

A Brief About RNA Viruses Conjunctivitis in the Current COVID-19 Pandemic

Acieh Es'haghi

Department of Ophthalmology, Imam Hossein Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Received: 04 May 2020; Accepted: 18 Aug. 2020

On January 31, 2020, the World Health Organization (WHO) described the COVID-19 outbreak as a global health threat of international concern. The rapid spreading of coronavirus disease 2019 (COVID-19) outbreak may draw attention to RNA viruses families induced conjunctivitis (1).

SARS-CoV-2 is an enveloped single-stranded RNA beta-coronavirus that causes COVID-19. Patients commonly present with respiratory tract symptoms, including fever, cough, and shortness of breath. Extracted data regarding 1099 subjects with laboratory-confirmed Covid-19 from 552 hospitals in China revealed conjunctival congestion in 9/1099 (0.8%) patients (2).

Current knowledge about how COVID-19 transmits is mainly based on what is reported about other similar coronaviruses (3). Lu *et al.*, proposed that the disease can be transmitted through the mucous membranes, including the conjunctival secretions. There have been several cases in which ophthalmologists were found to be infected through routine examination and treatment (4).

In a prospective case series in 30 confirmed novel coronavirus pneumonia (NCP) patients to assess tears and conjunctival secretions, no viral RNA was shown in the tear fluid and conjunctival secretions of the severe or common type patients with no conjunctivitis. However, 55 of the 60 sputum samples had positive results. This study showed that the virus was present in the patients' tears and conjunctival secretions with conjunctivitis and the virus did not exist in the patients' conjunctival sac with no sign of conjunctivitis (5).

The definite diagnosis of viral conjunctivitis can be challenging due to overlapping features in clinical manifestations. RNA viruses present less common to ophthalmologists and usually lead to more benign forms of conjunctivitis in comparison with DNA viruses. It is worth reminding ourselves about conjunctivitis caused by other RNA viruses in the great panic of COVID-19.

Enterovirus type 70 (EV 70) and coxsackievirus A type 24 variant (CA24v) are members of the *Picornaviridae* family and are the main reasons for acute hemorrhagic conjunctivitis (AHC). Adenoviruses (DNA viruses) 19 and 37, which are most commonly associated

with epidemic keratoconjunctivitis, have similar clinical findings. However, less corneal involvement and a more rapid disease course in AHC may help to differentiate them (6).

Measles, Newcastle disease, and mumps are from the paramyxoviruses family. The clinical features of measles are high fever, cough, coryza, and a generalized maculopapular rash. Furthermore, measles may cause catarrhal conjunctivitis, superficial keratitis, and subconjunctival hemorrhage. Measles keratopathy manifests as corneal ulceration in children with vitamin A deficiency. Systemic complications (pneumonia, encephalitis, and myocarditis) may occur in immunocompromised patients. Two hundred eighty-nine cases were reported in an outbreak of measles in Belgium in 2017 (7,8).

Newcastle disease is another member of the paramyxoviruses family. An epidemic of Newcastle disease in poultry handlers of Southern Utah happened in the late autumns of 1965. All three affected patients had bilateral follicular conjunctivitis predominantly in the inferior palpebral conjunctiva. In all subjects, there was epithelial staining of the cornea, and in one patient, there were subepithelial infiltrates that disappeared over 18 months. Enlarged and tender preauricular lymph nodes were invariably present (9).

Mumps is distinguished by enlargement (more commonly bilateral) of salivary glands. Ocular pain and a mass are present when the lacrimal gland is involved. Mild follicular conjunctivitis, episcleritis, and iritis may occur, and superficial punctate keratitis or stromal keratitis may be present (10).

Rubella (a togavirus) is characterized by self-limiting conjunctivitis and punctate keratitis (primarily in the central cornea). FHI in the United States was declined after the introduction of Rubella vaccination (11).

Yellow fever virus is a mosquito-borne RNA virus from the genus flavivirus. The virus causes an acute infection, with clinical manifestations ranging from mild non-specific illness to severe disease including high fever, chills, severe headache, jaundice, bleeding, and multiple organ failure, and 20% to 50% mortality.

