Review Article

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An updated review on etiopathogenesis of corona virus

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Abstract

Corona Virus disease is a contagious disease that the new generation is always hearing about. It is an infectious disease caused by newly discovered coronavirus namely, SARS-COV. At first, this virus primarily targets the respiratory systems. These viruses spread through droplets of saliva or discharge from nose, sneezes, or coughs. The origin of this disease is from Wuhan City, China. Scientists discovered that this is the virus having the largest RNA Genome amongst RNA viruses. Day by day it is spreading and making clusters.

Keywords: Corona Virus, Nucleocapsid, SARS-COV2,RNA viruses.

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Introduction

Coronavirus Disease 2019 (COVID 19) are a family or group of RNA viruses.. This is a pandemic disease " occurring over a wide geographic area and affecting in a high portion of the population ".The last pandemic was H1N1 flu pandemic in 2009.Corona virus is derived from Latin "corona" it means "crown" or "wreath". This was named by June Almeida and David Tyrrell. These are the people who first observed and studied human Corona virus diseases. This name represents according to their characteristic appearance of virions (means the effective form of the virus) by using electron microscope [1]. Coronavirus is caused by SARS-COV2 .These viruses cause diseases in mammals and birds.This corona virus cause respiratory infections from the common cold to more severe diseases such as Middle East Respiratory

Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS).so corona virus is a major health concern and devastating, especially for elders.[2]figure 1 shows the diagram of Corona Virus.

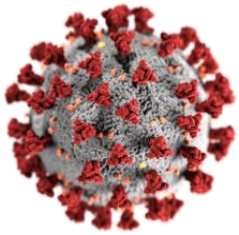

Fig 01: Illustration of Corona Virus

These viruses are likely to be zoonotic origin based on large number of people who infected this coronavirus disease from animal market in Wuhan city, China. These infected people were epidemiologically linked to sea food and animal market in Wuhan, Hubei Province in China [3].At the end of Decembe 2019, some patients were admittedto hospitals with initia diagnosis of pneumonia .At first the infected patients shown acute respiratory syndrome then after that the patient ha underlying diseases such

as Diabetes, Hypertension and cardiovascular disease [4]. On half of January coronavirus count has raised and starts spreading from person-to-person. A number of countries reported that includes Vietnam, Thailand, Taiwan, Nepal, Sri Lanka, Cambodia, Japan, Malaysia, Cambodia, Republic of Korea, United Arab
Emirates Canada, France, Finland, Cambodia, Australia, Germany and India (fig 02) [5].

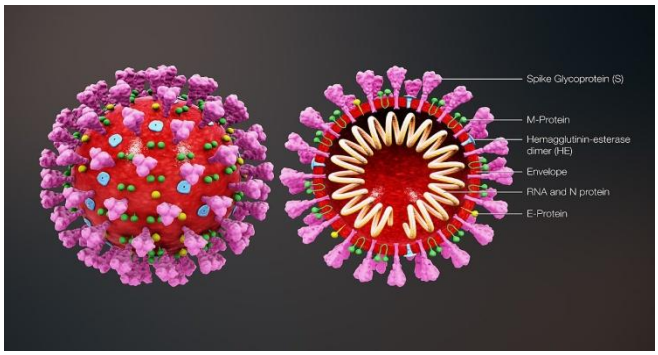

Fig 02 : The picture show the spread of Corona Virus

Due to the first cases of spreading In United states led to Identification, Description, Diagnosis, clinical course and management of this case.In the month of February, the count of persons who infected been raised to 51,174 and 15,384 severe cases and death cases comes to 1666 in China [6].

