



OVERVIEW ON CORONAVIRUS (COVID-19)

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AUTHOR'S CONTRIBUTION

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ABSTRACT

Coronavirus (COVID-19) is an important public health emergency of international concern. Firstly COVID-19 was isolated from Wuhan market in China at 7 Jan. 2020. As of this time, there is no known effective pharmaceutical treatment; although it is much needed for patient contracting severe form of the disease. This virus causes respiratory infection in human including sneezing, coughing, cold and pneumonia while in animal it causes diarrhea and upper respiratory diseases. COVID-19 is transmitted human to human or human to animal via airborne droplets. This disease can be diagnosis on the basis of travel history from infected areas, common symptom or by laboratory confirmations. WHO advised to avoid public place, close contact to Coronavirus infected persons, wearing mask, sanitizing hands and maintain social distancing for prevention. It's also advised infected persons keep in quarantine center for 14 days or separate from other family member to single separate room, implementation of contact, droplet precaution, and airborne precaution, keep physical distances. Some countries are also using lopinavir/ritonavir, remdesivir, chloroquine and hydroxychloroquine drugs for treatment of Coronavirus but these are not efficient in cure of this disease. The aim of the systematic review of literature is to summarize the evidence regarding COVID-19, symptoms, pathogenesis and prevention/treatment.

Keywords: COVID-19; symptoms; epidemiology and viral management.

1. INTRODUCTION

Coronavirus (COVID-19) are positive-sense, single stranded RNA viruses and its diameters is 60 nm to 140 nm with spike like projection on its around which giving it a crown like appearance [1]. Their viral is RNA genomic and their ranges from 26 to 32 kilobases in length [2]. COVID-19 belongs to the Nidovirales order which includes Roniviridae, Arteriviridae, and Coronaviridae families [3]. The Coronaviridae family is subdivided into Torovirinae and Coronavirinae subfamilies [3]. Coronavirinae is further sub classified into alpha, beta, gamma, and delta [3]. Phylogenetic clustering accounts from the classification of these subtypes of viruses. It can be

isolated from different animal species. In 1960 first case of coronavirus was notified [4] and Canadian study in 2001 was identified approximately 500 patients as Flu-like system in which 17 to 18 cases were confirmed as infected with Coronavirus by polymerase chain reaction. These include livestock, birds, and mammals such as bats, camels, masked palm civets, dogs, mice, and cats [2]. In 2003, various reports were published the spreading of Coronavirus in many countries such as Hong Kong, United States America, Singapore, Vietnam, Thailand, Taiwan and their several case of severe acute respiratory syndrome which caused by Coronavirus and their mortality was more than 1000 patient [4]. Another study report in Hong Kong was confirmed 50 patients

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are suffering from severe acute respiratory syndrome while 30 of them were confirmed as Coronavirus infected [4,5]. In Wuhan (China) late December 2019 a case unidentified pneumonia was reported by Hubei Province, People's Republic of China (PRC) their clinical characteristics were very similar to those of viral pneumonia [6,7]. After analysis on respiratory samples the Centre for Disease Control expert declared that the pneumonia, later known as novel virus [8] and officially named the disease COVID-19 was declared by World Health Organization (WHO). The initial cases had a common exposure to the Huanan wholesale seafood market that also traded live animals [9]. On December 31st 2019, China notified the outbreak to the WHO and on 1st January the Huanan sea food market was closed [9]. For identification of this disease different sample from Huanan sea food market also tested, signifying that the virus originated from there [10]. The number of cases started increasing exponentially, some of which did not have exposure to the live animal market, suggestive of the fact that human-to-human transmission was occurring [8]. This review of literature focuses on the various studies of COVID-19 disease and their epidemiology, symptoms, transmissions, diagnosis, preventions and therapy.

