REVIEW

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COVID-19 : AN OVERVIEW.

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ABSTRACT:

In december 2019 there was a cluster of pneumonia cases in the city of wuhan, china. Some of the cases are reported visiting sea food & live animal market in wuhan. Investigation found that the disease was caused by newly discovered coronavirus. The disease was subsequently named as covid-19. Covid-19 spread within china & then rest of the world. On 30th january 2020 WHO (world health organisation) declared the outbreak of public health emergency of international concern.

KEYWORDS: Covid-19, Coronavirus, Virus.

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INTRODUCTION:-

Coronaviruses are the large group of viruses. They consist a core of genetic material surrounded by a lipid envelope with protein spikes. This gives the appearance of crown. Crown in Latin is called corona. That's why this virus gets this name.

There are different types of corona viruses that cause illness in animals & humans. In humans coronavirus can cause respiratory infections ranging from common cold to more severe diseases includes

- SARS – COV = china 2003
- MERS – COV = Saudi Arabia 2012
- SARS – COV = china 2019

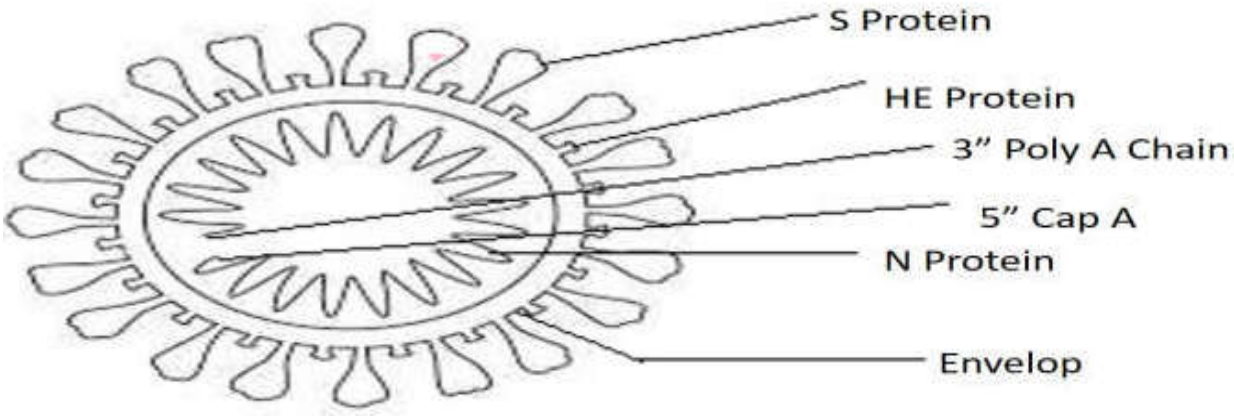

Fig.1: Structure of Covid-19.

It's known that the coronavirus circulate in range of animals. Sometimes this viruses can jump from animals to humans this is called spillover. It could be due to range of factors such as mutations in the virus or increase contact between humans and animals.

For e.g. MERS – COV is known to be transmitted from camels. And SARS – COV from cats.

The animal reservoir of the new coronavirus is not known yet.

TRANSMISSION:-

The disease can be spread from person to person through droplets. Person releases the droplets by coughing, talking and sneezing.

For e.g. when close to another person. It can also spreads when infected droplets lend on objects & when another person touches them & then touches their eyes nose & mouth.

Modes of transmission

This section briefly describes possible modes of transmission for SARS-CoV-2, including contact, droplet, airborne, fomite, fecal-oral, bloodborne, mother-to-child, and animal-to-human transmission. Infection with SARS-CoV-2 primarily causes respiratory illness ranging from mild disease to severe disease and death, and some people infected with the virus never develop symptoms.

Contact and droplet transmission

Transmission of SARS-CoV-2 can occur through direct, indirect, or close contact with infected people through infected secretions such as saliva and respiratory secretions or their respiratory droplets, which are expelled when an infected person coughs, sneezes, talks or sings. Respiratory droplets are >5-10 µm in diameter whereas droplets ≤5µm in diameter are referred to as droplet nuclei or aerosols.Respiratory droplet transmission can occur

when a person is in close contact (within 1 metre) with an infected person who has respiratory symptoms (e.g. coughing or sneezing) or who is talking or singing; in these circumstances, respiratory droplets that include virus can reach the mouth, nose or eyes of a susceptible person and can result in infection. Indirect contact transmission involving contact of a susceptible host with a contaminated object or surface (fomite transmission) may also be possible (see below).

