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Covid -19 A Detailed Review of Diagnosis, Prevention and Safety Measures

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ABSTRACT

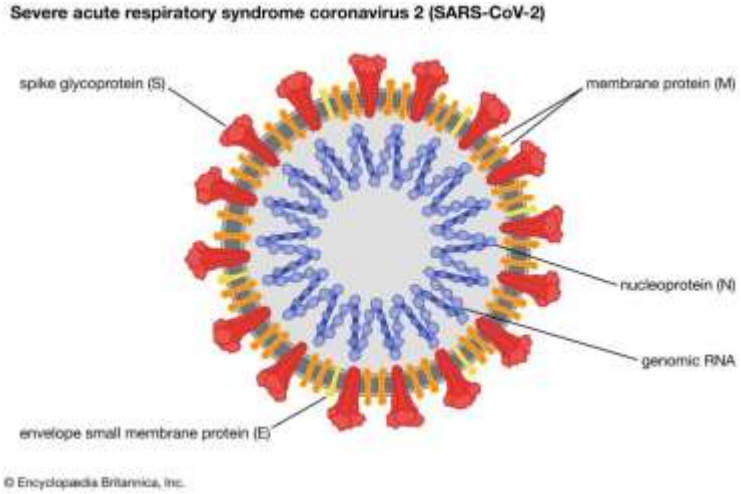
Coronaviruses are a group of enveloped viruses with no segmented, single- stranded, and the positive sense RNA genomes. The infecting a variety of economically important vertebrates (such as pigs and chickens), six coronaviruses have been known to infect human hosts and cause the respiratory diseases. Among them, severe acute respiratory syndrome coronavirus (SARS- CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) are zoonotic and highly pathogenic coronaviruses that have resulted in regional and global outbreaks Coronaviruses possess a distinctive morphology, the name being derived from the outer fringe, or -coronal of embedded envelope protein. Members of the family Coronaviridae cause the broad spectrum of animal and human diseases. Uniquely, replication of RNA genome proceeds through the generation of nested set of viral mRNA molecules. Human coronavirus (HCoV) infection causes the respiratory diseases with mild to severe the outcomes.

In the last 15 years, we have witnessed the emergence of two zoonotic, highly pathogenic HCOVs:severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV). Replication of the HCOV is regulated by a diversity of the host factors and induces drastic alterations in cellular structure and physiology. In this review all information about the Corona viruses are given.

KEYWORDS: Corona, respiratory, viruses, Hcov, host, RNA.

Introduction

Corona viruses are a large family of viruses which may cause disease in animals or humans. Seven corona-viruses can produce infection in people around the world but commonly people get infected with these four human corona viruses: 229E, NL63, OC43, and HKUI. They usually cause a respiratory infection ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) and the most recently discovered corona virus (COVID-19) causes infectious disease. This zoo notic disease caused by severe acute respiratory syndrome coronavirus 2 (SARS- CoV-2). The WHO called this infectious disease Novel Coronavirus-Infected Pneumonia (NCIP) and the virus had been named 2019 novel corona- virus (2019-nCoV). On 11th Feb 2020, the (WHO) officially renamed the clinical condition COVID-19 (a shortening of Corona Virus Disease-19), which was announced in a tweet. An outbreak of COVID-19 caused by the 2019 novel corona virus (SARS-CoV-2) began in Wuhan, Hubei Province, China in December 2019, the current outbreak is officially a pandemic. Since knowledge about the virus is rapidly evolving, readers are the urged to update themselves Regularly.



