



# Ocular Findings of Patients with Coronavirus Disease 2019

**Suzan Sirak<sup>1</sup>, George Katsaras<sup>2,3</sup>, Fani Akritidou<sup>1,4</sup>, Foteinos Stylias<sup>5</sup> and Theodora Papamitsou<sup>6\*</sup>**

<sup>1</sup>Department of Medicine, Aristotle University of Thessaloniki, Greece

<sup>2</sup>Department of Medicine, National and Kapodistrian University of Athens, Greece

<sup>3</sup>Department of Pediatric, General Hospital of Pella-Hospital Unit of Edessa, Greece

<sup>4</sup>Department of Ophthalmology, General Hospital of Pella-Hospital Unit of Edessa, Greece

<sup>5</sup>Department of Ophthalmology, General Hospital of Serres, Greece

<sup>6</sup>Department of Histology-Embryology, Aristotle University of Thessaloniki, Greece

## Introduction

Patients who were tested positive for Coronavirus disease 2019 (Covid-19) presented with ocular symptomatology posing a question on how coronavirus can affect the eye and its components. Coronavirus disease 2019 was initially diagnosed in a patient in China during December of 2019; however it was soon declared a Pandemic on March of 2020 [1]. The massive transmission of the virus in conjunction with the mortality rate stresses the necessity of determination of the damage that coronavirus causes to the eye. According to the literature ocular pathology was observed in a number of patients that had confirmed Covid-19 [2-4]. Such findings could be used as an early sign of infection, as a means of detecting the virus by testing tear sample or to acknowledge whether there can be transmission when it is concentrated in a sufficient amount in the tears. Moreover, there is evidence of diagnosis being reached by tear testing [5].

## Pathophysiology

There are known cases back in 2004 with patients whose tear samples were tested positive for SARS-CoV. In addition, there are similar findings in Wuhan in January 2020. Genome studying concludes that SARS-CoV and SARS-CoV2 use common ground to attack the system of the host. There is a lot of hard data on how the respiratory system is affected when infected. Our review will focus on the infection of the intraocular system. That is through the Angiotensin Converting Enzyme 2 (ACE2). It appears that the renin angiotensin system has a significant autocrine role to eye tissues, thus contributing to the spread of the virus and causing conjunctivitis, anterior uveitis and even retinitis. Once the virus is inoculated, macrophages of the retina release vasoactive amines, peptides and eicosanoids leading to the production of autoantibodies that cause degeneration of ganglion cells and photoreceptors. It is possible that autoimmune reaction triggered by the virus, is the cause behind the eye damage [6].

## OPEN ACCESS

### \*Correspondence:

Theodora Papamitsou, Department of Histology-Embryology, Aristotle University of Thessaloniki, Greece,

E-mail: thpapami@auth.gr

Received Date: 30 Apr 2020

Accepted Date: 20 May 2020

Published Date: 22 May 2020

### Citation:

Sirak S, Katsaras G, Akritidou F, Stylias F, Papamitsou T. Ocular Findings of Patients with Coronavirus Disease 2019. Am J Otolaryngol Head Neck Surg. 2020; 3(4): 1096.

**Copyright © 2020 Theodora Papamitsou. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.**

## Ocular Findings

The ocular manifestations of patients affected with SARS-CoV2 range from conjunctival hyperemia, epiphora and increased secretions to chimosis which are all found in conjunctivitis [7]. In a recent study of Wu et al. there had been a patient with Covid-19 whose first and only symptom on the onset was epiphora. In this study 38 confirmed with Covid-19 patients were examined and the prevalence of ocular findings was up to 30% of the sample, with a positive correlation between these ocular abnormalities and the severity of the pneumonia caused by SARS-CoV2 [4].

