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HEALTH GUIDE 2021

VOLUME XVII

COVID-19 EXPLAINED

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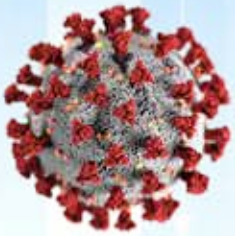

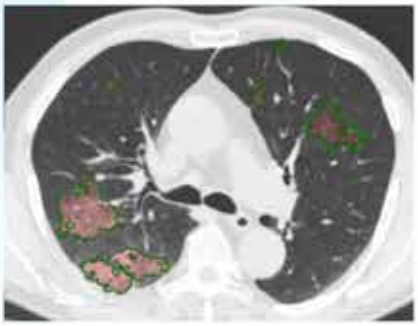

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AMBASSADOR OF INDIA
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MESSAGE

I am delighted to know that Indian Doctors' Forum – Kuwait (IDF – Kuwait) is publishing a health guide captioned '**COVID Explained**' focusing on Covid-19 pandemic. IDF is one of the most important professional groups in Kuwait and is the only Association in Kuwait which has been bestowed with the prestigious Pravasi Bhartiya Samman Award in recognition of its service to the Indian Community in Kuwait.

COVID-19 is an epochal challenge of our times. Socio-economic disruption of this magnitude has not been witnessed by humanity as a whole for many a lifetime. However, these challenging times have once again proved that we, humans are a resilient species. I am also delighted to say that India has played a leading role in this global battle against the deadly pandemic. An all-government, all-country approach resulted in decelerating the spread of the pandemic during both the waves of peak infections witnessed so far. Our frontline warriors, especially healthcare workers, worked tirelessly to save millions of lives. Our industry played a stellar role in ramping up the healthcare infrastructure within a short period of time which saw us becoming a net supplier of important medical equipments including PPE kits. Our scientists also rose up to the occasion to produce our own indigenous COVID vaccines.

While we did all this, we stayed true to our civilizational ethos and beliefs which finds expression in our age old philosophy – 'Vasudaiva Kutumbakam' or 'The World is one Family'. Hon'ble Prime Minister of India Shri Narendra Modi, who had given the clarion call of 'Aatmanirbhar Bharat' which envisaged the merger of the local with the global, also committed to put India's vaccine production capabilities and its medical assets at the service of the whole of the humanity. India truly lived up to its rightful tag of 'Pharmacy of the World' having supplied important medicines to more than 150 countries in the world and COVID vaccines to more than 90 countries.

Every Indian national in Kuwait today is aware of the services rendered by our healthcare professionals especially during the Covid-19 pandemic period. These frontline COVID warriors have toiled hard day in and day out for over a year and half now in highly challenging conditions, risking their lives to keep us and our families safe. IDF, in particular, has also taken the lead in voluntary community service going beyond their call of duty. They have been standing shoulder to shoulder with the Embassy and provide much needed assistance to our nationals here be it in the form of voluntary tele-medical consultations, or generating awareness about COVID-19 pandemic with several events, multi-lingual information campaigns, and now this special Health Guide – **'COVID Explained'** - devoted to demystifying COVID-19 for the benefit of everyone. I appreciate the effort and hardwork that has gone behind making this truly informative handbook.

I am very pleased to learn that IDF will be organizing a dedicated event following COVID protocol to release this health guide. I am particularly delighted to learn that this health guide will be distributed free of cost to the public. I extend my greetings and good wishes to the office bearers and members of IDF – Kuwait, especially the contributors to the Health Guide. Stay safe stay healthy.

(Sibi George)

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To,
Dr. Amir Ahmed K,
President,
Indian Doctors Forum – Kuwait.

The Kuwait Medical Association has always been honored and proud of its collaboration with the Indian Doctors Forum over the past several years. The IDF has involved itself in vigorous and selfless service of the less privileged members of the Indian and other expatriate communities, otherwise flourishing in the State of Kuwait, by rendering selfless and expert guidance to them in the form of Health camps and other sociocultural activities. The IDF boosts morale of the Indian Doctors working in Kuwait and provides unparalleled philanthropic and humanitarian resource to Indians in Kuwait as well as in India.

I am pleased to know that the IDF will be releasing their yearly Health Guide aptly on the burning topic of "COVID-19 EXPLAINED". It is bound to provide appropriate scientific guidance on this subject to the common person in general as well as those scientifically inclined. The role played by IDF during the ongoing pandemic is highly commendable. I would like to place on record my appreciation to all the members of IDF who rendered teleconsultation services, conducted webinars & symposiums on COVID in various Indian languages. The effort by IDF to create awareness & encourage the public to be vaccinated against COVID by releasing video messages & print pamphlets in 15 different Indian languages is noteworthy.

I am immensely grateful and thankful to the Indian Doctors and Indian Diaspora in general for their immeasurable contribution to medical services in Kuwait and great efforts in shouldering their social responsibility. I wish the entire IDF team good luck and success in all their future endeavors.

Dr Ahmad Thuweini AlEnizi
President KMA

Dr. Ahmad Th. AlEnizi
President

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PRESIDENT'S MESSAGE

At the very outset, let me on behalf of Indian Doctors Forum express my gratitude and at the same time commend Honourable Ambassador, His Excellency - Shri Sibi George and officials at the Embassy of India in Kuwait for their various initiatives to address, educate and reassure the Indian community residing in Kuwait on the various issues faced due to COVID-19 pandemic.

The Indian Doctors Forum is honored and privileged to render its services under the guidance and advice of Kuwait Medical Association & the Embassy of India. We have been rendering tele-consultation services in various Indian regional languages to the community residing in Kuwait. We have also through webinars and seminars help spread health awareness on COVID-19 to the community. Our members also visit and examine the inmates at the shelter under the Embassy of India. We offered our full support to Embassy of India initiative at over seeing that no one in our community goes hungry during this pandemic. We were at the forefront when Embassy of India decided to send oxygen cylinders, oxygen tanks and other medical supplies to India. We were committed to these humanitarian activities under the umbrella of ICSG (Indian Community Support Group).

The fight against COVID-19 can only be won by being vaccinated against this disease. Various false information, wrong beliefs and personal opinions spread through social media has deterred the public from being vaccinated. This leads to vaccine hesitancy and is one of the main reasons for newer strains of the virus emerging, leading to surge in the number of cases resulting in newer fresh waves of COVID-19 infection. Members of IDF have prepared videos and pamphlets in 14 different regional languages, dispelling the myths & false beliefs about vaccination and encouraging people to register and be vaccinated. Vaccination protects you from severe infection and protects others in the community through herd immunity. Let us all stand together in our fight against COVID-19 by being vaccinated and strictly follow COVID APPROPRIATE BEHAVIOR, which is washing of hands with soap or using sanitizers frequently, wearing of mask and maintaining social distance of 2 meter.

I wish to express my immense gratitude to Dr. Saroj Bala Grover, Dr. Arijit Chattopadhyay and the entire editorial board for presenting a concise and highly informative book titled, **'COVID-19 EXPLAINED'.** Most of the aspects related to COVID-19 has been dealt in this book, written by specialists from various specialties in simple English to be easily understood by a non-medical person. I would like to thank our Kuwaiti Colleagues and members of the forum who have contributed valuable articles in this Health Guide.

On behalf of the forum, I express my immense gratitude and respectful wishes to the Ruling family of Kuwait, Government of Kuwait and the wonderful people of Kuwait. Long live Indo-Kuwait friendship. Stay safe and stay healthy by strictly adhering to COVID protocol.

Dr Amir Ahmed. K
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GEN. SECRETARY'S MESSAGE

Indian Doctors Forum (IDF), Kuwait is a premier socio-cultural organization of Indian Doctors working in the State of Kuwait. There are approximately 600 doctors, who are members of this esteemed forum working in various Ministry of Health clinics & hospitals and Private hospitals across Kuwait. IDF is privileged to work under the patronage of the Kuwait Medical Association (K.M.A.). All the activities of IDF are conducted in adherence to the guidelines of KMA, which is a governmental body. KMA also supervises the various Continued Medical Education (C.M.E.) and Academic programs organized by IDF. IDF is proud to be of help to the people of low economic strata, by means of conducting several screening health camps and health awareness seminars, through which various cases are detected early and guided for proper treatment & further management.

IDF is the proud recipient of the PRAVASI BHARTIYA SAMMAN Award, granted by government of India for its community services.

Last year was no different for IDF, in context of the community services undertaken. In spite of the ongoing COVID - 19 Pandemic & the lockdown, IDF continued to support the needy by means of its Tele-Consultations services, Virtual Seminars and webinars on health awareness topics.

Like every year, IDF is going to release its 17th edition of Health Guide, the title of which is very apt for the current scenario, **"COVID -19: EXPLAINED "**. The health guide is authored by several experts in the field of medicine and is up to date with the latest information available on COVID-19. Topics have been written in simple language for the benefit of general public.

I would like to thank the Chief Editors Dr. Saroj Bala Grover and Dr. Arijit Chattopadhyay, and all the members of the editorial team for their tireless and commendable efforts in compiling a Health Guide on such a unique topic.

I would like to thank all the founder members and Ex-presidents of IDF, who have given us this great platform, which is an example of Unity in Diversity.
Finally, I would like to thank His Highness the Amir of Kuwait, The Crown Prince and the wonderful people of Kuwait, for giving us this opportunity to serve this great Nation.

Dr Nazim Parkar
General Secretary
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FROM THE EDITOR'S DESK

On behalf of the Editorial Board, We feel privileged and honored to present the XVII Volume of IDF Health Guide 2021; title ***"COVID-19 Explained".***

The World is going through a very difficult time for more than a year due to COVID-19 and its variant related ***Pandemic***. The disease has a Global impact with tremendous strain on Health Care Resources; front-line health care workers, equipment, treatment and hospital beds. Beside physical illness, COVID-19 has devastating impact on social, economic and mental health affecting both developed and developing Nations. This is a testing time of our patience, endurance and resilience. We should follow all ***precautionary measures*** meticulously, in order to restrict the transmission, increase awareness about the disease and most importantly about ***vaccination.***

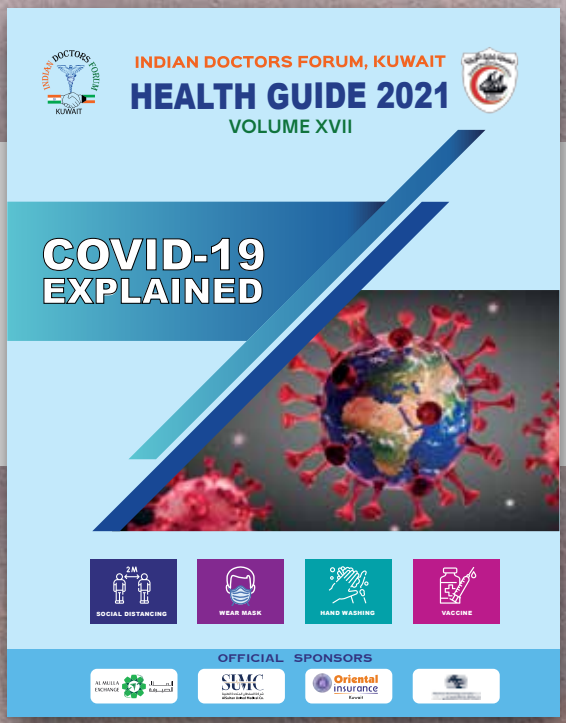
This Health Guide is intended to provide an Updated, Authentic Scientific information on COVID-19 in simple language. The book is strategically divided into Four Section: **A**. Clinical Spectrum, **B**. Special scenarios **C**. Other Useful Topics and most importantly **D**. **COVID-19 Vaccine.** COVID-19 Vaccine chapters provide an 'up to date' useful information and answers to various questions which we come across every day. All the articles have been written by the specialists with vast academic and clinical experiences in their respective fields. We are immensely thankful to all the authors for dedicating their time and expertise in writing these articles. We have also included: **1**. 'Creative Corner' which consist of beautiful pictures on COVID-19 by our Kids **2**. Useful Tips for Travelers, Health Care Workers etc.