Airborne transmission

Airborne transmission is defined as the spread of an infectious agent caused by the dissemination of droplet nuclei (aerosols) that remain infectious when suspended in air over long distances and time.Airborne transmission of SARS-CoV-2 can occur during medical procedures that generate aerosols ("aerosol generating procedures"). WHO, together with the scientific community, has been actively discussing and evaluating whether SARS-CoV-2 may also spread through aerosols in the absence of aerosol generating procedures, particularly in indoor settings with poor ventilation.

The physics of exhaled air and flow physics have generated hypotheses about possible mechanisms of SARS-CoV-2 transmission through aerosols. These theories suggest that 1) a number of respiratory droplets generate microscopic aerosols (<5 μm) by evaporating, and 2) normal breathing and talking results in exhaled aerosols. Thus, a susceptible person could inhale aerosols, and could become infected if the aerosols contain the virus in sufficient quantity to cause infection within the recipient. However, the proportion of exhaled droplet nuclei or of respiratory droplets that evaporate to generate aerosols, and the infectious dose of viable SARS-CoV-2 required to cause infection in another person are not known, but it has been studied for other respiratory viruses.

One experimental study quantified the amount of droplets of various sizes that remain airborne during normal speech. However, the authors acknowledge that this relies on the independent action hypothesis, which has not been validated for humans and SARS-CoV-2.Another recent experimental model found that healthy individuals can produce aerosols through coughing and talking , and another model suggested high variability between individuals in terms of particle emission rates during speech, with increased rates correlated with increased amplitude of vocalization. To date, transmission of SARS-CoV-2 by this type of aerosol route has not been demonstrated; much more research is needed given the possible implications of such route of transmission.

Experimental studies have generated aerosols of infectious samples using high-powered jet nebulizers under controlled laboratory conditions. These studies found SARS-CoV-2 virus RNA in air samples within aerosols for up to 3 hours in one study and 16 hours in another, which also found viable replication-competent virus.These findings were from experimentally induced aerosols that do not reflect normal human cough conditions.

Some studies conducted in health care settings where symptomatic COVID-19 patients were cared for, but where aerosol generating procedures were not performed, reported the presence of SARS-CoV-2 RNA in air samples , while other similar investigations in both health care and non-health care settings found no presence of SARS-CoV-2 RNA; no studies have found viable virus in air samples.Within samples where SARS-CoV-2 RNA was found, the quantity of RNA detected was in extremely low numbers in large volumes of air and one study that found SARS-CoV-2 RNA in air samples reported inability to identify viable virus. The detection of RNA using reverse transcription polymerase chain reaction (RT-PCR)-based assays is not necessarily indicative of replication- and infection-competent (viable) virus that could be transmissible and capable of causing infection.

Recent clinical reports of health workers exposed to COVID-19 index cases, not in the presence of aerosol-generating procedures, found no nosocomial transmission when contact and droplet precautions were appropriately used, including the wearing of medical masks as a component of the personal protective equipment (PPE). These observations suggest that aerosol transmission did not occur in

this context. Further studies are needed to determine whether it is possible to detect viable SARS-CoV-2 in air samples from settings where no procedures that generate aerosols are performed and what role aerosols might play in transmission.

Outside of medical facilities, some outbreak reports related to indoor crowded spaces have suggested the possibility of aerosol transmission, combined with droplet transmission, for example, during choir practice , in restaurants or in fitness classes.In these events, short-range aerosol transmission, particularly in specific indoor locations, such as crowded and inadequately ventilated spaces over a prolonged period of time with infected persons cannot be ruled out. However, the detailed investigations of these clusters suggest that droplet and fomite transmission could also explain human-to-human transmission within these clusters. Further, the close contact environments of these clusters may have facilitated transmission from a small number of cases to many other people (e.g., superspreading event), especially if hand hygiene was not performed and masks were not used when physical distancing was not maintained.