Corresponding Author: A. Es'haghi

Department of Ophthalmology, Imam Hossein Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
Tel: +98 2177552224, Fax: +98 2177552224, E-mail address: acieh_eshaghi@yahoo.com

Conjunctival injection, lid edema, and photophobia may present. Discharge is uncommon. Conjunctival hemorrhage may occur in patients who develop coagulopathy, in particular during the toxic phase of yellow fever when vomiting (black vomit) is common. Yellow fever has been responsible for urban epidemics of South American and African continents since the 17th century (12).

The most recent epidemic of Ebola virus disease (a member of *Flaviviridae* family) in West Africa, which continued from 2013 to 2016 and was remarkable for the huge number of affected patients and its high rate of mortality. By the end of the epidemic in mid-2016, the WHO had declared 28 616 Ebola virus disease cases in Guinea, Liberia, and Sierra Leone, with 11 310 deaths (13).

Systemic signs and symptoms of Ebola hemorrhagic fever (EHF) include fever, fatigue, headache, arthralgia, and myalgia. More than half of the patients manifest ocular findings such as conjunctival injection, subconjunctival hemorrhages, tearing, and uveitis (14).

Conjunctival injection, watery discharge, follicular conjunctivitis, lymphadenopathy, and hemorrhages are common in viral conjunctivitis. There is no specific treatment for the aforementioned viral conjunctivitis. Laboratory confirmation of the viral etiology might help in making a more precise diagnosis and taking hygienic precautions and therefore decrease the disease transmission.

References

1. WHO. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). (Accessed January 31, 2020, at [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-secondmeeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-theoutbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-secondmeeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-theoutbreak-of-novel-coronavirus-(2019-ncov)).)
2. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. China Medical Treatment Expert Group for Covid-19. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med* 2020;382:1708-20.
3. Alert: Important coronavirus context for ophthalmologists. American Academy of Ophthalmology. (Accessed March 07, 2020, at <https://www.aao.org/headline/alert-important-coronavirus-context>.)
4. Lu CW, Liu XF, Jia ZF. 2019-nCoV transmission through the ocular surface must not be ignored. *Lancet* 2020;395:e39.
5. Xia J, Tong J, Liu M, Shen Y, Guo D. Evaluation of coronavirus in tears and conjunctival secretions of patients with SARS-CoV-2 infection. *J Med Virol*. 2020;10.1002/jmv.25725.
6. Wu D, Ke CW, Mo YL, Sun LM, Li H, Chen QX, et al. Multiple outbreaks of acute hemorrhagic conjunctivitis due to a variant of coxsackievirus A24: Guangdong, China. , 2007. *J Med Virol* 2008;80:1762-8.
7. Butler D. Measles by the numbers: A race to eradication. *Nature* 2015;518:148-9.
8. Cornelissen L, Grammens T, Leenen S, Schirvel C, Hutse V, Demeester R, et al. High number of hospitalisations and non-classical presentations: lessons learned from a measles outbreak in 2017, Belgium. *Epidemiol Infect* 2020;148:e35.
9. Hales RH, Ostler HB. Newcastle disease conjunctivitis with subepithelial infiltrates. *Br J Ophthalmol* 1973;57:694-7.
10. Onal S, Toker E. A rare complication of mumps: kerato-uveitis. *Ocul Immunol Inflamm* 2005;13:395-7.
11. Birnbaum AD, Tessler HH, Schultz KL, Farber MD, Gao W, Lin P, et al. Epidemiologic relationship between Fuchs heterochromic iridocyclitis and the United States rubella vaccination program. *Am J Ophthalmol*. 2007;144:424-8.
12. Monath TP. Yellow fever: an update. *Lancet Infect Dis* 2001;1:11-20.
13. Shantha JG, Crozier I, Hayek BR, Bruce BB, Gargu C, Brown J, et al. Ophthalmic manifestations and causes of vision impairment in Ebola virus disease survivors in Monrovia, Liberia. *Ophthalmology* 2017;124:170-7.
14. World Health Organization. Ebola outbreak. 2014-2015. (Accessed February 25, 2018, at <http://www.who.int/csr/disease/ebola/en/>.)