2. EPIDEMIOLOGY

The World Health Organization (WHO) declared COVID-19 is a pandemic disease. As of January 24, 2020, at least 830 cases were diagnosed in the China, Japan, Singapore, Thailand, South Korea, Taiwan, Vietnam, United States and Nepal in which twenty-six fatalities occurred, mainly in patients who had serious underlying illness [11]. Therefore, many details of the emergence of COVID-19 such as its origin and ability to spread among humans remain unknown, an increasing number of cases day by day appear to have resulted from human to human transmission [11]. China quickly responded and informed to World Health Organization for the outbreak and sharing sequence information with the international community after discovery of the causative agent. Quickly World Health Organization responds and coordinating diagnostic development and issuing guideline on patient monitoring, treatment and providing up to date information on the outbreak of COVID-19. Therefore, several countries are screening travelers from Wuhan for detect COVID-19 cases. All the airports in different countries including India put in screening mechanisms to detect infected people which returning from China or any other places. Countries including India who evacuated their citizens from Wuhan through special flights or had travelers returning from China placed all people symptomatic or otherwise in isolation for 14 day and tested them

for the Coronavirus [9]. In fact on 12th February 2020, China changed the definition of confirmed cases of Coronavirus on the basis of the molecular tests but with radiological, clinical and epidemiologic features of COVID-19 leading to an increase in cases by 15,000 in a single day [9].

3. TRANSMISSION

People can be infected from COVID-19 through close contact with people who have symptoms of the virus which includes sneezing and cough. However, Coronavirus are generally spread via airborne zoonotic droplets and its replicate in ciliated epithelium which caused cellular damage and infection at infection site. Cascella et al. [12] has been reported that the transmission of COVID-19 occurs through the spread of airborne respiratory droplets by sneezing or coughing. Different studies are also suggested that the close contact between individuals can also result in Coronavirus transmission [13]. It's also indicates the possible transmission in closed spaces due to elevated aerosol concentration [12]. This virus can be transmitted through sneezing and coughing without covering the mouth can disperse in the minute droplets into the air, through touching or shaking hand with infected person, making contact with a surface or object that has the virus and then touching the mouth, nose or eyes [11].

4. SYMPTOMS OF THE PATIENTS

Coronavirus disease may be classified into mild, moderate, severe and critical [6]. Infected patient have common cold, while few of them remain asymptomatic and 80 % patient shows mild symptoms of the disease [14]. The most common symptoms of COVID-19 patients include fever (98.6%), fatigue (69.6%), dry cough, and diarrhea [6]. These infections include dry cough, nasal congestion, sore throat, mild fever, muscle pain, headache and malaise [15]. The less common symptoms are dizziness, diarrhea, nausea, headache and vomiting [8]. The corona virus patients with mild illness may present with symptoms of an upper respiratory tract viral infection [15]. However, adult have the best immunity against the COVID-19 infection but the demerit is that they are more likely to spread the infection [14]. A recent study in Zhongnan Hospital of Wuhan University has been identified among 140 patients that different types of symptom are lead to disease known as COVID-19 [14]. The risk of COVID-19 infection in pregnant woman is the same like general patients but as pregnancy is a state of immune suppression along with other physiological respiratory and immune changes might show more severe symptoms. The greatest risk of Coronavirus is in infected pregnant