Fomite transmission

Respiratory secretions or droplets expelled by infected individuals can contaminate surfaces and objects, creating fomites (contaminated surfaces). Viable SARS-CoV-2 virus and/or RNA detected by RT-PCR can be found on those surfaces for periods ranging from hours to days, depending on the ambient environment (including temperature and humidity) and the type of surface, in particular at high concentration in health care facilities where COVID-19 patients were being treated.Therefore, transmission may also occur indirectly through touching surfaces in the immediate environment or objects contaminated with virus from an infected person (e.g. stethoscope or thermometer), followed by touching the mouth, nose, or eyes.

Despite consistent evidence as to SARS-CoV-2 contamination of surfaces and the survival of the virus on certain surfaces, there are no specific reports which have directly demonstrated fomite transmission. People who come into contact with potentially infectious surfaces often also have close contact with the infectious person, making the distinction between respiratory droplet and fomite transmission difficult to discern. However, fomite transmission is considered a likely mode of transmission for SARS-CoV-2, given consistent findings about environmental contamination in the vicinity of infected cases and the fact that other coronaviruses and respiratory viruses can transmit this way.

Other modes of transmission

SARS-CoV-2 RNA has also been detected in other biological samples, including the urine and feces of some patients.One study found viable SARS-CoV-2 in the urine of one patient.Three studies have cultured SARS-CoV-2 from stool specimens. To date, however, there have been no published reports of transmission of SARS-CoV-2 through feces or urine.

Some studies have reported detection of SARS-CoV-2 RNA, in either plasma or serum, and the virus can replicate in blood cells. However, the role of bloodborne transmission remains uncertain; and low viral titers in plasma and serum suggest that the risk of transmission through this route may be low. Currently, there is no evidence for intrauterine transmission of SARS-CoV-2 from infected pregnant women to their fetuses, although data remain limited. WHO has recently published a scientific brief on breastfeeding and COVID-19.This brief explains that viral RNA fragments have been found by RT-PCR testing in a few breast milk samples of mothers infected with SARS-CoV-2, but studies investigating whether the virus could be isolated, have found no viable virus. Transmission of SARS-CoV-2 from mother to child would necessitate replicative and infectious virus in breast milk being able to reach target sites in the infant and also to overcome infant defense systems. WHO recommends that mothers with suspected or confirmed COVID-19 should be encouraged to initiate or continue to breastfeed.

Evidence to date shows that SARS-CoV-2 is most closely related to known betacoronaviruses in bats; the role of an intermediate host in facilitating

transmission in the earliest known human cases remains unclear. In addition to investigations on the possible intermediate host(s) of SARS-CoV-2, there are also a number of studies underway to better understand susceptibility of SARS-CoV-2 in different animal species. Current evidence suggests that humans infected with SARS-CoV-2 can infect other mammals, including dogs, cats, and farmed mink. However, it remains unclear if these infected mammals pose a significant risk for transmission to humans.

SYMPTOMS:-

The incubation period which is time taken from exposure of virus to the development of symptoms is an average 5-6 days but can range from 1-14 days. There can be a range of symptoms from very mild to severe, some people may not develop symptoms.

COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization.

1. **Most common symptoms**:
- fever
- dry cough
- tiredness

2. **Less common symptoms:**
- aches and pains
- sore throat
- diarrhoea
- conjunctivitis
- headache
- loss of taste or smell
- a rash on skin, or discolouration of fingers or toes

3. **Serious symptoms:**
- difficulty breathing or shortness of breath
- chest pain or pressure
- loss of speech or movement

Seek immediate medical attention if you have serious symptoms. Always call before visiting your doctor or health facility.
People with mild symptoms who are otherwise healthy should manage their symptoms at home.
About 80% of cases are recovered from disease without needing special treatment but there are some people who at risk of serious illness they include older people or people with underlying medical problems such as chronic respiratory disease, obesity, diabetes, high blood pressure, heart disease or cancer.

DIAGNOSIS:-

It is commonly diagnosed by a test called reverse transcriptase polymerase chain reaction generally known as PCR. This tests identifies the virus based on its genetic fingerprint.

There is also a blood tests that can check for antibodies against the virus which may show that someone infected in the past.

