

COVID -19 VS HANTAVIRUS- A REVIEW

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ABSTRACT:

There is a rapid surge in research in response to the outbreak of COVID-19 which has taken the lives of many people. A detailed structured review of the corona virus could bring about any development in the field of research concerning the discovery of vaccines and treatment methods for COVID-19. Another virus called the Hanta virus that had originated in China was another pandemic which was controlled in the initial stages itself. Different articles and research journals were selected, analysed and computed for better understanding. The collection and analysis of data was done in the year 2020. A review of the epidemiology, clinical features, diagnosis, symptoms and treatment of corona virus and Hantavirus could help in advancements in its field of research. Also the comparison of economical impacts in the world during the pandemic virus attack can also be helpful to be economically prepared to face the crisis and reduce the chaos. But certain limitations that come across in this review had to be rectified for a proper result. But this review can be used for any quick reference regarding these deadly viruses.

Keywords: COVID-19, Hantavirus, epidemiology, diagnosis, Treatment.

INTRODUCTION:

There has been a rapid surge in research in response to the outbreak of COVID-19. CO' stands for corona, 'VI' for virus, and 'D' for disease. Formerly, this disease was mentioned as '2019 novel coronavirus' or '2019-nCoV.' The COVID-19 virus may be a new virus linked to an equivalent family of viruses as Severe Acute Respiratory Syndrome (SARS) and a few sorts of cold. During this early period, published research primarily explored the epidemiology, causes, clinical manifestation and diagnosis, also as prevention and control of the novel coronavirus. To summarize, COVID-19 may be a new disease that has caused great impacts to the people's daily life extraordinarily [1]. We, as a community of shared future for mankind, got to take collectively and quickly strong emergency responses as a battle against our common enemy, the new coronavirus, not only in China but also in the world [2]. People of all ages can be infected by the new coronavirus (COVID19). Older people, and other people with pre-existing medical conditions (such as obesity, asthma, diabetes, heart disease) appear to be more susceptible to becoming severely ill with the virus. Hantaviruses are enzootic viruses that maintain persistent infections in their rodent hosts without apparent disease symptoms [3]. Viruses of the Hantavirus genus, within the family Bunyaviridae, can cause serious disease in humans. Hantaviruses are harbored by rodents, distinguishing them from the arthropod-borne viruses within the other genera of the Bunyaviridae family [4]. A detailed review of these viruses can bring about knowledge on the origin of such viruses and prevention of the same before it becomes a Pandemic [5]. The treatment and diagnostic review of the same can bring about faster finding of cures to treat such diseases. It could help scientists proceed in finding vaccines for such viruses and it could be prevented at an initial stage itself. Although for most people

COVID-19 causes only mild illness, it can make some people very ill. More rarely, the disease can be fatal. Older people, and people with pre-existing medical conditions (such as high vital signs, heart problems or diabetes) appear to be more vulnerable. The hantaviruses found in Europe and Asia cause a sort of renal disorder called haemorrhagic fever with renal syndrome (HFRS). The hantaviruses within the Americas attack the lungs, causing hantavirus pulmonary syndrome (HPS). The Aim of this study is to take a detailed structured review of COVID-19 and Hantavirus.

In order to study in detail about the COVID-19 and hantavirus, several articles and research journals were selected, analysed, and computed in order to gain accurate information of the viruses. The data collection and analysis was done in the year 2020.

METHODOLOGY:

This review was done based on the articles obtained from various platforms like Pubmed and google scholar. They were collected with restrictions in time basis from 1991 to 2020. The inclusion were original research papers, in vitro studied among various conditions and articles that contain pros and cons. Exclusion criteria came into account for review articles of other languages. All the articles were selected based on COVID- 19 and Hantavirus.

They are determined by article title, abstract and complete article. When article holder websites were analyzed on the topic COVID-19 and Hantavirus, more than 400 articles and based articles were found, when it was shortlisted based on the inclusion and exclusion criteria, the number of articles were lowered to 100 articles. When timeline and other factors were quoted only 27 articles came into play. This article is reviewed from the 27 articles collected. Quality of articles used was assessed using a quality assessment tool and graded as strong, moderate and weak.