woman when she is in labor, especially if she is acutely ill. Hafeez et al. [14] has been reported that 99% of the COVID-19 patients develop a fever with extremely high temperature, while more than half experienced fatigue, dry cough and one-third of the patient developed a dry cough and difficulty in breathing. Bendix, [16] has been reported that Chinese Centre for Disease Control and Prevention (CDC) observes that around 80% of the COVID-19 cases are mild, around 15% of the patients have infected severe cases, and 5% have become critically ill. In the infected persons starting from first day of the symptom, the patient suffers from fever along with [14] fatigue, muscle pain, and a dry cough. Few of them may experience nausea and diarrhea a few days before the arousal of symptoms. After fifth days patient may suffer from breathing problem especially if they are elderly or have some pre-existing health condition. According to the Wuhan University study after seventh day all these symptoms lead the patient to be admitted in the hospital. According to Chinese CDC in 15% patient after eight days develop acute respiratory distress syndrome and fluid fills in the lungs which causes severe effects. After tenth day in patients milder symptoms probably have loss of appetite and more abdominal pain. However, COVID-19 patients with preexisting comorbidities have a higher case fatality rate. These comorbidities include respiratory disease (6.5%), diabetes (7.3%), hypertension (6%), cardiovascular disease (10.5%), [6] and oncological complications (5.6%). Patient without comorbidities have a lowest case fatality rate (0.9%) [6] only small fractions are (mortality rate about 2%) die. However, the fatality rate are started to increase for those over 50 years of age. Those under 50 years who are infected have a death rate 0.40%, while for those 50-59 years its death rate is 1.3%. For those 60-69 years its 3.60%, for 70 to 79 years olds its 8.0% and for those over 80 years of age, it is 14.8% [14]. After two and a half weeks (17 days) patients who recover are discharged from the hospital [14].

5. DIAGNOSIS

A suspected case of COVID-19 is defined as one with fever, cough and sore throat who has history of travel to infected areas or other areas of persistent local transmission or contact with patients with similar travel history or those with confirmed Coronavirus infected [17]. Therefore, infected peoples can be diagnosis on the basis of the common symptoms of COVID-19. The initial cases of Coronavirus infection in India testing strategy was included people who had international travel history with symptoms, symptomatic contacts of laboratory confirmed, and symptomatic healthcare workers managing respiratory distress/severe acute respiratory illness [18].

However, cases may be asymptomatic or even without fever. A confirmed case is a suspect case with a positive molecular test [17]. The doctor may decide whether to conduct tests for COVID-19 which based on individual signs and symptoms. The doctor may also consider whether an individual had close contact with someone diagnosed with COVID-19 or travelled to or lived in any areas with ongoing community spread of Coronavirus within last 14 days [14]. The specific diagnosis of COVID-19 can be done by specific molecular test on respiratory samples such as throat swab, sputum, nasopharyngeal swab, endotracheal aspirates and bronchoalveolar lavage [17]. Till now, COVID-19 infection was not confirmed in urine and fecal sample of the patients [19]. The World health organization recommended that collecting samples from both lower and upper respiratory tracts it can be achieved through expectorated sputum, endotracheal aspirate or bronchoalveolar lavage [12]. A paper based test that may deliver results in less than half an hour. In this test a strip of paper required that is coated with antibodies this bind to a particular (COVID-19) protein. However, a second antibody is attached to gold nanoparticles, and therefore the patient's sample is added to a solution of these particles. Then the test strip is dipped in this solution. If the viral protein (COVID-19) is present in the sample, it will be attached to the antibodies on the paper strip as well as the nanoparticles bound with antibodies, and a colored spot appear on the strip within 20 minutes (14). These collected samples from respiratory tracts are then assessed for viral-RNA using polymerase chain reaction (PCR). If test result is positive, it is recommended to repeat test for the re-verification purposes. Whereas, negative test with a strong clinical suspicion also warrants for repeat testing [12].

6. PREVENTION

According to general guidelines of WHO, COVID-19 infected patient should be separate from other family member in a single separate room, implementation of contact, droplet precaution, and airborne precaution, keeps physical distances till to recovering [4]. European Center for Disease Prevention and Control (ECDC) has been published the information to people for avoid contact with sick people, in particular those with a cough. Avoid visiting markets and places where live or dead animals are handled, wash your hand with soap and water or use an alcohol based disinfectant solution before eating, after using the toilet and after any contact with animal, avoid contact with animals, their excretions or droppings [4]. It is essential to prevent the transmission of COVID-19 use the standard precautions which consist of hand hygiene, use of personal protective equipment (PPE)

and respiratory and cough etiquettes [20]. Hand washing following the correct steps with soap and water should suffice, sanitizer should be alcohol based which containing 60-80 per cent ethanol, cloth towels should be avoided for drying hands and disposable tissue papers should be preferred [20]. The personal protective equipment (PPE) consist of the medical masks or particulate respirators, goggles or face shields, gloves, gowns and shoes cover [21]. Therefore, prevention from COVID-19 should be strictly follow social distancing and uses personal protective equipment and sanitizer.