We are thankful to Dr. Amir Ahmed, President IDF for his sustained support. We would like to thank our associate editors, Dr Mohammed Yousef Dar, Dr Arun Joshi, Dr Aarti Chadha, Dr Aditya Raina and all the office bearers and executive committee members of Indian Doctors Forum.
Our special thanks to all the dignitaries who sent their best wishes messages, sponsors who came forward to support this publication. We would like to thank Mr Suhair and members of Printshop for their meticulous and dedicated service in publishing this Health Guide.

Together we shall breakthrough; together we shall overcome; together, mankind will win, once again.

Dr Saroj Bala Grover **Dr Arijit Chattopadhyay**

COVID-19 EXPLAINED



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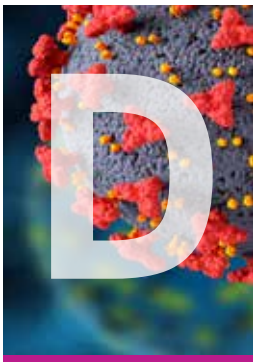

COVID-19 VACCINE INFO

COVID-19 EXPLAINED

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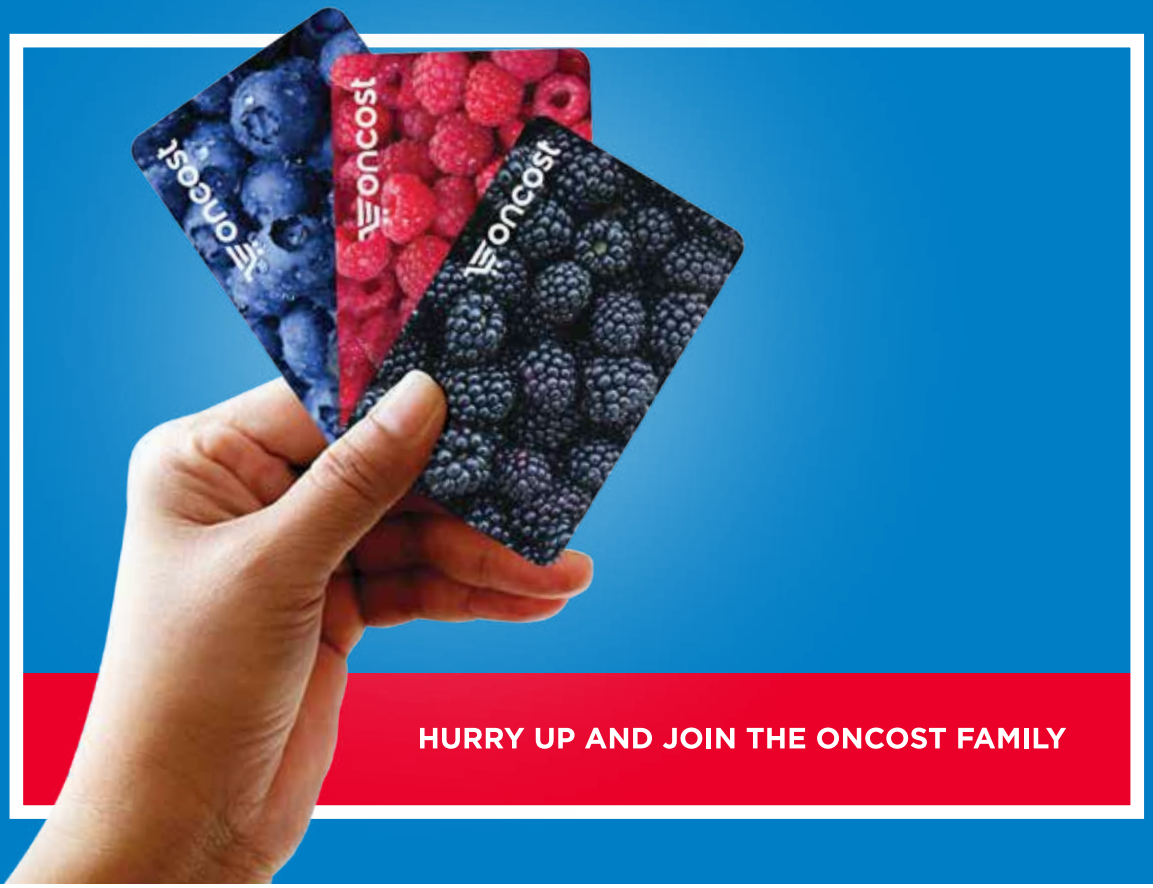

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AN OVERVIEW OF COVID-19 PANDEMIC

Dr Saroj Bala Grover
Physician
Infectious Diseases Hospital, Kuwait

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Al Sabah Hospital Kuwait

"In three words I can sum up everything I've learned about life: ***It goes on****"* *-Robert Frost*

COVID-19 Outbreak to Pandemic Status

CORONAVIRUS DISEASE 2019 (COVID-19) IS A HIGHLY contagious disease caused by a virus called **Severe Acute Respiratory Syndrome Coronavirus 2** (SARS-CoV-2) which belongs to The Middle East Respiratory Syndrome (MERS) virus and Severe Acute Respiratory Syndrome (SARS) virus Family. Coronaviruses are named for the crown-like spikes on their surfaces. The first cluster of patients of COVID-19 was reported in Wuhan City.

On January 7, 2020, it was confirmed that COVID-19 has 80% nucleotide sequence similarity to the SARS coronavirus and 96% similarity with bat coronavirus. Five days later the full genome was globally shared, a step that helped to facilitate the rapid development of diagnostics test and launched a search for **multiple vaccines Trials.**

By March 11, COVID-19 would increase by 13-fold world wide forcing the WHO Director General to officially declare a **PANDEMIC.**

Measures to Contain the PANDEMIC

The World Health Organization (WHO) advised countries to impose mitigation strategies and plan for health care needs as the Pandemic unfolded. With no effective treatments or vaccines and increasing number of infections globally, countries scrambled to promote **hand hygiene** and put into place **social physical distancing** measures such as banning large gathering, closing schools and businesses and placing people under shelter at home orders, easing the burden on healthcare systems by spreading out infection cases. The goal of **"flattening the curve of COVID-19"** became the defining graphic of the pandemic. **Initially,** lot of uncertainties persisted regarding the disease course, its mode of transmission, clinical manifestations and related precautionary measures and diagnostic modalities. **Transmission** occurs person to person through droplet produced by coughing and sneezing via personal contracts and by touching contaminated surfaces. Researchers have confirmed that infected individuals could transmit the virus without showing any symptoms either when they were pre-symptomatic or in some cases asymptomatic (never developing any symptoms of the disease). This poses a great challenge to containing COVID-19.

COVID-19 Pandemic Socio-economic Impact

The COVID-19 pandemic is the defining global health crisis we have faced in our time and the greatest challenge since World War Two. This pandemic has led to an unprecedented socio-economic crisis. An estimated 255 million jobs were lost as a result of the COVID-19 pandemic. Global unemployment increased by 33 million in 2020, with the unemployment rate rising by 1.1 percentage points to 6.5 per cent while 81 million workers quit the ranks of the labour market altogether. The International Labor Organization (ILO) has forecasted loss of 90 million full-time jobs in 2021.

As countries implemented lockdowns and near lockdowns aiming to slowdown COVID-19 transmission, adverse social, psychological and

economic consequences began to emerge and disproportionally affected the poor and marginal communities. The pandemic has massive fiscal consequences forcing governments to announce fiscal measures to protect business and people's livelihood.

New Variants of the Virus that Causes COVID-19

Multiple variants of the virus that causes COVID-19 have been documented from various geographical regions during this pandemic are circulating globally. These variant strains are evolved due to tiny changes in their genomic structures known as mutations.

On 2 June 2021, The World Health Organization (WHO) started a new naming system for these variants in 'Greek Alphabets.

Scientific name	WHO name
B.1.1.7	Alpha
B.1.351	Beta
P.1	Gamma
B.1.617.2	Delta

BBC

- The first variant, initially called B.1.1.7 with a large number of mutations in the fall of 2020. This variant spread more easily and quickly than other variants. In January 2021, Experts reported that this variant may be associated with an increased risk of death compared to other variant viruses, but more studies are needed to confirm this finding.
- Another variant called B.1.351 emerged independently of B.1.1.7. Originally detected in early October 2020, B.1.351 shares some mutations identical with B.1.1.7.
- Subsequently variant called P.1 emerged that was first identified in travelers during routine screening at an airport in early January 2021. This variant contains a set of additional mutations that may affect its ability to be recognized by antibodies.
- There is a new variant known as 'delta variant' (B.1.617.2) named on 31 May 2021 has been identified as double mutant with more chances of transmission.

These variants seem to spread more easily and quickly (transmissibility) than other variants, which may lead to more cases of COVID-19. An increase in the number of cases will put more strain on health care resources, lead to more hospitalizations, and potentially more deaths.

Rigorous and increased compliance with public health mitigation strategies, such as vaccination, physical distancing, use of masks, hand hygiene, and isolation and quarantine, is essential to limit the spread of the virus that causes COVID-19 and protect public health.

So far, studies suggest that antibodies generated through currently authorized vaccines recognize these variants. The US FDA is preparing a plan for updating vaccines. This is being closely investigated and more studies are underway.

CONCLUSION

COVID-19 infects people when they come together, but coming together is also how we will beat it. 2020 saw the World unite against the virus, from small personal gestures to protect others, to International collaboration on Research and Innovation. The year 2020 ended with **COVID-19 vaccines** rolling out – an extraordinary feat. **Science, solutions** and **solidarity** have been the primary tools addressing the biggest health threat of our time.

The **COVID-19 Pandemic** provides an opportunity to set up a different kind of World where health care can be delivered to all in a cost-effective manner, where mental health and well-being will become mainstream and part of health services.

It is uncertain to tell how long the **PANDEMIC** will continue. It depends on many things, including researchers work to learn more about the virus, their search for treatments, the **success of vaccines** tackling COVID-19 and its variants, and the public awareness and sincere effort to slow the spread.

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COVID -19 VIRUS CHARACTERISTICS AND PATHOGENESIS

Dr Aarti Chadha
Clinical Microbiologist
Mubarak Al Kabeer Hospital, Kuwait

IN late December 2019, a series of acute atypical respiratory infections ravaged several health facilities in Wuhan. It raised tremendous concerns due to ease of transmission. By metagenomics RNA sequencing and virus isolation from broncho-alveolar lavage fluid samples from patients with severe pneumonia, independent teams of Chinese scientists identified that the causative agent of the emerging disease is a beta-coronavirus that had never been documented before. On January 9th 2020, the result of this etiological identification was publicly announced. On 11 February, the International Committee on Taxonomy of Viruses named the novel coronavirus 'SARS-CoV-2', and the WHO named the disease 'COVID-19'.

What is corona virus?

A human coronavirus was isolated for the first time from the nasal secretions of a male child with a common cold in 1965 by Tyrell and Bynoe. Because of their morphological similarity with a solar corona under an electron microscope (crown-like) **(Fig 1)**, the virus was termed coronavirus. Such appearance is because of the spike [S] glycoprotein radiating from the viral surface virus. The S glycoprotein and the transmembrane glycoprotein [M] are two major envelope proteins. The S glycoprotein is an antigen that binds to the receptor and is responsible for cellular fusion. M glycoprotein has a role in envelope formation and virion assembly. The positive single-stranded RNA genome with about 26–32 Kbp, is the largest genomic RNA known among viruses and contains 7–10 different open reading frames.