The virus is typically rapidly spread from one person to an- other via respiratory droplets produced during coughing and sneezing. It is considered most contagious when people are symptomatic, although transmission may be possible before symptoms show in patients. Time from exposure and symptom onset is generally between two and 14 days, with an average of five days. Common symptoms include fever, cough, sneezing and shortness of breath. Complications may include pneumonia, throat pain and acute respiratory distress syndrome. Currently, there is no specific antiviral treatment or vaccine; efforts consist of symptom abolition supportive therapy. Recommended preventive measures include washing your hands with soap, covering the mouth fourteen days for people who suspect they are infected. The standard tool of diagnosis is by reverse transcription polymerase chain reaction (rRT-PCR) from a throat swab or nasopharyngeal swab when coughing, maintaining 1-meter distance from other people and monitoring and self-isolation for fourteen days for people who suspect they are infected. Most of the pathological findings are located in the lower and posterior areas. It is possible to scan in colour Doppler mode in order to detect a reduced blood supply in the lesions (usually increased in other inflammatory diseases). At present, the best radiological strategy remains undefined. The use of CT for all patients appears to be unreasonable in terms of time, cost and radiation exposure, especially as the management and therapeutic approach would not depend substantially on the results. We suggest that CT scanning should be reserved for patients with an undefined clinical picture, as well as differential diagnosis.

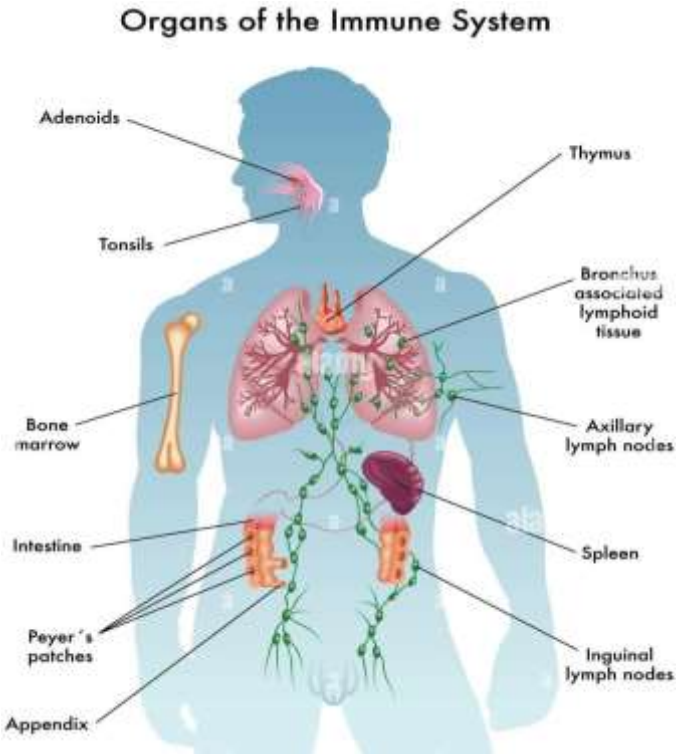
Immune response

The earth is relaxing but human is dying. As of 18th April 2020, more than 154,000 people died, 2.2 million have been affected, and at least 185 countries have been affected by corona virus. The world experienced coronavirus for the first time in 2002-2003 by Severe Acute Respiratory Syndrome (SARS) and in 2011 by Middle East Respiratory Syndrome (MERS). The causative coronavirus with zoonotic origin in the genus Beta coronavirus. agents for both cases (SARS- CoV and MERS-CoV, respectively) were newly identified The present corona virus (SARS-CoV-2) COVID-19 appeared for the first time in Wuhan, China at the end of 2019.

Process of Immune System in Human Body:

Our whole body consists of the organs of the immune system to protect against diseases. It plays the key role to maintain health and pathogenesis. It also protects our body from harmful substances, germs and cell changes (neoplasm). The key player in the immune system is the white blood cells (WBC)which can travel throughout the body using the blood vessels.

The incoming lymphatic vessels, immune cells and foreign particles enter the lymph nodes. they are in the bloodstream, it can be transported to tissues throughout the body. They continue the cycle all over through patrolling for foreign antigens everywhere and then gradually drift back into the lymphatic system. The immune cells gather, work, and serve to confront antigens in lymph nodes and spleen's.