Fig 03 : Structure of Corona Virus

The spikes of the coronavirus are homotrimers of S protein , which is S1 and S2 subunit. The S1 Subunit forms as the head of the spike and also has a receptor binding domain (RBD).The S2 subunit forms the stem which acts as an anchor. It anchors the spike in the viral

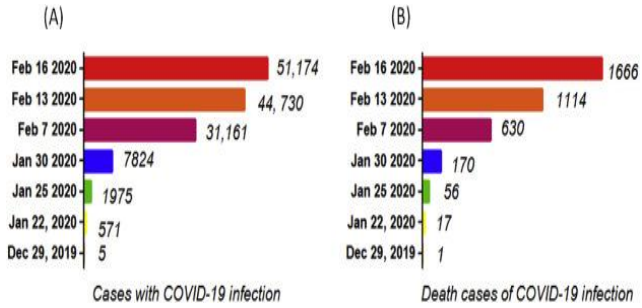

Figure 3 : The report of people who Infected and Death cases

Report from WHO :https://www.who.int/docs/default-source/coronaviruse/situation-reports

(A) Shows the cases of people who infected

(B) Shows the Death cases who are affected with covid 19 (Fig 03)

ETIOLOGY

Coronavirus is caused by SARS-COV2 .Coronaviruses are in spherical shape with bulbous surface projections. This virus spikes have average diameter about 125 nm, spikes is about 20nm long and envelope is 85nm.This envelop contains a lipid Bilayer, which consist of membrane (M),envelope (E) and Spike (S) structural proteins are anchored. From the observation its found that on an average a corona virus particle has 74 spikes and also a subset of coronavirus have shorter spikes-surface protein called Hemagglutinin Esterase [7].

envelope and on protease activation which enables fusion.when coming to the inside the envelope there is the nucleocapsid, it have multiple copies of nucleocapsid (N) protein ,these are bound to the positive-sense single-stranded RNA Genome in a continuous beads-on-a-string type conformation. When they are outside the host cell some characteristic fearures that will protect them they are Membrane protein, Nucleocapsid, and the lipid bilayer envelope [8].

Genome consists a positive-sense , a single-stranded RNA genome. The size of genome of this RNA Virus is considered as the largest among RNA viruses. Genome contain 5′methylated cap and a 3′polyadenylated tail. Then the genome organization would be 5′-leader-UTR-replicase (ORF1ab)-spike (S)-envelope (E)-membrane (M)-nucleocapsid (N)-3′UTR-poly (A) tail.

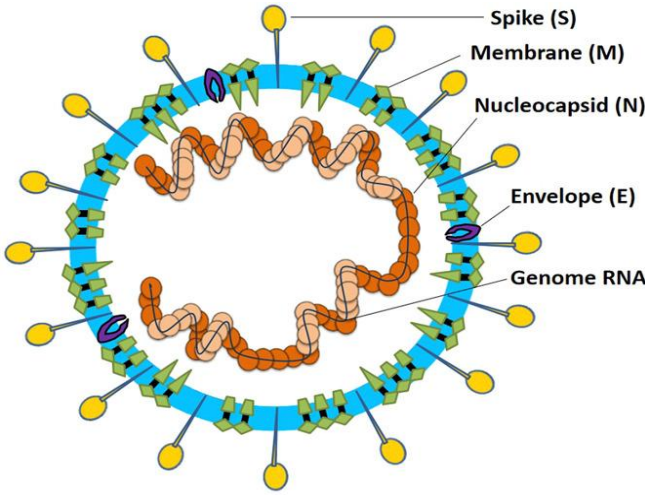

Fig 04 : Corona Virus detailed microbiological structure

Fig 04 :The above images shows about the Spikes (S), Membrane (M), Nucleocapsid (N), Envelope (E) and Genome RNA. From the image itself shows that corona virus is having largest RNA.[9]

PATHOPHYSIOLOGY

The corona virus are enveloped and single –stranded RNA viruses found in human and other mamals. These can cause respiratory , gastrointestinal and neurological diseases.In humans SARS-CoV-2 is the third corona virus which causes Severe Acute Respiratory Syndrome (SARS) [10]. Corona virus primarily infect the upper respiratory and gastrointestinal tract of birds and mammals.The most common corona virus is SARS-CoV which causes SARS. These corona virus also bring gastroenteritis. In human adults they bring common cold.In farm animals and domesticated pets which can bring a range of disease. Structure of corona virus consists of Spike (S), Membrane (M), Envelope (E) and Nucleocapsid (N).A spike-like protein called Hemagglutinin esterase (HE) has encoded in their genome [11].