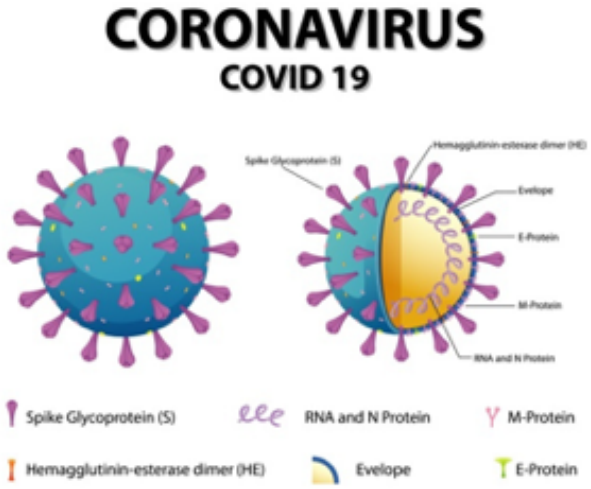


Fig 1: Structure of Corona virus

The Coronaviruses have four subfamilies including alpha, beta, gamma, and delta. The alpha and beta coronaviruses originate from mammals, while gamma and delta coronaviruses have been identified in pigs and birds. **Beta-coronaviruses** are also called **bat-coronavirus.**

How this virus infected us – from where it came?

An intermediate host usually plays an important role in the outbreak of bat-derived emerging coronaviruses; for example, palm civets for SARS-CoV and dromedary camels for MERS-CoV. The virus strains carried by these two intermediate hosts were almost genetically identical to the corresponding viruses in humans (more than 99% genome sequence identity). Currently, our knowledge on the animal origin of SARS-CoV-2 remains incomplete to a large part. The reservoir hosts of the virus have not been clearly proven. It is unknown whether SARS-CoV-2

was transmitted to humans through an intermediate host and which animals may act as its intermediate host **(Fig-2).**

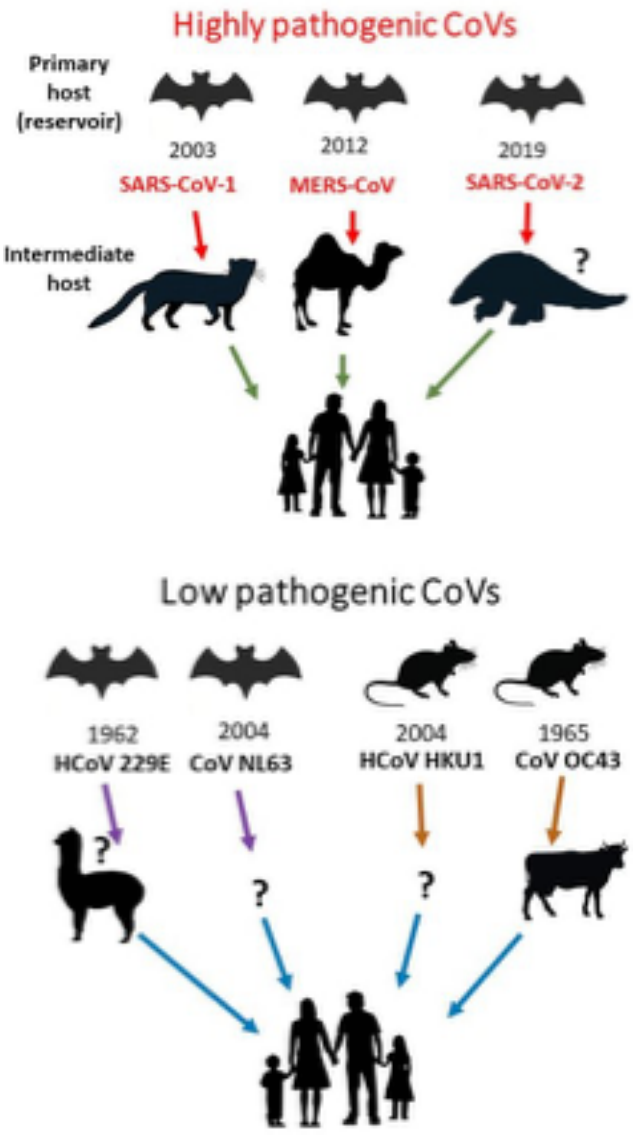


Fig 2: Primary and Intermediate hosts of various Corona virus.

Besides wildlife, researchers investigated the susceptibility of domesticated and laboratory animals to SARS-CoV-2 infection. The study demonstrated experimentally that SARS-CoV-replicates efficiently in cats and in the upper respiratory tract of ferrets, whereas dogs, pigs, chickens and ducks were not susceptible to SARS-CoV-2.

How this Virus causes infection?

The pathogenesis of SARS-CoV-2 infection in humans manifests itself as mild symptoms to severe respiratory failure. On binding to epithelial cells in the respiratory tract, SARS-CoV-2 starts replicating and migrating down to the airways and enters alveolar epithelial cells in the lungs(**Fig 3:)**. The rapid replication of SARS-CoV-2 in the lungs may trigger a strong immune response. Cytokine storm syndrome causes acute respiratory distress syndrome (ARDS) and respiratory failure, which is considered the main cause of death in patients with COVID-19.

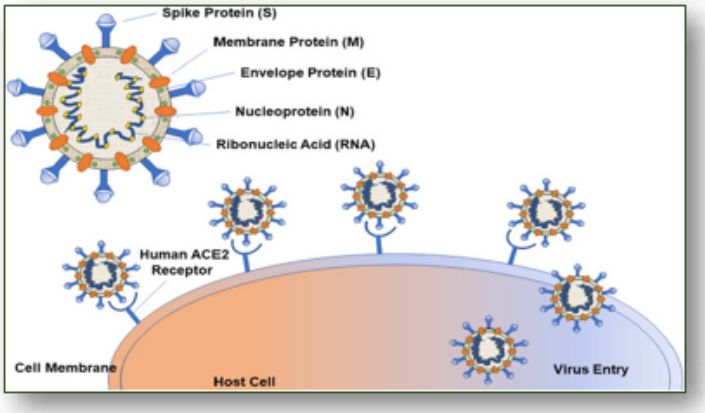


Fig 3: Entry of Virus into the host cell

SARS-CoV-2 needs ACE2 receptors and transmembrane protease serine protease 2 (TMPRSS2), for binding to various cells in our body. Single-cell RNA sequencing data showed that TMPRSS2 is highly expressed in several tissues and body sites and is co-expressed with ACE2 in nasal epithelial cells, lungs and bronchial branches, which explains some of the tissue tropism of SARS-CoV-2.

Severe and fatal severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection is characterized by chiefly pulmonary manifestations **(Fig. 4**). Clinically, **pneumonias** have been subdivided into specific phenotypes: a spectrum from patchy ground-glass opacification to the edematous lung with atypical acute respiratory distress syndrome features. Bilateral diffuse alveolar damage with cellular fibromyxoid exudates and desquamation of pneumocytes with hyaline membrane formation are pathologically apparent. For many of the patients

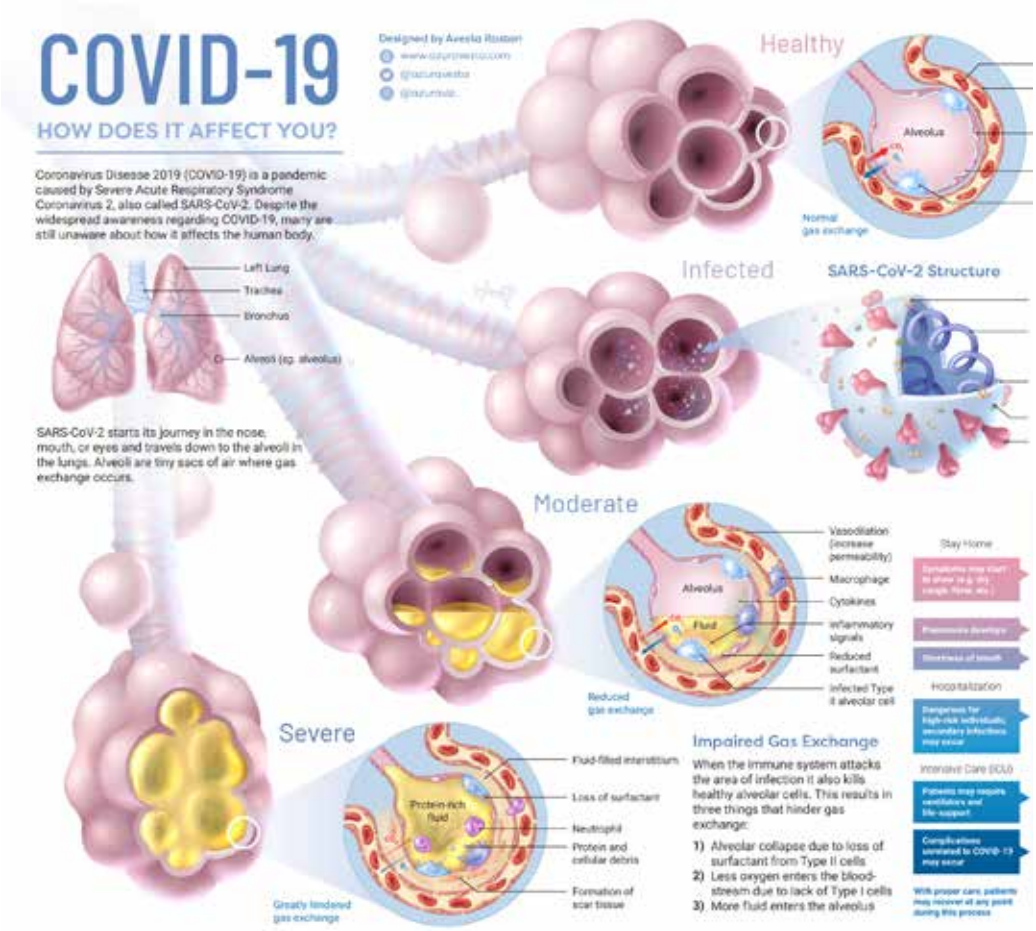
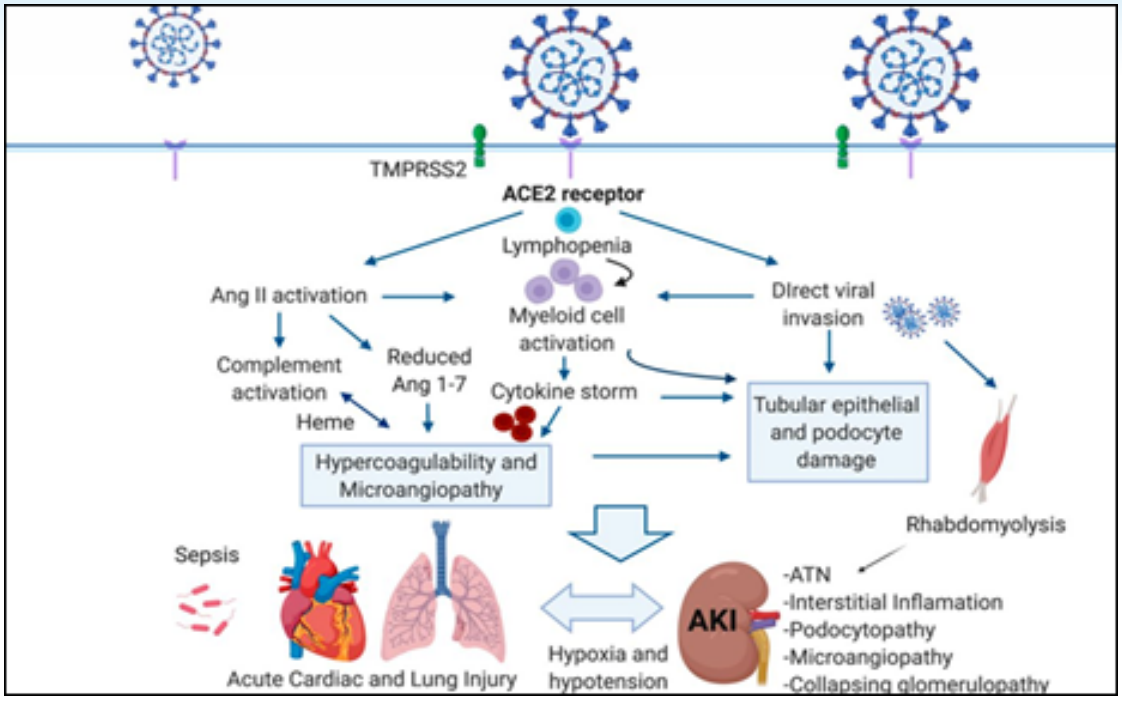


Fig 4: Changes seen in the lungs in patients with SARS-CoV-2 Infection

(varying by age and other factors), the condition has been mild. It appears that the causative virus, SARS-CoV-2, evolved into two major **genomic types**: L and S types. Although the L-type is likely phenotypically more aggressive, variability in host response is clearly a major determinant of outcome. But any system can be involved.