Table 1: QUALITY ANALYSIS:

S.No	Author	Year	Taken from	Quality
1.	Adhikari SP Et al.	2020	Pubmed	strong
2.	Ran ren Et al.	2020	Pubmed	strong
3.	Jonsson CB Et al.	2010	Pubmed	moderate
4.	Battisti AJ Et al.	2011	Pubmed	strong
5.	Mohammed A Et al.	2020	Google scholar	weak
6.	Macneil A Et al.	2012	Pubmed	moderate
7.	Dilip Methai Et al.	2017	Pubmed	strong
8.	Enria DA Et al.	2001	Google scholar	moderate
9.	Hooper J Et al.	2008	Pubmed	moderate
10.	Huang C Et al.	2020	Pubmed	strong
11.	Huggins JW Et al.	1991	Pubmed	strong
12.	Lake MA	2020	Google scholar	weak

HANTAVIRUS:

Ortho Hantavirus is a single stranded enveloped RNA virus [6]. The normal cause infection is due to rodents. Hanta virus normally cause infection in rodents, but does not cause disease. But in humans, when transmitted, it causes diseases. Vaccines for Hanta virus is not yet discovered but it is controllable. Hanta virus leads to a series of diseases ranging from gastrointestinal symptoms to renal syndromes and myalgias [7]. Hantavirus infection can be diagnosed by blood tests. Antibodies of certain types help diagnose the virus. Hantavirus has no specific vaccines but would be controlled with administering immunological and respiratory support [8].

COVID - 19:

Coronavirus is an infectious virus. It has taken the lives of many people and has crashed the economy of various countries. Until now the disease has been incurable. It hosts animals mostly [9]. Vaccines against coronavirus are still under research. Covid - 19 is a Severe Acute Respiratory syndrome, it causes various respiratory disorders, fibrosis and death. Covid - 19 can be diagnosed either by blood tests or Real time PCR. Only way to control it is immunology. The challenges faced are, it takes 5 to 6 days for the symptoms to show up. It can take up to 14 days. Self isolation should be followed [10].

CAUSATIVE FACTOR:

Hantavirus: The epidemiology of hantavirus infections in human populations is based largely on incidences of peridomestic exposure of humans to rodents in areas of endemicity. In the majority of these cases, humans acquire infection after direct contact with infected rodents or their excreta, which occurs mostly by inhaling virus-contaminated aerosol [3]. To date there has been no information nor evidence to suggest that the Hanta virus could be transmitted by mosquitoes.

COVID-19: Human to human transmission via either respiratory droplets or close contacts was initially proposed as the main routes of transmission of the pathogen based on experience gained in the previous two epidemics caused by coronaviruses (MERS-CoV and SARS-CoV) [8,9]. According to the World Health Organization (WHO) report, 2019-nCoV is a unique virus that causes respiratory disease, which spreads via oral and nasal droplets. Moreover, the pathogen of COVID-19 can float in the air in the form of aerosols and cause infection in healthy people [11]. Current evidence on other coronavirus strains shows that while coronaviruses appear to be stable at low and freezing temperatures for a particular period, food hygiene and good food safety practices can prevent their transmission through food.

CLINICAL FEATURES:

Hantavirus: Among 567 patients who met the inclusion criteria, 206 (36%) were confirmed as having HPS, and 361 were negative. There was no association between age, sex, race, or ethnicity, and ELISA results (results not shown) [12]. Fever, thrombocytopenia, elevated hematocrit, chest x-rays suggestive of HPS, and receiving supplemental oxygen were significantly associated with a positive test result. HPS was also more likely in patients who died or who resided in states west of the Mississippi River [13].

COVID-19: An important concern in the recent pandemic is the capability of the pathogen to establish and induce infection with different clinical manifestations in human. The virulence of a disease is usually measured on the basis of indicators such as mortality rate and disability. Compared with the previous two epidemics (SARS and MERS), the case fatality rate was lower and approximately 2% in COVID-19, and

only less than 15% of patients would seek hospital services [5,14]. The normal physical body temperature remains around 36.5°C to 37°C, no matter the external temperature or weather. The most effective thanks to protect yourself against the new coronavirus is by frequently cleaning your hands with alcohol-based hand rub or washing them with soap and water.

DIAGNOSIS:

Hantavirus: Serology is the mainstay of laboratory diagnosis of hantavirus infections. On onset of symptoms, most patients have detectable anti-hantavirus IgM and/or IgG levels. Indirect immunofluorescence assay (IFA) was the earliest diagnostic tests employing hantavirus-infected cells fixed on glass slides, as antigens. However, use of virus-infected cells as antigens is restricted because the yield of hantaviruses in cell lines is low and may be performed only in grade 3 laboratories [15]. In summary, a combination of molecular and serological testing is the prudent approach for laboratory diagnosis of hantavirus infections [16]. In most recorded cases, symptoms develop 1 to 8 weeks after exposure. Early symptoms, like fever, dry cough, body aches, headaches, diarrhea and abdominal pain, are almost like many other viral illnesses. This may prevent an HPS diagnosis before the illness progresses.

