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MASK ASSOCIATED DRY EYE (MADE): ARE WE HEADING TOWARDS ANOTHER PANDEMIC?

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ABSTRACT

The global pandemic of severe acute respiratory syndrome, COVID-19 has severly affected the world's social and health systems and has a great impact on every being. In an attempt to control the spread of the disease, regular usage of face masks became an ordinary routine. A large proportion of the population is reporting ocular symptoms through the period of mask wearing that are still underestimated. The results of our study indicate that the presence and severity of the ocular complaints are dependent on the type of mask and the duration of usage. Some medications approved for the treatment of dry eye symptoms may have a defensive effect against the viral invasion, which should be additionally evaluated.

INTRODUCTION

COVID-19, caused by the novel coronavirus 2019-nCoV (SARS-CoV-2), was declared a pandemic on 11th March 2020, the greatest in the past hundred years since the Spanish flu pandemic in 1918–1920.[1] Wearing protective masks and social distancing remained the most effective preventive measure against COVID-19. Since the beginning of the pandemic, there has been a noticeably great increase in the number of patients complaining of redness, discomfort, burning, stinging, tearing and foreign body sensation, irrespective of the major reason for their visit.[2] The magnitude of the problem is even higher in people who use face masks regularly and for a long period and are exposed to disinfectant usage. The purpose of this report is to highlight the risk of ophthalmic complaints in the face mask-wearing, pathogenic mechanisms for their occurrence, and to offer therapy.

MATERIALS AND METHODS

100 subjects, 55women and 45 men were included in the study. All patients underwent a thorough ophthalmic examination including best-corrected visual acuity, slit-lamp biomicroscopy, tonometry, fundoscopy, ocular surface fluorescein staining evaluation, Shirmer test and tear break up time measurement.

OBSERVATIONS AND RESULTS

A total of 100 persons were included in the study. Two major groups were formed, by the duration of daily usage of face masks: regular and occasional mask wearers. The group of regular mask users included persons wearing face masks 6 h/day or more (60 Subjects). The group of occasional users was formed by individuals who wear masks incidentally or for a short period (40 Subjects). The results were analyzed to evaluate the relationship between clinical symptoms and the period of mask usage. There was a significant difference in the prevalence of the symptoms among the groups.

TABLE 1.

SYMPTOMS	Regular users(60)		Occasional users(40)	
	N	%	N	%
Discomfort in eyes	37	61.6	15	37.5
Redness	33	55	13	32.5
Burning	30	50	11	27.5
Foreign body sensation	25	41.6	08	20
Itching	19	31.6	05	12.5
Dry eye feeling	17	28.3	02	05
Blurred vision	10	16.6	01	2.5

Ocular symptoms, summarized in Table 1, were reported by the patients for the time of mask using.

According to Pearson's Chi-square test, there were no significant differences between regular ordinary mask users and occasional users for most of the symptoms. In the group of regular mask users, including medical personnel and regular users of ordinary masks, all of the symptoms appear significantly more often than among the occasional users. There was a positive correlation between the time of mask usage and the presence and severity of the complaints.

DISCUSSION

COVID-19 infection has affected each and everyone in some aspects. Apart from its ocular manifestations, the most common preventive measure for infection that is the usage of masks have also contributed to the increase in ocular symptoms in the COVID era.

Different mechanisms lead to ocular complications in face mask usage. The major factor is the outflow of exhaled air, with a temperature around 36-37℃, passing over the upper border of the face mask to the ocular surface. This direct hot airflow leads to instability, increased evaporation, hyperosmolarity, and a decline in tear film turnover and clearance and results in ocular damage and dry eye symptoms. The severity of the symptoms correlates with the tear lipid layer thickness.[3] In cases with the additional use of a face shield, the temperature is even higher and the stream of fresh air diminished, which aggravates the complaints. Besides, the exhaled air has a decreased level of oxygen and an increased carbon dioxide concentration, which decreases the tear pH levels and consequently impairs the ocular surface.[4,5] Higher exposure to disinfectant solutions most of which evaporate in the air, has an additional influence on the anterior ocular surface and could provoke either chemical or allergic reactions and is an additional mechanism for ocular irritations among medical staff. It has to be emphasized that tear film deficiency and instability not only lead to ocular surface symptoms, inflammation and visual complaints[6,7] but also violate the defense mechanisms of the anterior ocular surface and thus make the cornea and conjunctiva more susceptible to infections.

The treatment of these ocular symptoms are multilayere, among which the artificial tears are most commonly used. Osmolarity balanced artificial tears are used to increase tear volume in patients with dry eyes. Products containing sodium hyaluronate, and carboxymethylcellulose alone or combined with glycerin are effective in treating dry eye symptoms and for their prevention, but sodium hyaluronate has faster efficacy.[8,9] Seawater sprays are reported to decrease the level of pro-inflammatory IL-1-beta IL-6 and could be safely and effectively used for the treatment of dry eye symptoms.[10] Application of lipid emulsion eye products could be the most appropriate therapy because they increase the lipid layer thickness, treat and prevent the symptoms of an evaporative dry eye, and could be used as monotherapy or combined with other products.[11] They are also reported to show better effectiveness compared to sodium hyaluronate, hydroxypropyl methylcellulose and hypromellose in reducing tear evaporation and treatment of dry eye disease.[12]

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