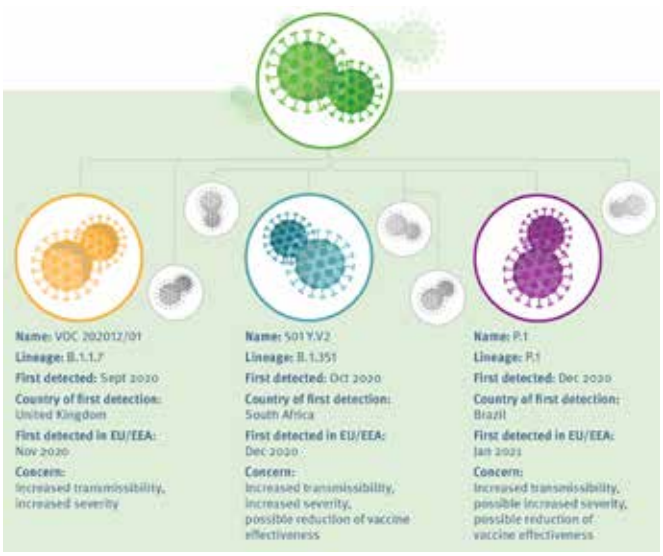
What other systems might be affected by this virus?

It can infect any system of the body, as seen in the next figure. Pulmonary system is the most common but not the only followed by cardio- vascular, renal and even nervous system. The varied presentation seen all over the globe has amazed the clinicians and it continues to do so with its post recovery syndromes in COVID-19 cases. Severe SARS/SARS-CoV-2 is suggestive of an apparent biphasic (dysregulated) immune response. A weak or absent interferon Type 1 ([IFN-1] i.e., IFNα and IFNβ) response during the early phase of SARS-CoV-2 infection plays an important role in permitting viral replication within nasopharyngeal cells and pneumocytes. Augmented T-cell apoptosis in SARS infection impedes T-cell response and engenders a relative lymphopenia.



The Variants

When a virus replicates or makes copies of itself, it sometimes changes a little bit, which is normal for a virus. These changes are called “mutations”. A virus with one or more new mutations is referred to as a “variant” of the original virus as now being seen with COVID -19 virus. Various variants seen are shown in the following figure.



Conclusion

A substantial component of this narration has been extrapolated from the laboratory work already done in the field of SARS-CoV and other coronaviral infections. Further research and understanding of the pathogenesis of this virus will be vital in developing therapeutics, vaccines and supportive care modalities.

The information in this ARTICLE is accurate at the time of publication but due to fluid nature of the COVID-19 pandemic, scientific understanding, along with guidelines and recommendations may change eventually.

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EPIDEMIOLOGY OF COVID-19

Dr. Gautam Hebbar
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Infection Control Directorate, Kuwait

THE Coronavirus disease 2019 (COVID-19) pandemic has emerged as a catastrophic health crisis which has had a devastating impact on the lives of millions of people around the world. From December 31 2019 to July 08 2021, a total of **185.1 million cases** of COVID-19 have been reported worldwide including **4 million deaths.** The reason why certain countries have higher death rates as compared to others is not fully understood and is currently being investigated by researchers. But it has been proven that the severity of illness and risk of death increases with age, with children being least affected and those above 60 years of age at the highest risk. It has also been found that people with preexisting health conditions have a higher chance of experiencing more severe COVID-19 infections.

As this virus was previously unknown to science, scientists are rapidly trying to understand how it spreads, how to treat to those who are infected and most importantly, how to prevent it from spreading. The following facts have been established:

How is it spread?

- Close contact with infected individuals is the main mode of transmission. This is why it is important to wear a mask at all times when outside the home and keep a distance of 6 feet or 2 metres from others.
- There is evidence that under certain conditions, people with COVID-19 may have infected others who were more than 6 feet away. These transmissions occurred in crowded, enclosed spaces with inadequate ventilation. This is why it is important to avoid crowded, indoor locations and ensure proper ventilation of indoor spaces.
- Respiratory droplets can fall on surfaces and objects in the vicinity of the infected person. If an uninfected person touches these surfaces and then touches their mouth, nose or eyes, they may infect themselves. This is why it is important to frequently wash your hands with soap and water or alcohol-based hand rub and avoid touching your mouth, nose or eyes.

How long after being infected does it take for symptoms to occur?

The time between when a person gets infected with the virus and development of first symptoms (also called the incubation period) can range from 1-14 days. On average, symptoms occur within 5-6 days after exposure to the virus.

How long must an infected person remain isolated?

Once a person has symptoms, it is recommended that they avoid others and remain in isolation until they have gone 3 days without fever, their symptoms have cleared and 10 days have passed since their symptoms started. This is how long a person who is infected can shed or release the virus and potentially infect others.

Can an infected person with no symptoms spread the virus?

Multiple studies have shown that asymptomatic (no symptoms) and pre-symptomatic (not yet developed the symptoms) infected individuals can spread the virus to others.

Should I worry about the new variants of the virus?

- All viruses constantly change through mutation and new variants of a virus are expected to develop over time. Sometimes these mutated viruses disappear by themselves but at other times they persist and become the predominant strain.

- Multiple variants of the SARS-CoV-2 virus are currently circulating all over the world. B.1.1.7 lineage (Alpha), B.1.351 lineage (Beta), P.1 lineage (Gamma) and B.1.617 (Delta) are variants of concern. These varieties of the SARS-CoV-2 virus have multiple mutations that allow them to spread more easily and quickly as compared to other variants. This may lead to more cases of COVID-19 and increase the strain on healthcare facilities.
- Information about the characteristics of SARS-CoV-2 variants is rapidly emerging but at this time the data suggests that the recently released vaccines should provide protection against these strains. Research is being conducted in laboratory around the world to understand these variants and evaluate their impact on public health.

What is the difference between quarantine and isolation?

- Quarantine means that you remain separated from others because you have been in contact with someone infected with SARS-CoV-2. Because you have been exposed and could have been infected, you must stay at home or a designated facility for 14 days to make sure that you do not spread the infection to others in case you have been infected.
- Isolation is used for people who have COVID-19 symptoms or have tested positive for the SARS-CoV-2 virus. Being in isolation means that you remain separated from others in either a medical facility or at home while you recover from the infection.

Where can I get more information?

Always obtain information from internationally recognized sources such as :

- World Health organization (WHO) website www.who.int
- Center for Disease Control (CDC) website www.cdc.gov
- European Centre for Disease Control (ECDC) website www.ecdc.europa.gov

Do not rely on unsubstantiated rumours or “facts” spread on social media e.g. Facebook, Whatsapp, Instagram, Twitter, Snapchat etc.

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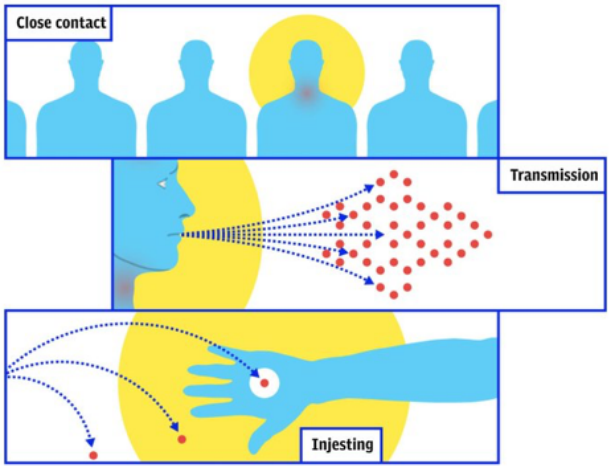
COVID –19:
MODES OF TRANSMISSION

Dr. Burhan S. Bhatia
Physician, Farwaniya hospital
Ministry of Health Kuwait

COVID -19, caused by SARS-CoV-2 **transmission** are now categorized as inhalation of virus, deposition of virus on exposed mucous membranes, and touching mucous membranes with soiled hands contaminated with virus.

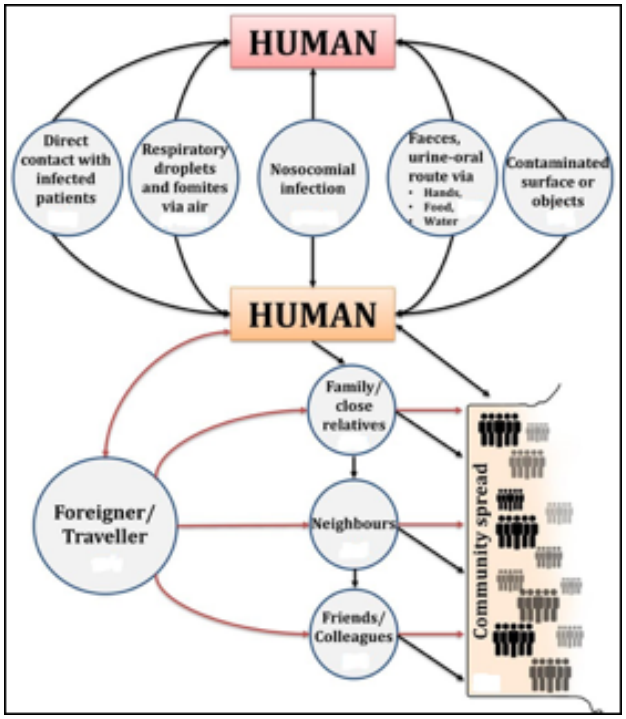


They are broadly classified into two modes of transmission: 1. Direct 2. Indirect.
The **DIRECT MODES** include

- Transmission via aerosols formed via surgical and dental procedures and /or in form of respiratory droplet nuclei **(air borne transmission)**
- Other body fluids and secretions for example – faeces, saliva, urine, semen and tears; and
- Mother to child.

The **INDIRECT MODE** includes

- Fomite transmission.

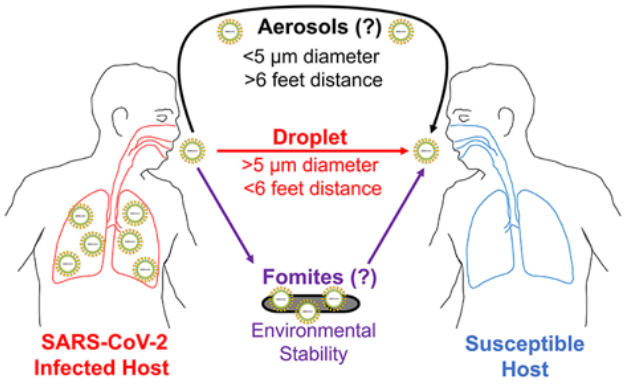


DIRECT MODES

Airborne Transmission

SARS-CoV-2 is thought to commonly spread via respiratory droplets formed while talking, coughing and sneezing of an infected person. Direct person to person respiratory transmission is the primary means of transmission of SARS-CoV-2, it is thought to occur mainly through close range contact (i.e. within approximately six feet or 2 meters) via respiratory droplets; virus released in respiratory secretion when a person with infection coughs, sneezes or talks, can infect another person if it is inhaled or makes direct contact with the mucous membranes.

Droplets are classically described as larger entities (> 5 µm) that rapidly drop to the ground by force of gravity, typically within 3 to 6 feet of the source person. Aerosols are smaller particles (≤ 5µm) that rapidly evaporate in the air, leaving behind the droplet nuclei that are small enough and light enough to remain suspended in the air for hours. Determining whether droplets or aerosols predominate in the transmission of SARS-CoV-2 has critical implications. If SARS-CoV-2 is primarily spread by respiratory droplets wearing a medical mask, face shield or keeping 6 feet apart from other individuals should be adequate to prevent transmission. If however SARS-CoV-2 is carried by aerosols that can remain suspended in the air for prolonged periods, medical mask would be inadequate, face shields would provide only partial protection (because there are open gaps between the shield and wearer's face) and 6 feet of separation would not provide protection from aerosols that remain suspended in the air or are carried by currents.