7. THERAPY

Till now not any appropriate therapy of the COVID-19, but sum therapies are in the clinical trial stages. Several clinical trials of the possible treatment of Coronavirus are underway which are based on antiviral, anti-inflammatory and immunomodulatory drugs, cell therapy, antioxidants and other therapies [22]. However, there are no any evidences that antibiotic prophylaxis can prevent bacterial superinfection, and indeed no evidences of a diagnostic role of procalcitonin in COVID-19 patients [23]. The anticoagulation therapy is recommended in COVID-19 patients with early-stage, especially [24] when the D-dimer value is 4 time higher than normal. In the second-generation antiretroviral drug combination lopinavir/ritonavir inhibits the viral protease. These combinations are widely available and drug interaction and safety profile are well established. The efficacy of lopinavir/ritonavir against SARSCoV has been demonstrated [25], and these drugs are also seemed to reduce the viral load in COVID-19 patient [26,27]. However, the clinical evidence for this combination therapy is remains limited, as suggested by case reports [27,28,29]. Cao et al. [30] observed no clinical benefit of lopinavir/ritonavir beyond standard care. In China remdesivir was successfully used in the several cases of COVID-19 patient [31]. However, chloroquine and hydroxychloroquine are used in the treatment of the amoebiasis and malaria. These drugs show a good tolerability profile. The various studies have been demonstrated that chloroquine activity *in vitro* and in animal models against SARS-CoV [32,33] and avian influenza [34], some studies also have the evidences of their efficacy in COVID-19 patients [29,35,36,37,38]. The suggested dosages are 500 mg BID for the chloroquine and 200 mg BID for hydroxychloroquine [38]. For the optimal treatment, a loading dose should be administered and followed by a maintenance dose [39]. In highly COVID-19 infected patient's oxygen therapy will be required if hypoxia is present or if symptoms of respiratory distress become evident. However, oxygen therapy is

generally administered through a nasal cannula, a face mask or noninvasive ventilation [40,41]. Therefore, on the basis of partial positive result in treatment of COVID-19, common drugs like lopinavir, ritonavir, remdesivir, chloroquine and hydroxychloroquine can be used for prevention till to perfect medicines/vaccinations.

8. CONCLUSION

Coronavirus was spreading from epicenter of the Wuhan, China in world. This virus contains a single stranded RNA genomic materials and it's covered by spike like projection and form crown like appearance. The name of the Coronavirus to COVID-19 and pandemic disease was officially declared by World Health Organization (WHO). Humans can be infected from Coronavirus through close contact with infected people via sneezing, coughing, airborne zoonotic droplets, touching or shaking hand, making contact with a surface or object that have COVID-19. Patient of the Coronavirus have high fever, fatigue, dry cough, common cold and diarrhea. The infections of this disease can be diagnosis on the basis of common symptoms of COVID-19, travel history from infected areas or by laboratory confirmations. For the prevention of COVID-19 infections should be personal protective equipment (PPE), hand washing soap, sanitizer and disposable tissue papers in proper uses. Common drugs like lopinavir, ritonavir, remdesivir, chloroquine and hydroxychloroquine are using in COVID-19, but these are not sufficient. Therefore, this review of literature concluded that different pharmaceutical drugs designing, mode of action of the COVID-19, control of viral replication in organism and formation of suitable vaccine against Coronavirus will be useful for humanities.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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