REPLICATION OF CORONA VIRUS

The replication begins from in cytoplasm in a membrane protected microenvironment.In the cytoplasm there is RNA genome.The genome has a 5′ methylated cap and a 3′polyadenylated-A tail. This makes RNA to attach to ribosomes. Replicase is the first protein, this replicase is translated the translation is stopped by a stop codon.The RNA genome is replicated and forms a long polyprotein is formed.it also have a non-structural protein called protease which can separate the proteins in the chain [12].

TRANSMISSION

These Corona virus is transmitted by aerosols of Respiratory secretions,by the fecal-oral routeand the transmissions are done by mechanical transmission.Most of these virus grow in epithelial cells ocassionaly in liver, Kidneys, heart or eyes will be infected.In respiratory infection this growth appears to the epithelium and upper-respiratory tracts [13].

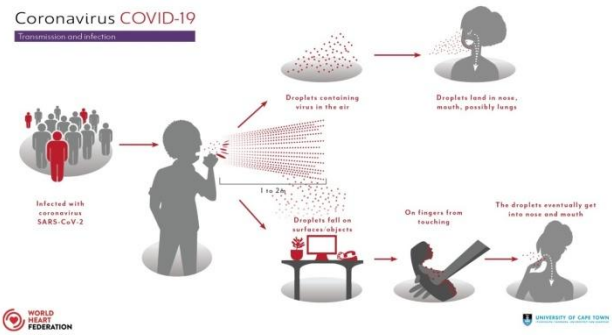

Fig 05 : The image shows spreading of corona virus through several medium

This coronavirus can spread directly or indirectly (through contaminated objects or surfaces) or contact with infected person via mouth or nose secretion. People who are in close contact can catch covid-19. [14]

We can protect ourselves by staying 1metre from others if it is in a group or not , use fabric mask and hand sanitizers, cleaning hands frequently and maintaining social distances [15].

SIGNS & SYMPTOMS

The infected people showed sign of higher Leukocyte numbers, abnormal respiratory findings and increased levels of plasma pro-inflammatory cytokines ,coarse breathing sounds of both lungs, and a raise in body temperature of 39.0 °C or above.High erythrocyte sedimentation rate and D-dimer were observed.Also high blood levels of cytokines and chemokines were found in patients with COVID-19 infection [16]. Less symptoms are Diarrhoea, headache, loss of taste and smell, a rash on skin or decolouration of fingers and toes ,sore throat and conjuctivities.The most common symptoms are fever, dry cough, tiredness [17].

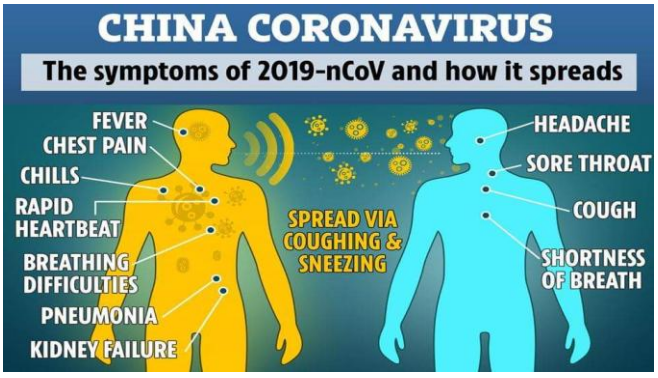

Fig 06 : Symptoms and signs of Corona Virus

(Fig 06) The image will show a clear vision about Signs and Symptoms of Corona Virus.Some serious symptoms are difficulty in breathing or shortness of breath , chest pain or pressure and loss ofspeech or movement.

Conclusion

Corona Virus are Zoonotic, means they are transmitted between people and animals.This viruses bring Middle East Respiratory Syndrome (MERS-CoV) which affects the respiratory system.Coronavirus is caused by SARS-COV2 . The new Corona virus leads to millions of infection globally and causing more deaths. The people who having serious medical conditions, heart disease, chronic lung diseases,people aged above 65 years would affect more badly and van can cause death also. By following standarad recommendations such as washing hands, wearing mask, using sanitizers and social distancing can stop the spread of these diseases.

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