The **aerosol mode** of transmission contribution to the pandemic is controversial. In health facilities, some medical procedures called aerosol generating procedures can produce very small droplets (called droplet nuclei or aerosols) that can stay suspended in the air for larger periods of time. This is why health workers performing these procedures take specific airborne protection measure.

Fecal- Oral Transmission

Fecal oral transmission was theorized early in the outbreak because of the known high concentration of ACE-2 receptors in the small bowel. No evidence currently supports fecal – oral transmission in humans.

Blood borne Transmission

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 blood borne transmission remains uncertain and low viral titers in plasma and serum suggests that the risk of transmission through this route may be low.

Vertical Transmission

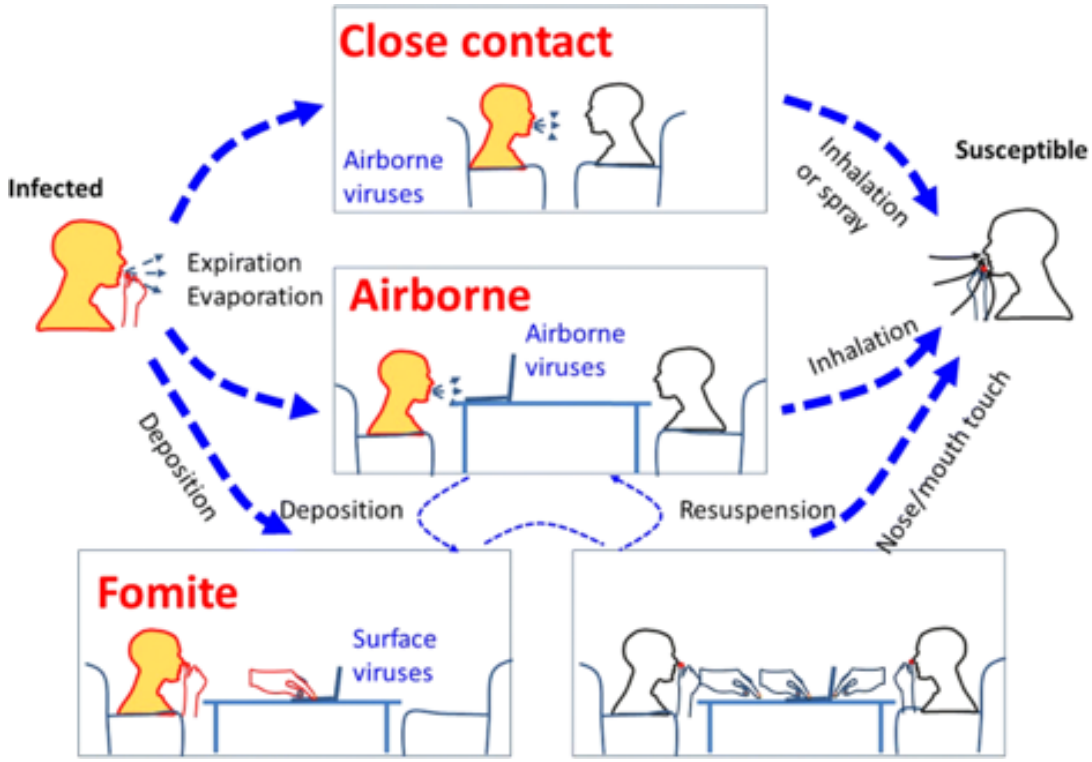
Currently there is no evidence for intra-uterine transmission of SARS-CoV-2 from infected pregnant women to their fetuses although data remains limited. World Health Organization (WHO) has recently published a scientific brief on breast feeding and COVID-19. Transmission of SARS-CoV-2 from mother to 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. The WHO recommended that mothers with suspected or confirmed COVID-19 should be encouraged to initiate or continue to breast feed.

INDIRECT MODE

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, 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



COVID-19: MODES OF TRANSMISSION

transmission. People who come into contact with potentially infectious surfaces often also have close contact with 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 corona viruses and respiratory viruses can transmit this way.

Conclusion

Understanding how, when and in what types of settings SARS-CoV-2 spreads between people is critical to develop effective public health and infection prevention measures to break chains of transmission. These include physical distancing, community use of well-fitting masks (e.g., barrier face coverings, surgical masks), adequate ventilation, and avoidance of crowded indoor spaces.

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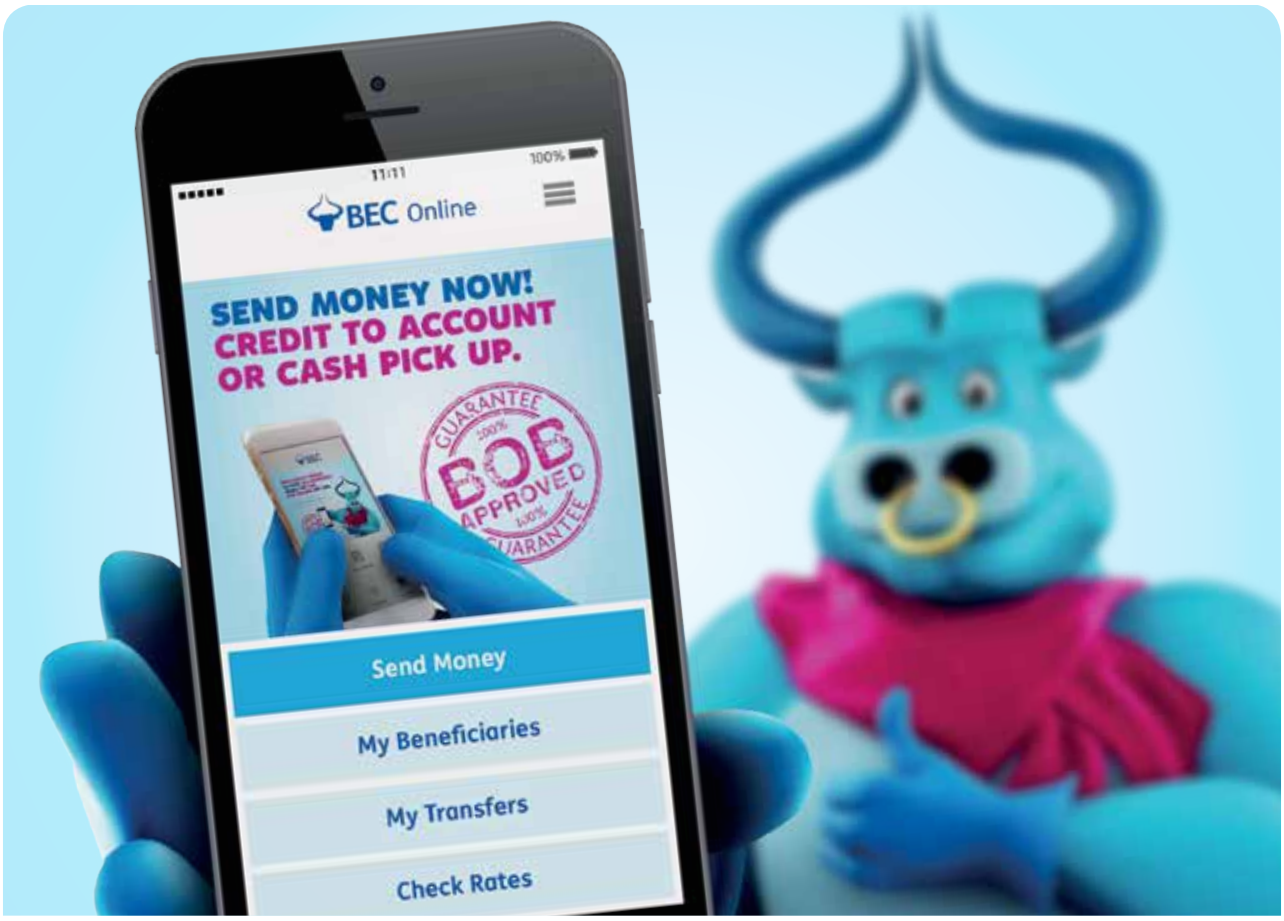

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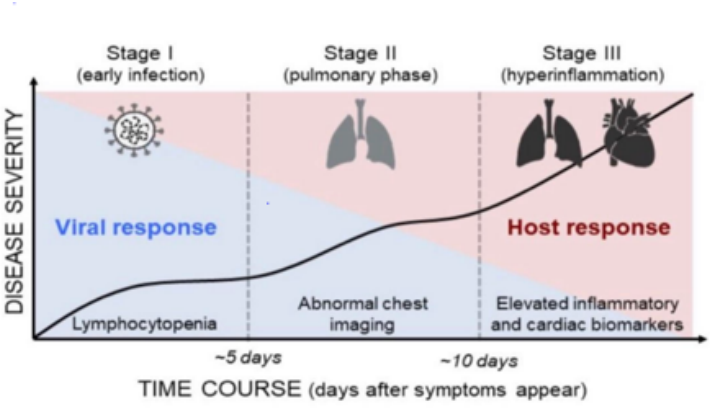
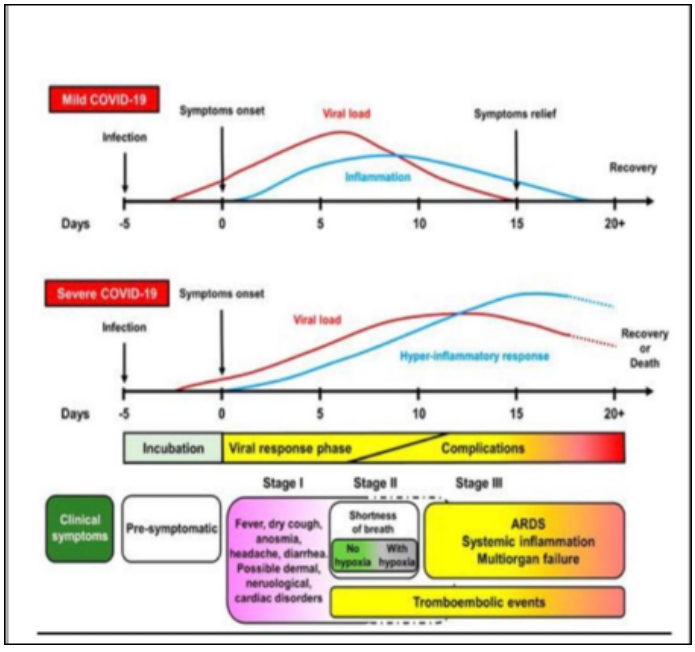
STAGES OF COVID-19

Dr. Syed M Rahman
Physician
Farwaniya Hospital, Kuwait

THE incubation period for COVID-19 disease is thought to be within 14 days following exposure, with most cases occurring approximately four to five days after exposure.

Most symptomatic infections are mild. Severe disease (e.g., with hypoxia and pneumonia) has been reported in 15 to 20 % of symptomatic infections; it can occur in otherwise healthy individuals of any age, but predominantly occurs in adults with advanced age or certain underlying medical comorbidities. Certain **laboratory features,** such as lymphopenia (90%), elevated D-dimer, and elevated inflammatory markers; ferritin, C-reactive protein and erythrocyte sedimentation rate (ESR), elevated aminotransaminase levels, elevated lactate dehydrogenase levels have been associated with severe COVID-19.





Stages of COVID- 19 infection

1. **Early infection /Viral Response** fever muscle pain, chest pain, cough, vomiting loss of taste, smell and loose motion etc.
2. **Pulmonary phase /Inflammatory phase** shortness of breath, Hypoxia (PaO2 /FiO2 ratio<300) Cardiac markers and other inflammatory markers may be elevated.
3. **Cytokine Release storm/ Hyper inflammatory phase** (severe breathing problems) leading to life threatening complications; ARDS, Sepsis, Multiorgan dysfunction, Heart failure, Clotting abnormalities and shock.

