Prevalence of viral keratitis in a Covid 19 infected patient- A Hospital based study

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Abstract: The coronavirus illness 2019 (COVID-19) is brought on by the severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2). Numerous cases of opportunistic infections, such as bacterial, fungal, protozoal, and viral infections during the course of SARS-CoV-2 infection have been documented ocular as well as systemic. Patients with COVID-19 have experienced and been shown to have herpes zoster and herpes simplex virus activation. The focus this present study was to understand the prevalence of viral keratitis and its association keratitis with covid-19 infection. In the present study we have clearly seen a rise in HZO or HSV infection during the rise of covid infection and a decline was also noted as people are either getting heard immunity or vaccinated for covid but it is yet to be established whether this was due to immunocompromised status of a person or due to direct association of covid and herpes infection.

Key words: Viral keratitis, covid-19, herpes zoster, HSV, immune-compromization,

Introduction:

The coronavirus illness 2019 (COVID-19) started in the Chinese province of Wuhan in late 2019 and spread quickly to become a pandemic.[1] The disease is brought on by the severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2), which mainly affects the respiratory system and has a variety of secondary effects, such as acute respiratory distress syndrome (ARDS), which leads to multi-organ involvement.[2] The risk of COVID-19-related complications, ICU admissions, and fatal outcomes is increased in patients with comorbidities (older age, obesity, immunocompromised states, cancer, diabetes mellitus, chronic respiratory and cardiovascular illness). Numerous cases of opportunistic infections, such as bacterial, fungal, protozoal, and viral infections during the course of SARS-CoV-2 infection have been documented [3] ocular as well as systemic. Patients with COVID-19 have experienced and been shown to have herpes zoster and herpes simplex virus activation.[4-6]

Conjunctivitis is the most prevalent symptom, and it can appear at any stage of the disease [7]. China observed that 31.6% of COVID-19-infected patients developed conjunctivitis-like ocular symptoms. [8] Other viruses, such as herpes simplex, have

been linked to ocular symptoms, with the latter having an annual incidence of 11.8 new cases per 100,000 people [9]. Indeed, reactivation of latent herpes simplex virus (HSV) in the sensory ganglia can result in initial or recurring illness, which is often monocular [9]. The findings in the eye are caused by a direct invasion of the virus, immune-mediated tissue damage, activation of the coagulation cascade and prothrombotic state created by the viral infection, related comorbidities, and medicines employed in management.

Although viral ribonucleic acid (RNA) has been isolated from ocular tissues, the role of the eye as a route of infection has yet to be proven. Ophthalmic signs may be the first sign of COVID-19 infection, or they may appear several weeks later. Ophthalmologists should be aware of the potential associations of ocular diseases with SARS-CoV-2 in order to obtain relevant history, look for specific signs, recommend appropriate tests, and thus reduce the spread of infection as well as diagnose and initiate early treatment for potentially life-threatening complications. In this case study we also tried to look for association between covid 19 and viral herpes infection. The study was aimed with the focus to study the prevalence of viral keratitis and find out the association of viral keratitis with covid-19 infection.

Materials and Methods:

A hospital based cross-sectional study was carried out in ophthalmic department of Santosh medical college and hospital during September 2021 to august 2022. All cases of viral keratitis confirmed either by clinical examination or investigation and who had a recent history of covid infection in last 3 months were included in the study irrespective of age, sex, social background. All cases of microbial keratitis, keratitis due to non-infectious causes like nutritional (vitamin A deficiency), allergic keratitis (shields ulcer) confirmed by clinical examination were excluded. A detailed history of ocular problems was taken from the patient including history of covid infection in last 3 months, treatment modality or history regarding hospital admission. A detailed ocular examination was carried out using slit lamp biomicroscopy, fluorescent staining, visual accuity was checked on Snellen's chart.

Results:

In our study out of the total 46 patients, 34 (80%) were males and 12 (20%) were females. The predominance of corneal ulcers were more pronounced in middle decades of their life 36.95%, as they were more often involved in outdoor activities as well as more middle aged people were infected with covid during that time .63.04% viral keratitis were reported in month of Jan to April 2022 .80.4% of patient had a positive history of covid infection in last three months72.4% and 75% of patient affected with HSV and HZV reported within one month respectively .Only 10.3% of HSV patient reported in 3rd month after covid infection .No patient with HZO reported in third month . Viral keratitis was diagnosed on the basis of clinical features, and hence confirmatory diagnosis could not be made. Of the 46 cases of viral etiology 9 cases were Herpes Zoster virus ,37were Herpes simplex virus .Of these 46 cases 37 patient had a positive history of covid infection out of all patient who had covid infection 78.3%had herpes simplex infection and 21.6% had zoster infection. Most of herpes zoster infected patient had a history of either hospital admission or steroid intake.