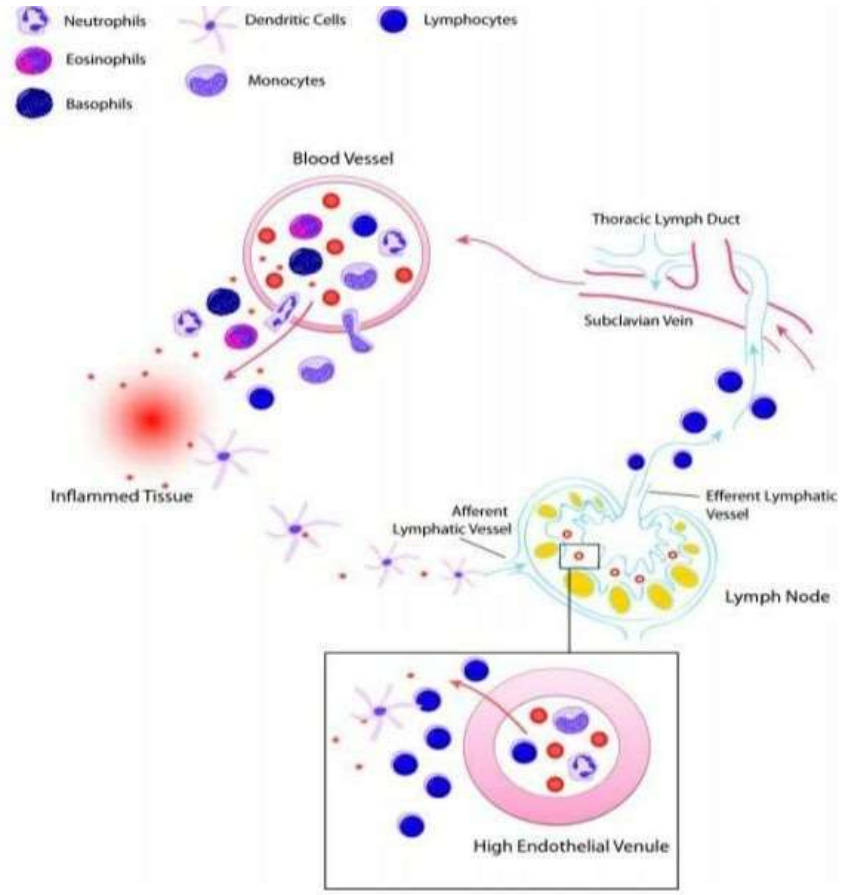
Impact of Covid – 19 on Human body :-

Covid-19 is an RNA virus with a crown like apperance .Its diameter is approx 60- 140 nm and have higher affinity. It is transmitted through respiratory droplets from coughing and sneezing. It COVID-19 virus. The spike protein present on the surface of COVID-19 gets pinched inside the enters our nasal system by inhaling and starts replicating. ACE2 is the main receptor for the role for the virus to enter, which was absent in SARS-CoV. Then the virus starts to propagate with host cell binding to the ACE2 receptor. Here, the enzyme Furin present in the host cell plays a vital.

limited innate immune response and can be detected by nasal swabs. The virus propagates and reaches to the respiratory tract. There it faces a more robust innate immune response. At this stage, the disease is clinically manifest and an innate response cytokine may be predictive of the subsequent clinical course. beta and lambda infections, the viral infected epithelial cells are a major source. These disease will be mild for 80% of infected patients and mostly restricted to the upper and conducting airways. With conservative symptomatic therapy, these individuals may be monitored at home. Around 20% of the infected patients will develop pulmonary infiltrates and some of these will develop very severe disease. The mortality rate of severe COVID-19 patients can be as high as 49% showed by a recent epidemiological by China CDC. From Wuhan, 292 COVID-19 patients were studied there. Age was the risk factor of severe patients shown by the Lasso algorithm. When the age of severe patients increased by 5, years, the risk increased by 15.15%. Most of the patients with COVD-19 were elderly patients in the severe group with the basic diseases.

Mechanism of Immune Systems in Human Body

Against Covid-19 As there is no registered medicine or vaccine against COVID- 19, our immune system is the best defence. The immunity system supports our body's natural ability to defend against pathogens which include viruses, bacteria, fungi, protozoan, and worms, resist infections. As long as the immune system runs smoothly, we do not notice infections like COVID-19. Our immune system can be categorized into three categories.



