Epidemiological Features of COVID19

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The name CORONA has been in the air since December 2019 when the first report of infection with a novel virus SARS COV2 was reported in Wuhan in the province of Hubei in China. Since then the virus has spread rapidly and ferociously to all the countries including India at the cost of international travel and has been an important cause of morbidity and mortality. The disease caused by this virus SARS COV2 is called COVID 19 (Corona Virus Disease-2019) by WHO .The respiratory system is the main target of the attack however the gastrointestinal tract and the liver may also be involved during the infection. Since this is a new kid down the block our knowledge regarding natural history and pathogenesis is sparse in addition till date there is no definite therapy and no vaccine available .Hence it is empirical that we the pediatric gastroenterologists should be aware of the ABCs of this virus so that we can effectively treat and prevent this infection.

Coronaviruses (CoV) are a large family of viruses that can infect humans or animals. They are named as Corona meaning Crown because of the crown like spikes on the surface. Most corona viruses cause diseases in their particular host species, those that can infect humans through cross-species transmission have posed an important threat to public health. Corona viruses are classified into four genera, alpha-CoV, beta-CoV, gamma-CoV, and delta-CoV and have been reported to cause infection in humans from the year 1960. Over these years 7 human corona viruses tagged to specific infections have been identified. Four of these are the usual CoVs which cause mild to moderate respiratory infections, like the common cold. During the last two decades there have been two zoonotic outbreaks of beta-CoVs associated with epidemics causing severe respiratory infections namely Severe Acute Respiratory Syndrome Corona virus (SARS-CoV) and Middle East Respiratory Syndrome Corona virus (MERS-CoV),. SARS CO - V2 is the seventh in this series of human corona viruses and has been shown to cause disease by a mechanism similar to SARS Corona Virus. The source of infection was first considered to be from bats but recently the pangolin has been identified as a probable source.

Structure of the virus and its relevance: SARS CoV2 is a non segmented positive stranded large ,enveloped RNA virus with a 30 kb genome and a protein coat.(Fig 1) .The important proteins are the spike protein (S) which enables the virus to attach itself to the host cell . This protein binds with high affinity to human ACE2 receptors and uses it as an entry receptor to invade target cells. The other proteins are envelope protein(E),. the membrane protein(M) and the nucleocapsid protein(N) which encases the viral RNA. The lipid membrane protects the virus and holds the membrane and envelope protein. However washing with soap opens up the exterior lipid membrane and causes the virus to degrade. Thus hand washing for at least 20 seconds is recommended as a very important step in prevention Efficient person to person transmission occurs with this virus the Ro (basic reproduction) number being 1 to 3 indicating that one person can infect up to 3 persons then 3 infects 9 and so on .The idea of social distancing is to flatten the epidemic curve.

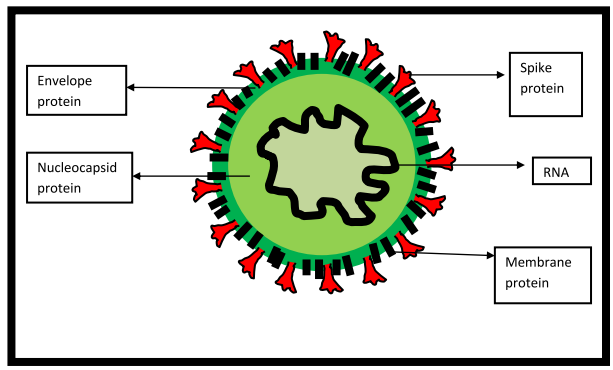

Fig. 1: Schematic Diagram of COVID19

Mode of transmission : The most common mode of transmission is the droplet infection. However the virus has been detected in respiratory secretions ,feces and blood. When an infected patient coughs, sneezes or speaks droplets of saliva or secretions from nasal cavity or respiratory tract containing the corona virus are sprayed up to a distance of about 3 feet which can

directly infect another person's mouth, eye or nose. Indirect spread can also occur as the virus can survive for about a few hours to about 3 days on various surfaces like door handles , taps ,cardboard etc. There are 4 stages of spread of the disease in a population 1.imported 2.local.3.community and 4.epidemic.

Fecal Oral Transmission : Since the virus attaches to the ACE 2 receptors of the intestine and studies have reported positive rectal swabs even after naso pharyngeal swabs have become negative fecal oral transmission has been proposed as another route of spread. It is possible that asymptomatic children and adults may be shedding the virus through this route. Therefore all precautions should be taken

Incubation Period : The incubation period of COVID -19 infection is 1 to 14 days with a mean of 5.2 days and the majority develop symptoms 10.5 days following exposure.

Age and Sex: COVID 19 is most common in the age group 20 to 50 years with male predominance.

Pattern of disease: The majority (80 %) present with mild respiratory symptoms such as sore throat ,fever ,myalgia and cough. In 15 -20 % it is severe, the cough is associated with breathlessness and requires hospitalisation. In 5 % it is critical requiring advanced and prolonged ventilatory support and this stage is associated with a high mortality.

COVID-19 in children: Information on COVID in children is very limited. In China children of all ages appeared susceptible to COVID-19, and there was no significant gender difference. The transmission was mainly person to person from close contacts in the family. Clinical manifestations COVID-19 cases in children were generally less severe than those of adults' patients, young children, particularly infants, were vulnerable to infection. Children younger than 10 years old and those 10 to 19 years old each represent about 1% of a total of just over 72,000 cases. The proportion of severe and critical cases was 10.6% in infants < 1 year of age but decreased to 3 % in adolescents more than 15 years. In Korea, the proportion of cases in children aged 0 to 19 years was 4.8%, and to date in the United States, 5% The severity and mortality of the infection in young children, contrary to circulating influenza viruses, is less than in adults. In a recent observational cohort study of children with COVID 19 it was noted that 1/3 were asymptomatic and in those with symptoms it was mild probably due to the absence of co-morbidities such as diabetes ,hypertension and cardiovascular disease. Several other reasons for the milder presentation are speculated such as lower maturity and function (*e.g.*, binding ability) of ACE2 receptors in children, higher antibody levels to other respiratory viruses and variable response to pathogens compared to adults

Suggested reading

1. Nicole Le Saux Current epidemiology and guidance for COVID-19 caused by SARS-CoV-2 virus, in children: March 2020.Canadian pediatric society .Practice point.

2. Dong Y, Mo X, Hu Y, et al. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. *Pediatrics.* 2020; doi: 10.1542/peds.2020-0702.

3. Haiyan Qiu, Junhua Wu, Liang Hong, Yunling Luo, Qifa Song, Dong Chen. Clinical and epidemiological features of 36 children with coronavirus disease 2019 (COVID-19) in Zhejiang, China:an observational cohort study. Lancet Infect Dis 2020. https://doi.org/10.1016/S1473-3099(20)30198-5