COVID-19: Pathogen of COVID-19 has been detected in upper and lower respiratory tracts in initial assessments. Moreover, viral RNA has been detected in fecal and blood samples in later studies [17]. The virus can cause a variety of symptoms, starting from mild illness to pneumonia. Symptoms of the disease are fever, cough, pharyngitis and headaches. According to WHO guideline, laboratory diagnosis of COVID-19 is based on a positive RT-PCR test. Results of a recent study on rapid IgM-IgG combined test revealed some limitations for RT-PCR test as a standard diagnostic method for COVID-19. The following limitations were indicated for RT-PCR test: long turnaround times, complex operation, and need for quality controlled laboratories, expensive equipment and trained specialists [11].

SYMPTOMS:

Hantavirus: HPS, caused by New-World hantaviruses, has been associated with a much higher rate of fatal illness. The illness is characterized by fever and vascular leakage resulting in noncardiogenic pulmonary edema followed in severe cases by shock with lactic acidosis, a low cardiac index and elevated systemic vascular resistance [18]. Following the incubation period, the patient develops a prodrome of fever, myalgia, and progressively worsening thrombocytopenia, often accompanied by headache, back pain, abdominal pain, and diarrhea. Both IgM and IgG antibodies can typically be detected at or shortly after the onset of the prodrome [19]. Early symptoms include fatigue, fever and muscle aches, especially within the large muscle groups—thighs, hips, back, and sometimes shoulders. These symptoms are universal. There may also be headaches, dizziness, chills, and abdominal problems, such as nausea, vomiting, diarrhea, and abdominal pain.

COVID-19: 98% of the patients in the study had fevers, of which 78% had a temperature higher than 38°C. They reported that 76% of the patients had coughs, 44% of patients experienced fatigue and muscle pain, and 55% of patients had dyspnea [20]. A small number of patients also developed expectoration (28%), headaches (8%), hemoptysis (5%), and diarrhea (3%). Laboratory tests found that 25% of infected patients had leukopenia and 63% had lymphocytopenia. The level of aspartate aminotransferase was elevated in 37% of the patients [21]. Myocarditis was diagnosed in 12% of the patients, and the level of hypersensitive troponin I was significantly increased in these patients. Abnormalities in chest computed tomography (CT) images were found in 100% of the patients. Grinding glass- like and consolidation areas were found in 98% of the infected patients' bilateral lungs [22].

TREATMENT:

Hantavirus: Ribavirin was tested for efficacy in HFRS patients in China and shown to have a statistically significant beneficial effect if initiated early in the disease course [23]. No FDA-approved vaccine for HPS is available in the United States [24]. A killed-virus vaccine, almost like approaches utilized in China and Korea, isn't being pursued for several reasons, including the risks related to the production of virus under high-containment (BSL-4 for large preparations of virus) and unresolved questions of the efficacy of killed-virus vaccines. However, a number of laboratories have been working to develop vaccines that employ viral antigens delivered by DNA vectors or as recombinant proteins [19].

COVID-19: As of 23 February 2020, no COVID- 19 vaccine has been successfully developed. At present, the treatments of patients with SARS- CoV- 2 infection are mainly symptomatic treatments [25]. A study reported that the most common complications in patients with 2019- nCoV infection were acute respiratory distress syndrome, followed by anemia, acute heart injuries, and secondary infections. Therefore, empirical antibiotics, antiviral therapy (oseltamivir), and systemic corticosteroids were often used for treatments. Patients with intractable hypoxemia were given invasive mechanical ventilation [22,26].

ECONOMIC EFFECTS:

Hantavirus: During the outbreak of the pandemic hantavirus in China, there was also a severe downfall in the economy due to lock down and quarantines ordered by the government. But no clear data of the exact economical effects have been published. It is also seen that the hantavirus has not caused that much economic downfall as compared to COVID-19.

COVID-19: The entire world is going through a collapse in economical standards because of the corona virus. This collapse is mainly due to the reduction in consumer movement. There has been a great economic downfall for both government and private sectors. The sudden downfall can be due to sharp rise in unemployment, stress on supply chains, decrease in government income, collapse of tourism industry and reduced fuel consumption [27].

LIMITATIONS:

COVID-19 proper structure has been unidentified. No proper vaccines have been discovered for both the viruses.

FUTURE SCOPE:

This review can be used for any quick references regarding the deadly viruses and any future spread of these viruses could be controlled and treated.

CONCLUSION:

Hantavirus pulmonary syndrome is a significant health threat in endemic areas because of the sporadic and unpredictable occurrence of disease in formerly healthy adults, its high case–fatality rate and absence of vaccines or drugs. Vaccination of individuals in endemic areas or those who could be exposed to the virus in military, clinical or research settings would be an important strategy toward reducing the incidence of disease. As novel pathogens have emerged and spread, the international response has become successively more sophisticated and far reaching. Initially detected by monitoring systems put in place after the SARS-CoV outbreak of 2002–2003, the emergence of SARS-CoV-2 has been accompanied by a remarkable response from public health bodies and the scientific community.

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CONFLICT OF INTEREST:

There was no conflict of interest declared.

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