Blood in the pipeline of the immune system

After being affected by the virus immune responses to the mediate antibody. The B cells are assisted by T cells to differentiate into plasma cells, which in return produce antibodies specific to a viral antigen. Neutralizing nature antibody is efficient in fully blocking the virus from entering into host cells to limit the infection and plays a very intense protective role at the later stage of infection and prevents relapse of infection in the future. In contrast, a cellular immunity response can be seen inside the infected cells, which is mediated by T-lymphocytes. The overall adaptive immune response is directed by helper T cells, while cytotoxic T cells play a vital role in the clearance and cleaning of viral infected cells. Information from SARS-CoV and MERS CoV may allow exploration of knowledge to understand how SARS-CoV-2 escapes the host's immune response as data on SARS-CoV-2 are still very few.

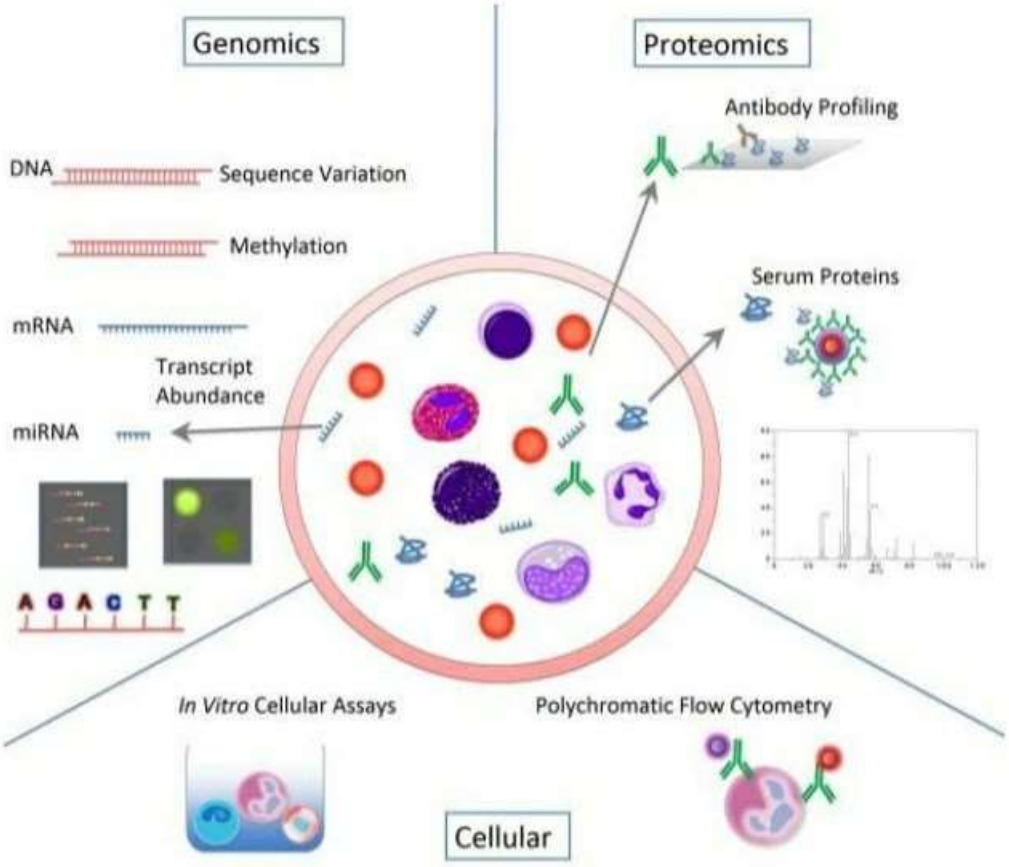


Fig:-The immune profiling armamentarium

Reasons of Failure:

The leading cause for mortality of COVID-19 patients is respiratory failure from acute respiratory distress syndrome. Secondary haem phagocytic lymph histiocytosis (sHLH) is characterised by fulminant and fatal hypercytokinaemia with multiorgan failure and it is under recognized. Viral infection triggers SHLH and occurs in 3-7-4-3% of sepsis cases in adults. sHLH, resembled by a cytokine profile, is associated with COVID-19 disease severity, characterised by increased inter leukin (IL)-2, IL-7, interferon-y inducible protein 10, granulocyte-colony stimulating factor, macrophage inflammatory protein 1-a, monocyte chemoattractant protein 1, and tumour necrosis factor-a(TNF-a).The recent retrospective of fatality predictor's multicenter. study of 150 confirmed COVID- 19 cases in Wuhan, China, included elevated ferritin and IL-6, suggesting that mortality might because of virally driven hyper inflammation.