Clinical Severity stages :-

Mild

- Respiratory Rate < 24/min

- SpO2 > 94 on room air

Moderate

- Respiratory rate between 24-29

- SpO2 between 91-94 on room air

Severe

- Respiratory Rate ≥ 30

- SpO2 < 90

What factors are associated with Severe COVID-19?

Severe illness may occur in otherwise healthy individuals of any age, but it predominantly occurs in adults with advanced age or underlying medical comorbidities.

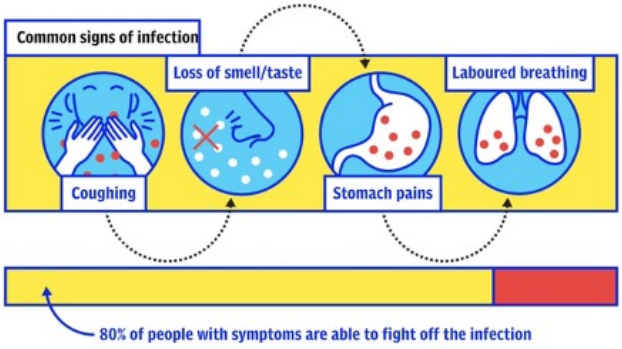
Comorbidities associated with severe illness and mortality include:

- **Cardiovascular disease**
- **Diabetes mellitus**
- **Hypertension**
- **Chronic lung disease**
- **Cancer**
- **Chronic kidney disease**
- **Obesity (body mass index ≥30)**
- **Smoking**

CLINICAL MANIFESTATION OF COVID-19

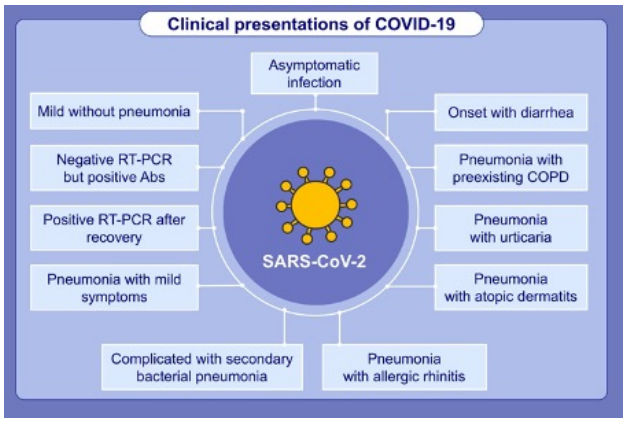
Dr Ashok Bihari Deb
Physician
City Clinic, Kuwait

Clinical manifestation of COVID-19 depends on various factors e.g. patient age, immune response, co-morbidities, medications etc. Symptoms can be widely variable in terms of severity and organ of involvement. **Fortunately,** in large majority of cases, **COVID-19** behaves like a prolonged viral flu with typical symptoms: fever, cough, shortness of breath, tiredness, muscle pain or myalgia, headache, chills, sore throat, sneezing or runny nose, reddish irritating conjunctiva, chest pain.

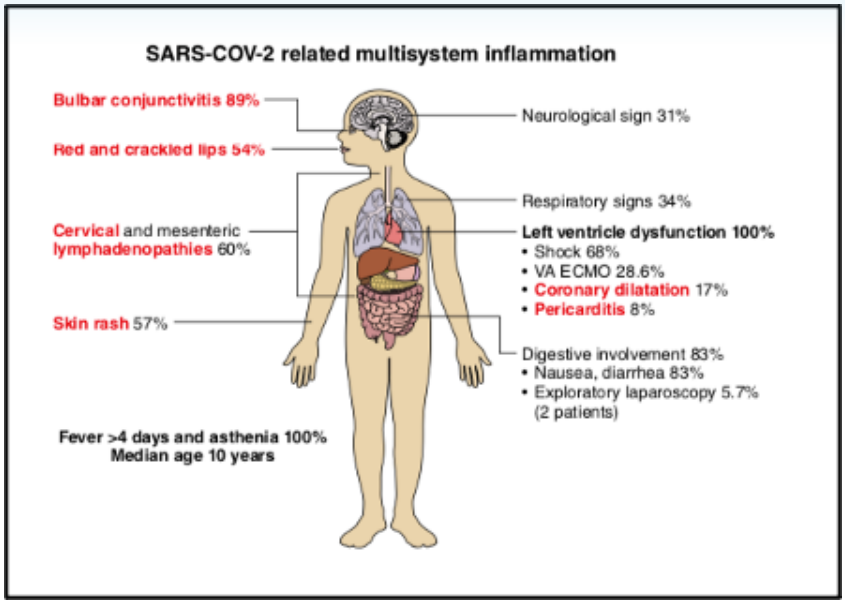


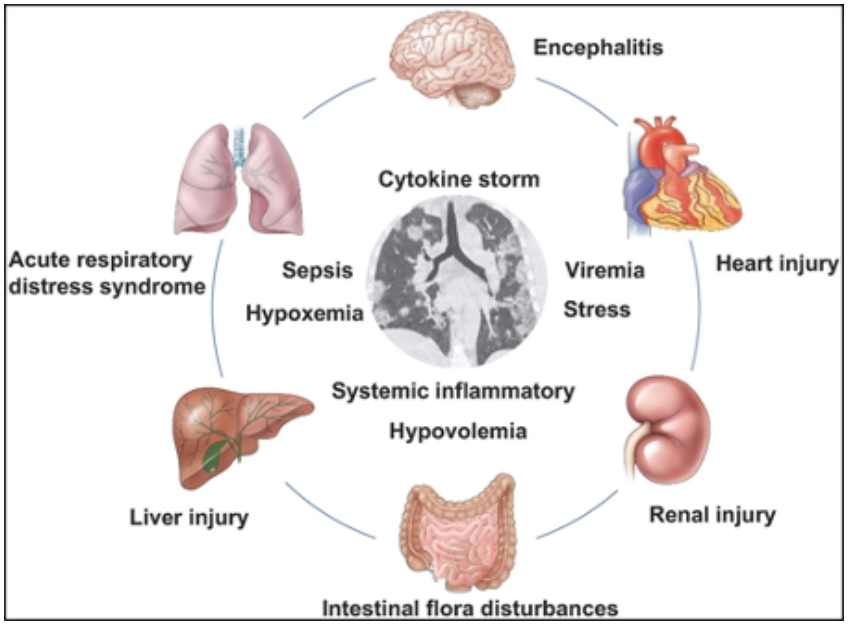
The **first week of the disease** onset is when all the symptoms start to appear – for some it's gradual, while for others it hits all at once and hard on. After the 7-day mark, generally and not always, is when patients start experiencing shortness of breath, coughing and pneumonia-like symptoms. Some have the infamous dry cough while others may present with mucus, full of the lung cells killed off by the virus.

Early symptoms of COVID-19 may include nothing but only loss of taste and smell, bodyache. It may even start with gastrointestinal symptoms only, like – Nausea, Vomiting, Diarrhoea, Abdominal pain etc. Studies revealed that children show similar symptoms to adults and usually have mild illness.



The severity of COVID-19 symptoms varies from mild to severe. Some people may experience **rapidly worsened symptoms**, especially shortness of breath progressing to severe dyspnoea because of the onset of pneumonia, 5 to 7 days after emergence of symptoms. Stages and severity of pneumonia can be assessed by Chest X-ray and HRCT chest and laboratory investigation. If the illness goes unnoticed or the patient doesn't receive treatment in time, around eight and 10 days after infection is when things go downhill and more intervention is needed





When to consult a doctor

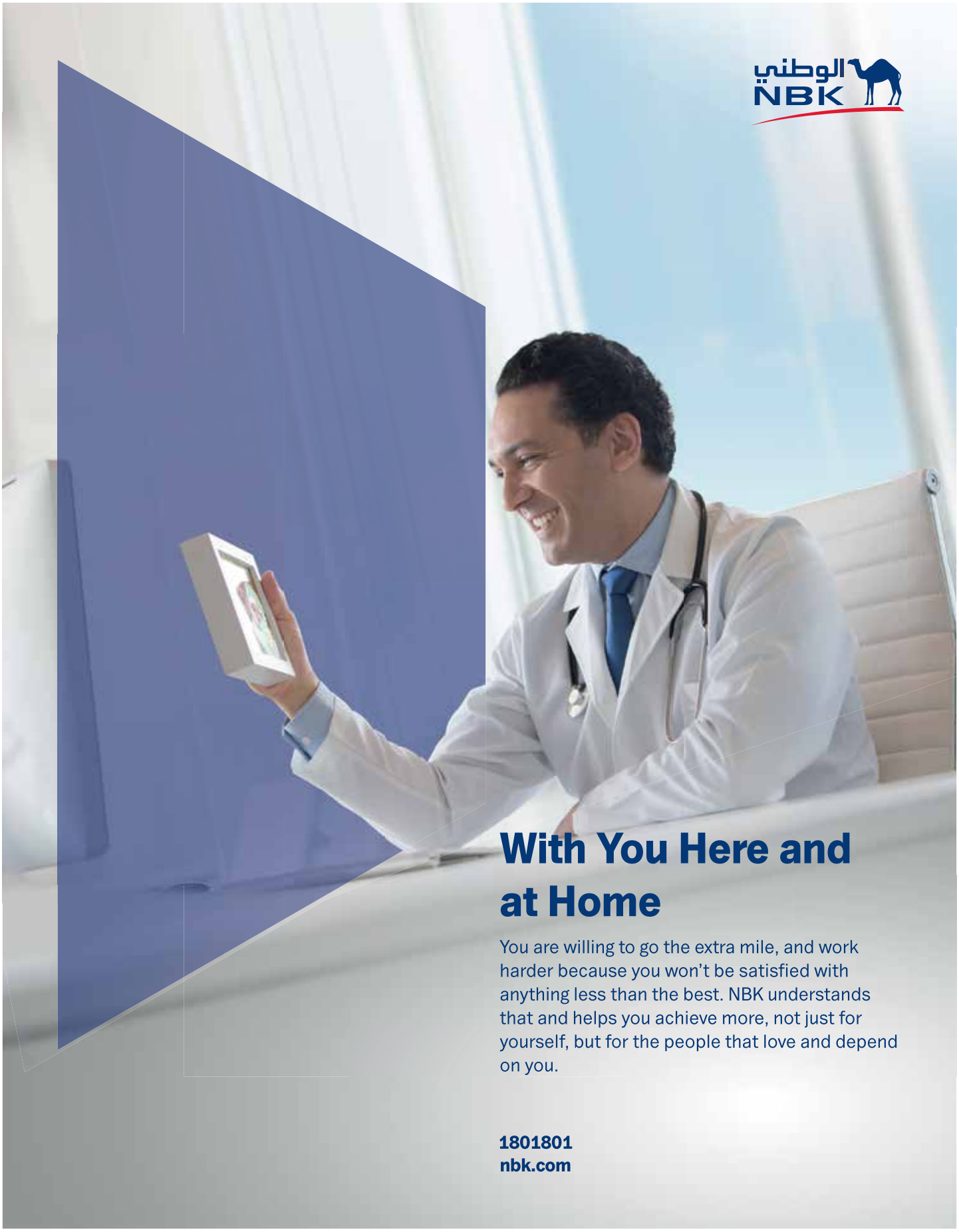
If a person has COVID-19 symptoms or has been in contact with someone diagnosed with COVID-19, it is better to contact a physician at primary care clinic right away for further help.

There are certain symptoms which should be considered with utmost importance and Medical help should be sought immediately.

- **Increasingly stressful breathing.**
- **Persistent chest pain or pressure.**
- **Inability to stay awake and significant dizziness.**
- **Recent onset of confusion.**
- **Cyanosed lip, tip of nose or tongue.**
- **Acute Watery Diarrhoea, Vomiting and Abdominal Colic.**
- **If Pulse oximeter is available, then SpO2** level is persistently below 90 and Pulse Rate above 120.

It is always mandatory to inform the doctor if the person has co-morbidities.

Although mortality rate of COVID-19 is around1 to 4%, it is still uncertain – how long this Pandemic would cast its spell significantly, it is mandatory to follow Protocols for Prevention.