In response to the growing COVID-19 pandemic and shortages of laboratory-based molecular testing capacity and reagents, multiple diagnostic test manufacturers have developed and begun selling rapid and easy-to-use devices to facilitate testing outside of laboratory settings. These simple test kits are based either on detection of proteins from the COVID-19 virus in respiratory samples (e.g. sputum, throat swab) or detection, in blood or serum, of human antibodies generated in response to infection

Rapid diagnostic tests based on antigen detection

One type of rapid diagnostic test (RDT) detects the presence of viral proteins (antigens) expressed by the COVID-19 virus in a sample from the respiratory tract of a person. If the target antigen is present in sufficient concentrations in the sample, it will bind to specific antibodies fixed to a paper strip enclosed in a plastic casing and generate a visually detectable signal, typically within 30 minutes. The antigen(s) detected are expressed only when the virus is actively replicating; therefore, such tests are best used to identify acute or early infection.How well the tests work depends on several factors, including the time from onset of illness, the concentration of virus in the specimen, the quality of the specimen collected from a person and how it is processed, and the precise formulation of the reagents in the test kits. Based on experience with antigen-based RDTs for other respiratory diseases such as influenza, in which affected patients have comparable concentrations of influenza virus in respiratory samples as seen in

COVID-19, the sensitivity of these tests might be expected to vary from 34% to 80%.[1]

Based on this information, half or more of COVID-19 infected patients might be missed by such tests, depending on the group of patients tested. These assumptions urgently require further study to understand whether they are accurate. Additionally, false-positive results – that is, a test showing that a person is infected when they are not – could occur if the antibodies on the test strip also recognize antigens of viruses other than COVID-19, such as from human coronaviruses that cause the common cold. If any of the antigen detection tests that are under development or commercialized demonstrate adequate performance, they could potentially be used as triage tests to rapidly identify patients who are very likely to have COVID-19, reducing or eliminating the need for expensive molecular confirmatory testing.

TREATMENT:-

The treatment is mainly supportive care.

Medicines against the virus are currently under investigation.

1. Remdesivir is an experimental broad-spectrum antiviral drug originally designed to target Ebola. This treatment is not yet approved in humans, but two clinical trials for this drug have been implemented in China. One clinical trial was recently also approved by the FDA in the United States.
2. Chloroquine is a drug that's used to fight malaria and autoimmune diseases. It's been in use for more than 70 years and is considered safe.
3. Lopinavir and ritonavir are sold under the name Kaletra and are designed to treat HIV. According to the World Health Organization (WHO), there could be benefits of using Kaletra in combination with other drugs.
4. China has approved the use of the antiviral drug favilavir to treat symptoms of COVID-19. The drug was initially developed to treat inflammation in nose and throat.
5. Hydroxychloroquine alone or in combination with azithromycin may reduce detection of SARS-CoV-2 RNA in upper respiratory tract specimens compared with a non-randomized control group but did not assess clinical benefit. Hydroxychloroquine and azithromycin associated with QT prolongation and caution is advised when considering these drugs in patients with chronic medical conditions or who are receiving medications that might interact to cause arrhythmias.
6. Hydroxychloroquine and Chloroquine are orally prescribed drugs that have been used for treatment of malaria and certain inflammatory conditions. Both drugs have in-vitro activity against SARSCoV, SARS-CoV-2, and other Coronaviruses, with Hydroxychloroquine having relatively higher potency against SARS-CoV-2.
7. India has approved the use of the antiviral drug Favipiravir to treat symptoms of COVID-19.The drug was developed to treat mild to moderate symptoms of covid-19.

PREVENTION:-

There are no of effective ways to prevent the spread of the disease. These include covering your mouth and nose when coughing or sneezing with flexed elbow or tissue & throwing the tissue in a closed bin immediately after use. Wash your hands regularly with soap & water or an alcohol based hand rub. Maintaining atleast 1 meter distance from people & the appropriate use of masks and PPE kit (personal protective equipment) especially in health settings. It's important to staying at home if you feeling unwell & to call a hotline or medical professional or if you have a fever, cough or difficulty in breathing seek medical care early & share your travel history or contact with someone unwell with your healthcare provider. Follow government rules & maintain physical & social distancing.

DISCUSSION:-

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

The best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol based rub frequently and not touching your face.

The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow).

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