smell and taste disturbance at presentation¹³.

A review conducted by El-Anwar and colleagues in Egypt involving 1773 PCR positive covid-19 patients, the most common ENT manifestations were sore throat (11.3%), headache (10.7%), nasal congestion (4.1%) and pharyngeal erythema (5.3%)¹⁴. Recently, an increase in the number of cases with mucormycosis of the sinuses has been observed. Multiple factors including diabetes mellitus, existing respiratory pathology, immunosuppressive therapy, nosocomial infection, and immune alterations by COVID-19 infection, are thought to be associated with its pathogenesis¹⁵.

Clinically invasive fungal sinusitis can mimic as complicated acute bacterial sinusitis. It can present either as limited sino-nasal disease with only sinonasal tissue invasion, sinonasal palatal disease, rhino-orbital disease, rhino-orbital-cerebral disease or acute fulminant disease with a rapid progression¹⁶.

In a retrospective study in India by Bhageel SS and colleagues found a total of 124 patients diagnosed with invasive fungal sinusitis. Of the total 20 patients were COVID-19 positive at the time of presentation while the remaining had recovered from an earlier proven infection. During management of COVID-19, 72.6% patients received corticosteroids. Mucor was the predominant type of fungus in 92.1% followed by aspergillus in 16.9%¹⁷.

All of the major respiratory viruses have been associated with causation of acute laryngitis. Among adults admitted for respiratory disorders due to rhinovirus and corona virus, dysphonia was present in 25% of the patients¹⁸. Its presence in covid-19 disease is multifactorial and depends upon the severity of the disease. It may develop as a result of the extension of inflammatory process to the larynx and vocal folds. Those who require endotracheal intubation and ICU care are more prone to develop this symptom. In a multicenter study involving 702 European patients with covid-19, Jerome R et al found prevalence of dysphonia in 26.8% of the patients. They concluded that dysphonia should be considered in the symptoms list of covid-19¹⁹.

Viral infection has been known to be associated with sudden sensorineural hearing loss. The exact pathology is yet to be ascertained²⁰. Many reports have linked SARS-CoV-2 infections to causation of peripheral neuropathy, therefore, the impairment of transmission in the auditory pathway is a likely possibility. There is some evidence of association of SARS-CoV-2 and Guillain-Barre syndrome in the recent studies²¹. The conductive element is thought to be due to ascending infection from nasopharynx to the middle ear cleft.

Saniyasiya J conducted a literature search articles published in PUBMED on July7, 2020 and found 3 cross sectional studies and 4 case reports. A total of 35 cases were found & all these

patients with covid-19 disease had hearing loss as primary complaint. Only one patient had severe sensorineural hearing loss and 1 had acute suppurative otitis media. He concluded that it was important to investigate hearing loss in patients with covid-19 disease and especially those who have recovered from it as permanent hearing loss was a likely possibility²². In our study we did not find a single case of sudden sensorineural hearing loss. All the cases reported had conductive hearing loss and most probably occurred due to ascending infection from the nasopharynx.

Limitations and advantages of the study: Besides the sample size being small and the rarity of tools for objective assessment of neurosensory deficits in our setting, this study still provides an insight into what may be termed as the predictive symptoms of covid-19 disease. As the portal of entry of SARS-Cov-2 is through the nose, the symptoms related to ENT are invariably the first to appear. There is a wide variation of the ENT symptoms in covid-19 disease, it is important to be aware of the predictive symptoms. This will allow early institution of appropriate measures. Identification & isolation of patients will prevent spread of disease and focussed therapy and investigations.

CONCLUSION

The portal of entry for the SARS-CoV-2 is through the upper airway and early ear, nose & throat involvement is therefore natural. It is important to be aware of the symptoms related to ENT to identify & diagnose the disease early and therefore, institute measures for management and prevention of further spread of the disease.

Conflict of interest: We, the authors, have no conflicts of interest to declare in relation to this article.

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