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COVID-19 AND HEART DISEASES

Dr Hasan Ali Khan
Cardiologist
EXIR Medical Center, Jahra

THE HEAD AND BODY….BRAIN AND HEART.

How do we understand Co-morbidities through "Alternate Medical courses" and our "Allopathy course"?

There is complete course of study in USA. At the end, one procures a Degree in "Osteopathy". It is the Alternate Medical field in America. Likewise, we have in India the alternate medical fields like the Homeopathy and The Ayurvedic medicine. There is also Unani medicine. They are known as the "Hakims". These alternate branches differ from Allopathic form of Medicine in that we go deeper into each organ and research our diseases and manage them as branches. Thus, we have a Cardiologist, a Virologist, a Diabetologist and a Neurologist. We have advanced in the deeper research and reached the depth of the human body which no branch can compete. But the reason, I mentioned their fields is that they consider rightly the whole body as "one being" and call it a "Holistic approach to Medical management". They have a holistic method of treatment while we have a targeted and "evidence based" treatment. All forms need their due respect with no interference. That is what we need to understand when we wish to know why suddenly a patient with a COVID-19 infection dies of a heart disease. The body is one long train with connected compartments. When one train compartment derails, it takes many with it. Our aim in understanding the COVID-19 process of infection spread is to keep the railway track intact. The better the condition of the track the easier it is for the bogies to move and reach the destination. The recovery from the disease.

THE COMPACT BODY ORGANS

How does Allopathy explain Co-morbidities?

The difference is that over centuries we, the allopathic physicians have researched deep into the human body and took the best from all the research and understood Co-Morbidities the best. Our topic of connecting one disease state in one part of the

body affecting the other parts is what we will try to understand. It is simply like two little kids fighting in a class and the teacher punishes a third child. The other two kids were weak and vulnerable so they were the seen targets but the third was the virus which used their weakness. The teacher detected that the real culprit was the third child. Similarly, patients of COVID-19 with comorbidities are vulnerable for a severe disease. When one gets a heart attack, we get a state of depression. This is a simple co-morbidity. There can be multiple co-morbidities in the same person. The more they are the greater the danger. When an Allopath, specialized in his field, does not understand fully the other specializations. The human body is an extremely complex machine. I am just giving an example to proceed. Even me as a Cardiologist cannot go into the depth of understanding what a "T cell is telling a "B cell". (T cells are derived from an organ called the Thymus in the chest and B cells are derived from the Bone marrow in the bones). These two cell lines are the two branches of a body's defense forces. They protect our organs from the invaders from outside, the Bacteria and the Viruses. Only the Cytologists (the cell specialists), understand it. Thus, we as followers of Allopathy rely on collected information from different specialties and then manage the co-morbidities caused by the disease. Human body is a cluster of Biology, chemistry physics and Math. The more we know about it the less it is. This was proven by the sudden invasion by an unseen invading soldier, COVID-19, which has baffled all the specialties and woke us up to learn more.

Factors that lead to co-morbidities to develop!!!!

PREVENT THESE DISORDERS TO BOOST YOUR IMMUNITY!

Which is the Heart related conditions we must take care to avoid damage by the Corona virus?

There are three conditions relating to the heart which one can take care. Under all the available knowledge the Corona virus or COVID-19 is here to stay. Vaccines do not kill the roaming around virus. On a long-term plan, we must aim to take care of our body and prevent the serious comorbidities of the viral infection.

To prevent the Heart arteries getting affected we must remember the risk factors affecting them. The worst is the habit of **smoking**. It destroys the arteries supplying blood to the heart muscle. Those affected with this disorder called the Coronary artery disease are at higher risk of even dying. The second risk factor for preventing heart disease is controlling the blood sugar well if one is a **Diabetic.**

Hypertension has two factors for consideration. One is that uncontrolled blood pressure (BP) is itself a direct co-morbidity. In addition, it can lead to chronic Kidney disease, problems during pregnancy called pre-eclampsia and even become a factor for coronary artery disease. Taking good care of the blood pressure is therefore an important consideration in preventing COVID-19 related complications.

Another important condition that is a part of the circle that affects heart as well as damages other parts of the body. It is the **Obesity.** Any body weight that exceeds a Body Mass Index (BMI) of thirty is obesity. Between 25-30 is overweight. It can load and strain the heart and even cause a heart muscle dysfunction. It was discovered that those who were obese and overweight had a more serious disease due to COVID-19 infection. I am repeating, not scaring but cautioning that the Virus has come to stay. The virus will not get tired but we may. Our aim should be not to get tired and take all precautions to avoid getting the disease.

The aim of writing this article is to explain how one body works in harmony till it is disturbed by a disease process. Sometimes all organs get affected

and it becomes a multiorgan disease. Finally, if we take care and keep and maintain our defense forces in a perfect order, we can easily fight with even severe infections. Let us be positive and we will win the war over the Corona virus.

A small philosophical passage explains the relationship between nature and human body.

The unseen soldier: Oh! Mankind, HE has sent an unseen soldier killing people of its own choice, diseasing huge numbers at random. Is it just a warning from the skies for more to come? It's a blessing that it is not airborne as we know. If the virus can be heard it may be saying, "Beware! Oh Humans, I, the unseen soldier named Corona (Crown looking) can come again changing my looks. This time, I am a just the Crown, next time I can be the king myself. My powers can get enhanced and I can be more destructive to your race. The natural disasters are a result of the corruption in the land by your own deeds, done by your own hands. O, humans. He encouraged and instructed humanity to be loving to each other, help each other, detach any thoughts on hate, yet it did not obey. I warn you again, I CAN COME BACK WITH A GREATER VENGENCE".

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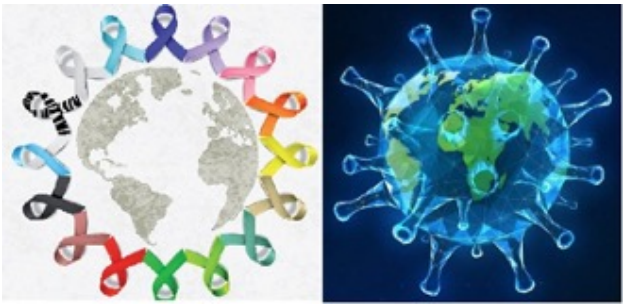
COVID-19 AND CANCER MANAGEMENT

Dr Susovana Sujit Nair
Oncologist
Kuwait Cancer Control Center (KCCC)

Cancer screening, diagnosis, treatment, and post-treatment surveillance in COVID-19 infected patients during the pandemic has become a challenge. The rapid spread of COVID-19 related acute respiratory pandemic has impacted all areas of daily life including medical care.



It became a real challenge to deliver care **to the cancer patients** during this crisis with the competing risks of death from cancer versus death or serious complications from SARS-CoV-2. There was even a higher lethality of COVID-19 in immunocompromised hosts. A huge number of patients have struggled to receive treatment for their cancer due to hospital cancelling or delaying surgeries or other procedures including chemotherapy and radiation therapy.

It was also obvious that patients who are otherwise healthy and have curable cancers that require timely implementation of surgery, chemotherapy or radiation have unfortunately concluded that the risks of contracting COVID-19 may outweigh the benefits of cancer treatment.

Other issues like inadequate supplies of personal protective equipment for health care providers, limited hospital capacity, including intensive care units and lack of point of care testing and seroprevalence data further complicated the scenario.

General considerations

It's a fact that there is no "one size fits all" approach to delivering cancer care during the COVID-19 pandemic; and no international guidelines. Treatment decisions must be made on a case-by-case basis.

Providing safe care for the patients visiting the out-patient departments

American Society of Clinical Oncology (ASCO) recommendations emphasized on the following factors.

1. All patients with cancer should be informed regarding the symptoms of COVID-19 and trained in proper handwashing, hygiene and minimizing exposure to sick contacts and large crowds.
2. It is very important for the patients as well as the clinicians to follow the CDC's general recommendations on mask wear, which now recommend that everyone should wear a cloth face cover when they go out in public.

Please note: There is no guidance or evidence to suggest that N95 masks are required for cancer patients. Most institutions and clinical practices

are requiring health care workers, patients and visitors to wear surgical face mask within the facility regardless of symptoms, to help prevent transmission from infected individuals who may be asymptomatic.

3. A recommendation by **Centers for Disease Control (CDC) USA** also advises that any clinic visit that can be postponed without risk to the patients should be postponed. These include cases like routine surveillance visits to detect cancer recurrence.
4. Pre-screening via telephone calls or digital platforms for COVID-19 symptoms and exposure history from 48 to 72 hours prior to planned in-person clinic visits or each new cycle of therapy is recommended, if possible. It is very important for cancer patients to get evaluated for COVID-19 if they have any symptoms of fever or other symptoms of infection prior to treatment of cancer.

ASCO Guidelines also suggested to develop screening clinics to allow patients to be evaluated and tested in dedicated unit with dedicated staff. All these data also to be documented prior to the patient entering the facility. Cancer patients who have fever or lower respiratory findings like cough, dyspnea, hypoxia is at the highest priority for COVID-19 testing. Testing is also recommended for those with an exposure to someone with confirmed COVID-19.

Cancer Diagnosis and Staging

In areas where infection is still an ongoing issue, any clinic visits which can be postponed without risk to the patients should be postponed. While in areas where infection has been controlled, clinicians should follow specific local guidance maintaining full adherence to guidelines for limiting the spread of SARS-CoV-2 infection.

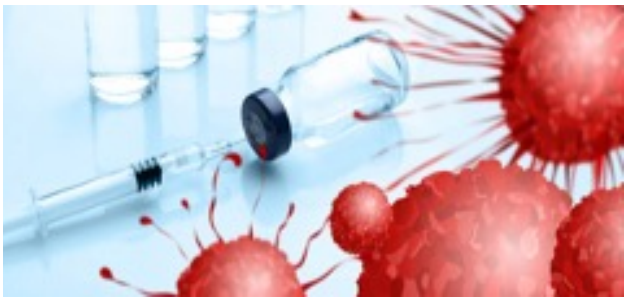
Due to the global lockdown and curtailed screening for cancer there is a backlog of patients with symptoms needing urgent assessment and existing services may not have the capacity to manage these cases even if they return to the pre-pandemic levels. In that case co-operation between primary care and subspecialty clinicians and health systems is essential to prioritize and safely investigate the patients who are at high risk.

Post-treatment surveillance

For patients who have completed their treatment or those on active surveillance who are at low risk of recurrence or disease progression and those who are asymptomatic during the follow up period can be even managed with tele-health systems.

Anti-cancer treatment during COVID-19 Pandemic

COVID-19 pandemic has affected health systems globally and caused disruption in cancer care as such. The adverse effect is widespread although with varying magnitude worldwide. In a cross-sectional study of 356 cancer centers from 54 countries across 6 continents, 88% reported facing challenges in delivering cancer care during the pandemic.



The reasons included the following:

- reduced services during the active periods of infection
- lack of personal protective equipment
- staff shortages
- restricted access to medications.

Tools to aid in decisions for immediate versus delayed treatment

Delays in treating cancer can result in adverse oncologic outcomes, depending on the type of cancer and the stage at diagnosis. Sometimes even short delays in specific cases, in terms of surgery, initiation of systemic chemotherapy and radiation therapy for example, for bladder, breast, colon, head and neck, nasopharyngeal, cervical and non-small cell lung cancers, increase mortality.

Cancer surgery

World Health Organization (WHO) suggests that elective surgeries at inpatient facilities should be rescheduled. Anyway, clinicians and patients must make individual determinations based on the potential harms of delaying cancer related surgery. Cases like brain tumors, breast, colon, stomach, pancreas that cannot wait two to three months and patients have a significant benefit from surgery.

However, if a surgery will likely require post-operative intensive care, the capacity of available intensive care units should be considered as part of decision making.

In other situations where, neoadjuvant hormonal therapy is not routinely considered (e.g. Early stage breast cancer, high risk prostate cancer), it may be reasonable to offer neoadjuvant therapy or to simply delay surgery.

When Elective surgeries can be resumed?

SARS-CoV-2infection rates should be on a downward trend for at least two weeks as per the local statistics.