Table 1 : Age Distribution Of Keratitis

S.no	Age	No. Of cases	%
1	21-30	3	6.5
2	31-40	17	36.95
3	41-50	9	19.56
4	51-60	6	13.04
5	>61	11	23.91
	Total	46	100

TABLE 2 : Sex Distribution

S no.	Gender	No . Of cases	%
1	Male	34	80
2	Female	12	20
		46	100

Table 3 : History Of Covid Infection

S.No	History Of Covid	Number	Percentage
1	Present	37	80.4
2	Absent	9	19.5
	Total	46	100

Table 3 Month in which maximum keratitis cases were seen

S.no	Month	No .of viral keratitis	Percentage
1	Sep-Dec 2021	12	26.08
2	Jan-April 2022	29	63.04
3	May-Aug2022	5	10.86

Table 4 Time of onset of keratitis after covid infection

S.No	Time Of Month	HSV	HZV	Percentage HSV	Percentage HZV
1	1st	21	6	72.41	75
2	2nd	5	2	17.24	25
3	3rd	3	0	10.34	0

Table 5 : Type Of Viral Keratitis

S no.	Viru s	No of cases	Percentage
1	Herpes simples	37	80.43
2	Herpes zoster	9	19.21
	Total	46	100

Table 6 Association of viral keratitis with the covid 19

S.No	Type of viral keratitis	Number of cases	Percentage
1	Herpes simplex	29	78.3
2	Herpes zoster	8	21.6
	total	37	100

Discussion:

In this study incidence of viral keratitis was higher in males (80%) than females which is compatible with the study done by Bandyopadhyay showing a male predominance by 64%. This study also shows that both sexes tend to develop corneal ulcers in the middle decade of life indicating that they are presumably physically active in this phase of life and are at higher risk of corneal injuries [10].in our study majority of cases were reported in month of Jan 2022 to April 2022 coincidently maximum number of active covid cases according to government Sensex were reported in this period only. As the number of covid cases are decreasing or people are developing immunity we have seen a decrease in number of herpetic cases also April 2022. Herpes simplex virus (HSV) 1 is a neurotrophic virus that develops latency in the neural ganglia following primary infection in the body. After oral involvement, ocular infection is the second most prevalent site of symptomatic HSV1. HSV keratitis is the most common ocular manifestation, however it can also produce conjunctivitis, uveitis, or acute retinal necrosis. Psychological stress, fever, immune system weakness, and the presence of inflammatory mediators such as cytokines are thought to be triggers for HSV1 reactivation. [11]

There have been several case reports of reactivation of latent viral infections, including HSV infections, among COVID-19 patients.[12] In a case series described by Majtanova et al.,[13] five cases (two of them bilateral) of keratitis were found among COVID-19–positive patients during the SARS-CoV-2 pandemic in Slovakia, where they also found 2–2.5 times higher incidence of HSV keratitis in that period and suspected COVID-19 as a potential activator of these five cases. All of their cases had associated epithelial keratitis, and most of our cases also had either punctate keratitis or dendritic ulcer. Most of their cases presented in 1–3 weeks of COVID-19 infection, but in some patients it developed even 1 month after recovery from COVID-19 illness.[14] In our case most of patient reported keratitis within one month 72.4% and 75% of patient affected with HSV and HZV reported

within one month respectively. Only 10.3% of HSV patient reported in 3rd month after covid infection .No patient with HZO reported in third month The possible reason of increased susceptibility of COVID-19 patients for herpetic reactivation may be the immune dysregulation.[15] COVID-19–related psychological stress, higher level of inflammatory and pyrogenic mediators, and IL-6– related cytokine storm may also have a direct role in reactivation of the herpes virus.[16] Most of the patients in our study who developed herpes zoster infection where severely ill with covid and had a history of either hospital or intake of steroids for prolonged period.COVID-19 infection may represent a trigger for HZ reactivation. Among the COVID-19 pandemic, several published laboratory-confirmed COVID-19 reports with coexisting clinical manifestations of HZ virus have been reported, suggesting a probable co-existence of the two viruses, or an increased frequency of HZ in this population. [16,17]

Conclusion:

During last pandemic it is evident that many opportunistic infection can lead to a more dangerous heath issue for any patient .as we can see in this article an immunocompromised health either due to recovering phase after covid infection or administration of various drugs while getting treatment or prolonged hospital stay had given rise to either reactivation of HZO or HSV or made human susceptible to such opportunistic infection. In this study we have clearly seen a rise in HZO or HSV infection during the rise of covid infection and a decline was also noted as people are either getting heard immunity or vaccinated for covid but it is yet to be established whether this was due to immunocompromised status of a person or due to direct association of covid and herpes infection

Limitations of the Study:

1. The findings could not be reproducible in the rural community since the current study was performed in urban areas of Delhi NCR region.

2. No direct association between covid infection and herpes infection could be made in study group which need further investigation for verification.

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