## Diagnosis

In order to confirm the disease, all patients with possible Covid-19 have their nasopharyngeal swap sample or blood sample tested with the method of Reverse Transcription Polymerase Chain Reaction (RT-PCR), since the genome of the virus is RNA. Two sets of primers are also used for the procedure. Results are considered positive when twain sets of primers are positive or one set is positive and a different type of sample is also obtained positive at the same time. Whole genome sequencing may also be carried out on positive samples in order to understand the transmission and mutations of SARS-CoV2 [8]. What is more, the virus RNA can be identified in the feces of Covid-19 patients up to 42 days, in contrast with the nasopharynx where it can be identified up to approximately 2 weeks [9]. A series of case reports with SARS in the outbreak of 2003 had shown

that the virus can also be identified in tear samples. In some patients tear specimens gave positive results before respiratory system samples were conclusive. Thus, emphasizing the importance and value of tear sample testing, as well as the ability to diagnose the illness shortly after onset [5].

## Prevention

Ophthalmologists should take the necessary safety precautions whenever a patient is presented with mild follicular conjunctivitis since the corona virus can be present in tear specimen [10]. All instruments are to be subjected to thorough sterilization with the use of regular bleach and alcohol disinfectants so as to prevent the transmission of the virus from asymptomatic SARS-CoV2 positive patients to following patients. A study suggests that ophthalmologists are among the physicians who were infected by this novel coronavirus more, compared to other specialties [11]. The use of Personal Protective Equipment (PPE) such as masks, goggles and gloves is highly recommended to ophthalmologists and commonly accepted as an appropriate practice despite the lack of PPE disposal [12].

## Conclusion

The Covid-19 pandemic has caused a worldwide health crisis. The duration of the crisis may yet be unknown but the ramifications of late actions are already perceivable. Ophthalmologists may soon take part intensively in the distinction of the Covid-19 as the virus can be present in tear specimen. Physicians practicing in the front line are to be preserved otherwise they may transform to sites of infection, not to mention affected fatally. It is of great significance that we all be aware that only by shielding those confronting the virus can one expect to defeat it.

## References

1. Lake MA. What we know so far: COVID-19 current clinical knowledge and research. Clin Med. 2020;20(2):124-7.
2. Zhang X, Chen X, Chen L, Deng C, Zou X, Liu W, et al. The evidence of SARS-CoV-2 infection on ocular surface. Ocul Surf. 2020;18(3):360-2.
3. Lu C, Liu X, Jia Z. 2019-nCoV transmission through the ocular surface must not be ignored. Lancet. 2020;395(10224):e39.
4. Wu P, Duan F, Luo C, Liu Q, Qu X, Liang L, et al. Characteristics of ocular findings of patients with coronavirus disease 2019 (COVID-19) in hubei province, China. JAMA Ophthalmol. 2020.
5. Loon SC. The severe acute respiratory syndrome coronavirus in tears. Br J Ophthalmol. 2004;88(7):861-3.
6. Seah I, Agrawal R. Can the Coronavirus Disease 2019 (COVID-19) Affect the Eyes? A review of coronaviruses and ocular implications in humans and animals. Ocul Immunol Inflamm. 2020;28(3):391-5.
7. Su L, Ma X, Yu H, Zhang Z, Bian P, Han Y, et al. The different clinical characteristics of corona virus disease cases between children and their families in China - the character of children with COVID-19. Emerg Microbes Infect. 2020;9(1):707-13.
8. Zhou P, Yang X-L, Wang X-G, Hu B, Zhang L, Zhang W, et al. A pneumonia outbreak associated with a new corona virus of probable bat origin. Nature. 2020;579(7798):270-3.
9. Jiang X, Luo M, Zou Z, Wang X, Chen C, Qiu J. Asymptomatic SARS-CoV2 infected case with viral detection positive in stool but negative in nasopharyngeal samples lasts for 42 days. J Med Virol. 2020.
10. Chan WM. Tears and conjunctival scrapings for coronavirus in patients with SARS. Br J Ophthalmol. 2004;88(7):968-9.
11. Ing EB, Xu QA, Salimi A, Torun N. Physician deaths from corona virus disease (COVID-19).
12. Chen MJ, Chang KJ, Hsu CC, Lin PY, Liu CJL. Precaution and prevention of corona virus disease 2019 (COVID-19) infection in the eye. J Chinese Med Assoc. 2020.