

Case Report

Severe Dry Eye in Covid-19 Patients Subject to Oxygen Therapy: A Case Report

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Abstract

Dry eye is a common problem that mainly affects affecting the adult population. In severe cases, it can lead to sterile corneal ulceration and perforation. We report a rare case of severe dry eye in a 50-year-old woman with COVID-19 who that developed after using an oxygen therapy device. Despite the medical history of dry eye, the severity of the disease increased so that it did not respond to bandages contact lenses, antibiotics, and artificial tears without preservatives at two-hour intervals. However, autologous serum improved but blurred vision and severe pain was improved by autologous serum. Awareness of possible ocular complications related to oxygen ventilation is important essential because prompt diagnosis and treatment can prevent severe visual consequences. In this clinical case, the timely management prevented a serious eye complication following oxygen therapy.

Keywords: COVID-19; Dry Eye Disease; Ventilator; Oxygen Therapy Device.

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Introduction

The COVID-19 pandemic emerged in December 2019, causing pulmonary complications such as pneumonia and in severe cases, acute respiratory distress syndrome ¹. Patients with COVID-19 may develop hypoxemic acute respiratory failure requiring oxygen support with positive expiratory pressure ^{2,3}. The nasal cannula is the most common way to administer oxygen. In this simple and convenient device, a plug, about 1.5 cm long and located at the center of a disposable tube, is placed inside the nasal cavities. Oxygen is administered through the cannula with a maximum flow of 1 to 6 liters per minute. The amount of FiO₂ equals 24-44 % of the patient ⁴.

Dry eye is a multifactorial ocular surface disease in which the tear film homeostasis is disturbed, ultimately resulting in ocular discomfort. Tear instability, inflammation, ocular surface injury, and neurosensory abnormalities play an important role in the etiology of this disease. Dry eye may cause several ocular and visual symptoms. The ocular symptoms include a foreign body and burning sensation, grittiness, and itching. With an increase in corneal involvement, symptoms like pain, photophobia, and epiphora may occur ⁵. The first line of treatment is the use of lubricants and artificial tears and lifestyle changes ⁶.

Case Report

A 50-year-old woman came to the eye clinic complaining of a painful loss of vision in both eyes (mainly in the right eye) for the past seven days. The decreased vision was associated with photophobia and redness. There was no history of any trauma to either eye. In the evaluation of her medical history, no eye disease was recorded. Also, no underlying systemic

disease was observed. Due to covid-19 and chronic hypoxia, the patient was treated with non-invasive ventilation with a nasal cannula for the past two months and could not breathe when the oxygen device was turned off.

An experienced optometrist performed all eye examinations for the patient. The best corrected visual acuity was 20/32 in the right eye and 20/20 in the left eye. Biomicroscopic examination showed dense conjunctiva without luster in both eyes. There was a 1.5 mm sterile corneal ulcer in the right eye's inferonasal quadrant. In the left eye, there was partial corneal opacification without evident ulceration and decreased tear breakup time (TBUT). The study found no evidence of meibomian gland dysfunction or eyelid deformity in either eye. An evaluation by an ophthalmologist was requested. Also, the patient was examined for any systemic cause of severe dry eye. ESR was within normal range, the rheumatoid factor was negative, and the oral mucosal biopsy was standard for Sjogren's syndrome.

Bandage contact lenses were placed in both eyes, and topical antibiotics (ciprofloxacin 0.3 %) QID and preservative-free artificial tears were used at two-hour intervals to alleviate the patient's symptoms. After three weeks, there was no improvement, and the patient was still receiving oxygen therapy. The patient complained of dry eyes in the mornings and a progressively increasing burning sensation in her eyes. During eye examinations, eye redness and purulent secretions of the right eye were evident. According to the ophthalmologist's recommendation, autologous serum and oral vitamin A tablet (800 micrograms of Eurho Vital Vitamin A) was also added to the previous prescription to take once a day. On day 14, the patient reported significant improvement in her symptoms (especially photophobia and

burning). On examination, both eyes showed good wound healing and typical tear breakup time test (TBUT) results.

Discussion

Dry eye is one of the most common eye diseases, especially in the elderly, in the world, between 5 % and 50 % of people suffer from dry eye ⁷. In the final stages or in severe cases of the disease, conjunctival ulcer or its complications in the cornea, in addition to filamentous keratitis, persistent epithelial defect, wound, and even corneal perforation occur at this stage. Severe complications of dry eye are rare and are seen in primary and secondary Sjogren's syndrome, transplantation, ichthyosis, Stevens-Johnson syndrome, and xerophthalmia (vitamin A deficiency) ⁸⁻¹².

Oxygen cannula ventilation is a type of non-invasive ventilation used for patients with COVID-19 and severe lung disease ¹³. Oxygen cannula ventilation is a type of non-invasive ventilation used for patients with COVID-19 and severe lung therapy ¹⁴⁻¹⁶. On the other hand, another large study using a face mask versus an HCPA mask finds no such side effects in

the eyes ¹⁷.

Conclusion

It is essential to warn ophthalmologists, optometrists, and nurses about the possible ocular complications of ventilation therapy. When the patient starts ventilation, the cornea should be examined regularly, and if there is a possibility of dry eyes, drops and ointments of moisturizing should be prescribed. Also, the typical dry eye patient should be carefully examined. The sudden onset of vision loss, photophobia, redness, and eye discharge should be investigated and managed to prevent the severe consequences of dry eye syndrome. Although this case report indicates the development of dry eye after a period of oxygen therapy, further studies are needed to clarify the ocular side effects in patients with oxygen ventilation.

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Footnotes and Financial Disclosures

Conflict of interest

The authors have no conflict of interest with the subject matter of the present manuscript.