

Till 2019 people hardly considered Coronavirus a threat to the mankind. Coronavirus generally causes a plethora of disease in various animal species. Human Coronaviruses (HCoV) was isolated in 1965. It is known to cause innocuous respiratory infections and occasional viral diarrhea in human. The first epidemic of HCoV, Severe Acute Respiratory Syndrome (SARS) was reported in 2002. Middle East Respiratory Syndrome (MERS) was the next major HCoV outbreak which occurred in 2012.

The Coronavirus family comprises of two subfamilies, Coronavirus and Torovirus. The Coronavirus subfamily is divided into four genera, alpha, beta, gamma and delta. Human Coronaviruses (HCoV) belong to alpha and beta genera. Coronaviruses are medium to large enveloped RNA viruses. The viral RNA is 30 kilobases in length, positive sense, single stranded. It is the largest known viral RNA. It has got characteristic widely spaced, petal shaped surface projections, making the virus look like solar corona. Structurally a nucleoprotein (N) surrounds the RNA genome and together they appear as a coiled tubular helix inside the bilayer lipid envelope. This envelope contains two or three glycoproteins. The viruses are heat labile and also to lipid solvents and acid pH.

While replicating, first the virus attaches to the cell membrane by HE or S protein in the spikes. Some of the viruses use angiotensin-converting enzyme 2 (ACE 2) as the cellular receptor. Next the penetration occurs due to fusion of the viral envelope with plasma membrane. A large polyprotein is formed and it is cleaved into 15 or 16 nonstructural proteins and a replication complex is formed, following which the transcription is initiated. Virions are assembled by budding into cytoplasmic vesicles and released by cell lysis.

Though Coronavirus infections usually occur throughout the year, more cases are seen around winter months. Asymptomatic and symptomatic infection occurs at all ages. Coronavirus infection contributes about 35% of upper respiratory infection during peak activity. Occasionally there may be outbreaks. Reinfection is common. It may be due to rapid diminution of antibody level after infection.

Infections occur mainly through respiratory route via aerosols generated during cough, sneeze or talking. It consists of saliva and nasopharyngeal secretions that are contaminated with infectious agents. The droplets can be propelled for some distance depending upon their size and force of expulsion. Small droplets less than 5µm can travel rapidly and some distance depending upon the external environment. Respiratory droplets can also contaminate inanimate objects. Touching these objects with contaminated fingers following cough or sneeze can transmit infection.

In healthy children HCoV replicate only in the upper respiratory tract. The incubation period is generally 2 days and the infection lasts for about a week. Infection in immune-compromised children may be severe.

Manifestations of HCoV

Upper respiratory tract infection: It often presents like an undifferentiated acute respiratory tract infection. Rhinorrhea, sore throat, cough, malaise, headache and fever are the usual features.

Lower respiratory tract infection: It is also a cause of viral pneumonia and bronchiolitis. It may also precipitate acute asthma.

Enteric infection: Outbreaks of severe diarrhea and NEC.

Neurologic diseases: ADEM, multiple sclerosis, polyradiculitis.

Severe Acute Respiratory Syndrome (SARS): First identified in China in November 2002 and subsequently it spread throughout the world. The epidemic lasted till the summer of 2003, the last known case occurred in summer of 2004. It accounted for 774 deaths (9.6% mortality) all over the world.

SARS-CoV was classified as betacoronavirus lineage B. It originated in animals, most probably bats and then spread to exotic animals for human consumption in China. Humans were affected subsequently through an intermediate host. The viruses have been noted to mutate frequently and infect new species. In children the disease manifested with fever and systemic influenza like symptoms along with cough. Some children had diarrhea. Pneumonia developed in few children

Middle East Respiratory Syndrome (MERS): The first case was in Saudi Arabia in June 2012. Later it spread to different parts of the world. The virus was named MERS-CoV. Globally it accounted for 609 deaths (36% mortality). MERS-CoV was classified as betacoronavirus lineage C, it is closely related to bat coronaviruses. Patients present with fever, chills, sore throat, cough, arthralgia and myalgia. Often develop dyspnea and rapidly progress to pneumonia. Some patients presented with nausea, vomiting and diarrhea. Renal failure, pericarditis and ARDS have been reported. Children and adolescents with MERS sometimes have been asymptomatic or mildly symptomatic.

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