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VIROLOGY ASSIGNMENT

**Q1**

**Discuss the etiology, origin, structure and pathophysiology of COVID – 19.**

Coronavirus disease 2019(covid-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) . The disease was first identified in december2019 in Wuhan, the capital of china’s Hubei province, and has since spread globally, resulting in the ongoing 2019-20 coronavirus pandemic. Common symptoms include fever, cough, and shortness of breath. The virus is spread mainly through close contact and via respiratory droplets produced when people cough and sneeze. Respiratory droplets may be produced during breathing but the virus is not generally airborne. People may also contract covid 19 by touching contaminated surface and then their face. It is most contagious when people are symptomatic, although spread may be possible before the symptoms appear. The virus can survive on surfaces up to 72hrs time from the exposure to onset of symptoms is generally between two or 14days with an average of five days. The standard method for the diagnosis is by reverse transcription polymerase chain reaction (rRT-PCR) from a nasopharyngeal swab. The infection can also be diagnosed from a combination of symptoms risk factors and a chest CT scan showing features of pneumonia.

Recommended measures to prevent infection include frequent hand washing, social distancing (maintaining physical distance from others, especially from those with symptoms) covering coughs and sneezing with a tissue or inner elbow and keeping unwashed hands away from face.

**Signs and symptoms**

Fever

Dry cough

Fatigue

Sputum production

Loss of smell

Shortness of breath

Muscle or joint pain

Sore throat headache

Those infected with the virus may be asymptomatic or develop flu like symptoms including fever cough fatigue and shortness of breath. Emergency symptoms include difficult breathing, persistent chest pain or pressure, confusion difficulty waking, and blush face or lips immediate medical attention is advised if these symptoms are present. Less commonly upper respiratory symptoms such as sneezing, runny nose, or sore throat may be seen. Symptoms such as nausea vomiting and diarrhea have been observed in varying percentage.

As is common with infection there is a delay between the moment when a person is infected with the virus and the time when they develop symptoms this is called incubation period. The incubation period for covid-19 is typically five to six days but may range from two to 14 days

**Pathophysiology**

The lungs are the organs most affected by covid-19 because the virus accesses host cells via the enzyme ACE2, which is the most abundant in the typeII alveolar cells of the lungs .the virus uses a special surface glycoprotein called a spike to connect to ACE2 and enter the host cell. The density of ACE2 in each tissue correlates with the severity of the disease in that tissue and some have suggested that decreasing ACE2 activity might be protective, though another view is that decreasing ace2 using angiotensin II Receptor blocker medications could be protective and that these hypotheses need to be tested as the alveolar disesase progresses , respiratory failure might develop and death might follow. The virus affect gastrointestinal organs as ACE is abundantly expressed in the glandular cells of gastric, duodenal and rectal epithelium as well as endothelial cells and enterocytes of the small intestine.

 **structure**

Coronavirus virions are spherical to pleomorphic enveloped particles (Fig. 60-3). The envelope is studded with projecting glycoproteins, and surrounds a core consisting of matrix protein enclosed within which is a single strand of positive-sense RNA (Mr 6 × 106) associated with nucleoprotein. The envelope glycoproteins are responsible for attachment to the host cell and also carry the main antigenic epitopes, particularly the epitopes recognized by neutralizing antibodies. OC43 also possesses a haemagglutin.

 Causes

 The disease is caused by a severe acute respiratory syndrome coronavirus (SARS-COV-2 it is primarily spread between people during close contact and via respiratory droplets from cough and sneezes. A study investigating the rate of decay of the virus found noviable viruses after four hours on copper, 24hours on cardboard, 72hours on stainless steel and 72hours on plastics, however the disease spread faster where people are close together or travel between areas.travel restriction can reduce the basic reproduction number from 2.35 to 1.05, allowing the epidemic to be more manageable.

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