Diet treatment

adaptive immune system. Briefly, excessive SFA usage may induce a lipotoxic condition and neutrophils. The activation of these biological stimulants produces proinflammatory mediators and activate the Toll-Like Receptor 4 (TLR- 4) uttered on macrophages, dendritic cells, and other effectors of the intrinsic immune system. In addition, the use of High-Fat Diet (HFD) in rats increased macrophage infiltration to lung tissues, specifically in the alveoli. Recently, Siegers etal demon-started that HFD increases influenza A virus-associated cardiovascular damage in mice. This is particularly pertinent to

COVID-19 patients agreed on the high rate of the infection among lung alveolar epithelial cells and taking part of lung tissue inflammation and alveolar damage in COVID- 19 morbidity. Moreover, fast food consumption and the HFD inhibits T and B lymphocyte in the adaptive immune system, followed by an increase in oxidative stress markers. Particularly, oxidative stress-induced by HFD-impairs T and B cell proliferation and maturation, and induces B cell apoptosis; it has been vital implication in host protection against viruses.

General Advice for Obstetric/Emergency Gynaecology Theatre:

1. Elective obstetric procedures (e.g. cervical cerclage or caesarean) should be Scheduled at the end of the operating list.
2. Non-elective procedures should be carried out in a second obstetric theatre, where Available, allowing time for a full post-operative theatre clean-up as per national Health protection guidance.
3. The number of staff in the operating theatre should be kept to a minimum, and all Must wear appropriate PPE. 5.11 Anaesthesia and Advice regarding Personal Protective Equipment for Caesarean Birth:

1) The level of PPE required by healthcare professionals caring for a woman with COVID- 19 undergoing a caesarean birth should be determined based on the risk of Requiring a general anaesthetic.

2) Intubation for general anaesthesia (GA) is an aerosol-generating procedure (AGP). This significantly increases risk of transmission of coronavirus to the attending staff.

3) Regional anaesthesia (spinal, epidural or CSE) is not an AGP.

4) For the minority of caesarean births where GA is planned from the outset, all staff in Theatre should wear full PPE, including a filtering face piece level 3 (FFP3) mask. The Scrub team should scrub and don PPE before the GA is commenced.

Respiratory protection

1.Triple layered surgical mask. 2.N95 facemasks.

3. These are needed when performing an aerosol-generating procedure or in an area where neonates are being provided respiratory support by CPAP device/ventilator.

Eye protection

1.Goggles (will not be usable by those using vision glasses) or face shield.

Body protection

1. Long-sleeved water-resistant complete gown including head and shoe cover. A single piece head to toe water resistant body cover will be ideal for attending resuscitation in delivery room or OT.
2. Hand protection 3.Well-fitting gloves.

Use of Personal Protective Equipment Steps in Wearing PPE (Donning) Before wearing the PPE for managing the suspected or confirmed COVID-19 Case, the proper hand hygiene should be performed. These gown should be donned first. The mask or respirator should be put on next and properly adjusted to fit; Remember to fit check the respirator.

Conclusion

Over the past 50 years the emergence of many different coronaviruses that cause a wide variety of human and veterinary diseases has occurred. It is likely that these viruses will continue to emerge and to evolve and cause both human and veterinary outbreaks owing to their ability to recombine, mutate, and infect multiple species and cell types. The Future research on coronaviruses will continue to investigate many aspects of the viral replication and pathogenesis. First, understanding of these propensity of the viruses to jump between species, to establish infection in a new host, and to the identify significant reservoirs of coronaviruses will be dramatically aid in our ability to predict when and where potential epidemics may occur.

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