1. Resource utilization, including ICU beds and personal protective equipment must be carefully calibrated.
2. Testing of patients and employees must be strongly considered.

Radiation Therapy

For patients who are receiving radiation therapy with curative intent or for rapidly progressing or symptomatic tumors may reasonably proceed with therapy, as the risks of delaying treatment may outweigh the risks of COVID-19 exposure and infection. Wherever available, alternative RT regimens (hypofractionation) should be offered.

Randomized trials support deferring RT across a multitude of cancers by placing systemic therapy first in the treatment sequence esp. for cases like initial androgen deprivation therapy for intermediate to high-risk prostate cancer, induction chemotherapy for nasopharyngeal and upfront chemotherapy for some grade 2 or 3 gliomas.

Systemic Anticancer Treatments

Actually, there is no direct evidence to support changing or withholding chemotherapy or immunotherapy in patients with cancer and other critical anticancer or potentially immunosuppressive therapy for patients who do not have COVID-19. **ASCO recommends** that clinical decisions be individualized and consider factors such as curability of the cancer, risks of cancer recurrence with treatment delay, modification or interruption, number of cycles of therapy already completed, existing comorbidities and the patient's tolerance of treatment. The local incidence of viral infection and availability of necessary resources and testing for SARS-CoV-2 has been performed are also considerations.

For patients under maintenance therapy, stopping chemotherapy may be an option.

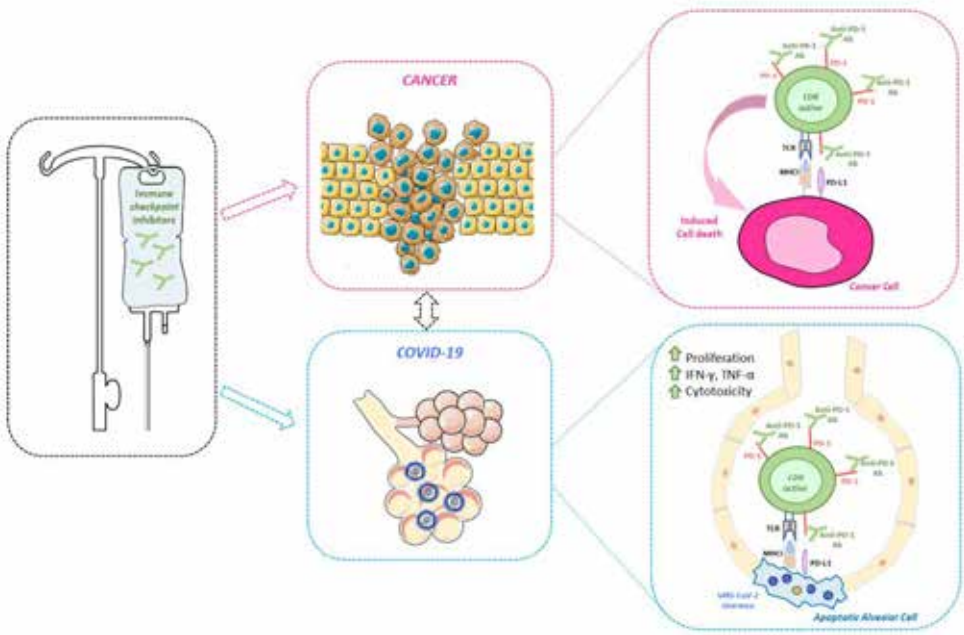
Oral chemotherapy and home administration of chemotherapy drugs; if logistically feasible, may be options for some. Here it is very important to coordinate that the patients are taking their treatment correctly.

Immunotherapy and COVID-19

At present there are conflicting data whether ICI therapy affects the severity of COVID-19. There are concerns that ICI therapy may exacerbate the clinical course of COVID-19 because immune responses are enhanced by these treatments. There are also concerns that COVID-19 may impact the diagnosis and treatment of ICI-related side effects. A particular concern for cross-interference is treatment related pneumonitis, which may mimic COVID-19 and increase the risk of serious complications if the patient develops COVID-19. Moreover, glucocorticoids are cautioned against, for mild to moderate COVID-19 but are used to manage ICI-related pneumonitis, diagnostic uncertainty may delay proper management of a severe condition.

Ever since the Corona Virus pandemic brought the world to a standstill back in March 2020, there's been talk of a **vaccine**. COVID-19 vaccines have been the biggest opportunity to control the virus and return to normal. Last year researchers and scientists across

the world have been racing to make that a reality. With over 300 vaccines in development and many being rolled out it's very important that everyone has access to information about the Covid-19 vaccine and what it could mean for people with cancer. Studies have shown that after the first dose of Covid-19 vaccine, there is a trigger in the immune response in around 70% of patients with myeloma. Studies have also shown that there are detectable antibody responses at three weeks following the first dose of the Pfizer BioNtech Vaccine in 13% of people with blood cancers. One need not be afraid of the type of vaccine available to him or her. Experts say the differences seen in the studies related to different vaccines may depend on multiple factors, response to vaccine, cancer type, treatment type, timing of treatment related to vaccination as well as a whole host of non-cancer factors.



Conclusion

During the **pandemic patients with cancer** are faced with competing risks of potentially more severe SARS-CoV-2 infection and the possibility of adverse consequences from delaying effective cancer treatment. Also, there are no evidence based international guidelines to address the management of cancer patients in any infectious pandemic.

There's no reason to suspect one vaccine is better than the other. Ultimately, any protection provided by a vaccine is better than none. We encourage everyone who can, to get the vaccine when offered. Each case must be discussed in a detailed way to weigh the risks versus benefits of delaying cancer treatment to reduce the risk of COVID-19.

References

- Mayo Clinic - https://www.mayoclinic.org/covid-19- and-cancer-treatment/art-20489810
- UpToDate - https://www.uptodate.com/contents/
- Cancer Research UK – https://cancerresearchuk.org/

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COVID-19 AND KIDNEY DISEASES

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AS scientists learn more about COVID-19, it has become clear that the virus especially impacts those with existing medical conditions, such as kidney disease. While kidney disease does not put patients at higher risk of contracting this virus, it does put them at risk for more severe outcomes.

How does COVID-19 affect kidneys?

About one third of people admitted to the hospital for COVID-19 will develop acute kidney injury (AKI) which is a sudden decline in kidney function even if they have never had kidney disease before. This rate of injury increases to more than half for those who become critically ill and need intensive care and, in most cases, will require emergency dialysis. Though the exact reasons as to how COVID-19 affects kidneys are unclear, scientists have outlined some possible causes.

Kidney structure: One reason why the corona virus is so contagious is that the spikes in the virus are how it attaches to a host cell. These spikes form a strong bond with the cell receptors called **ACE2 receptors** before entering the cells and like many other organs these receptors are abundant in the kidneys as well. Many AKI cases have injury to the small tubules of the kidneys (acute tubular necrosis).

Blood clotting: The purpose of the kidneys is to remove waste and extra fluid from the body. Kidney biopsies from COVID-19 patients have shown tiny blood clots which can affect proper kidney functioning.

Micro-inflammation: Extreme inflammation in the kidneys and the immune response from the body that follows may cause damage to the kidneys.

Long term effects of COVID- 19 on the kidneys

The long-term effects of COVID-19 on the kidneys are still unknown. Some people with chronic kidney disease (CKD) may have worsening of their kidney function and some who did not previously have CKD may develop it following COVID-19. It is recommended that recovered COVID-19 patients who had an AKI or acute renal failure should be followed up regularly, because their risk of developing CKD is higher than others. COVID-19 patients who did not develop AKI but who had blood and/or protein in their urine, should be monitored as they are at higher risk of developing chronic and end stage kidney disease.

Does kidney disease put a person at higher risk for COVID-19

Patients with kidney diseases and other chronic medical conditions are at higher risk for more severe illness. Patients with kidney function less than 15% (CKD 5), patients on dialysis, kidney transplant recipients and patients taking immunosuppressive medications fall under high risk group. Dialysis patients can have weaker immune system, making it harder to fight infections. They are also exposed to higher risk of getting COVID-19 in a hospital-based dialysis centre. People with a kidney transplant need to take their immunosuppressive medicines which are also their antirejection medicines.

These medicines work by keeping the immune system less active, which can make it harder to fight infections.

Key points for patients with kidney disease.

They should stock up on adequate supplies of medicines, avoid crowds, stay home as much as possible and if needed to go out in public or to workplace, keep away from others who are sick and follow everyday precautions of safe distancing and hand hygiene. WHO and Centres for Disease Control and Prevention **(CDC)** have not recommended that patients stop any particular drug in order to decrease the chance of getting COVID-19 or to make it less severe. Blood pressure medications called angiotensin converting enzyme inhibitors **(ACEs**) and angiotensin receptor blockers **(ARBs)** should not be stopped. Stopping them could lead to heart attack, stroke and decreasing kidney function. For patients on dialysis, it is important to continue their regular scheduled dialysis and take necessary precautions as recommended by their health care team. Patients with kidney transplants should not stop taking their immunosuppressant medicines or lower their dose, unless their doctor tells them. Patients with kidney disease are usually told to avoid pain killers called non-steroidal anti-inflammatory drugs **(NSAIDs)** and use only acetaminophen (Paracetamol) for pain relief and reducing fever. But if recommended by a doctor to take NSAID for a specific reason, then they should not stop taking it because of COVD-19.

Kidney Transplantation during COVID-19 pandemic in Kuwait

Like in many centres around the world, due to risks regarding the safety of elective surgical procedures in the context of COVID-19, renal transplantation was temporarily suspended in Kuwait in March 2020, except for deceased (cadaver) donor and emergency transplant. In fact, **Organ transplant centre, Kuwait,** never stopped the outpatient or any other services even during the lockdown/ curfew period here in Kuwait. Since August, 2020, the transplant program has been restarted in a phased manner selecting low risk cases and doing lesser number of transplants. Prospective kidney donors and recipients go through a strict protocol and risk assessment including COVID-PCR testing and CT chest besides a thorough clinical assessment. We are now back to full operational state of doing regular donor and recipient assessments and live and deceased donor transplants, with all recommended precautions.

COVID-19 vaccination in kidney patients

Currently several vaccines are under development against SARS-CoV2 and two of the vaccines based on mRNA (Pfizer and Moderna) have been approved by FDA for emergency use. A third vaccine, the Oxford- AstraZeneca vaccine has been approved by the UK's medicines regulator (MHRA). Kuwait started vaccination with the Pfizer vaccine to begin with and now has Oxford Astra Zenca vaccine two. Those patients who are mentioned above as high risk for Covid-19 will come under the priority group for vaccination. Weighing the risks and benefits of vaccination is important. While current data are lacking specific to the vaccine in immunosuppressed patients including transplant recipients, it is reasonable to anticipate that benefits of vaccination outweigh any theoretical risks, because the clinical outcome of COVID-19 disease in this group is far worse than the general population.

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3) COVID -19 and kidney transplantation- NEJM, 2020
4) COVID-19 pandemic: Advice for the public – World Health Organisation
5) Protocol for live donor kidney transplants during COVID-19 pandemic in Kuwait- Organ Transplant Centre, Hamed Al Essa, Kuwait, August 2020
6) COVID -19 Vaccine – American Society of Transplantation – 8/12/2020

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COVID-19 AND DIABETES MELLITUS

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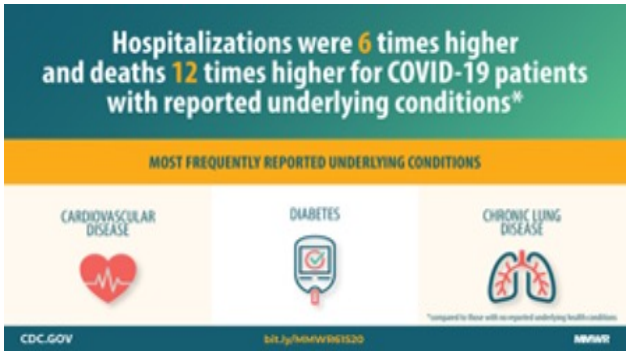
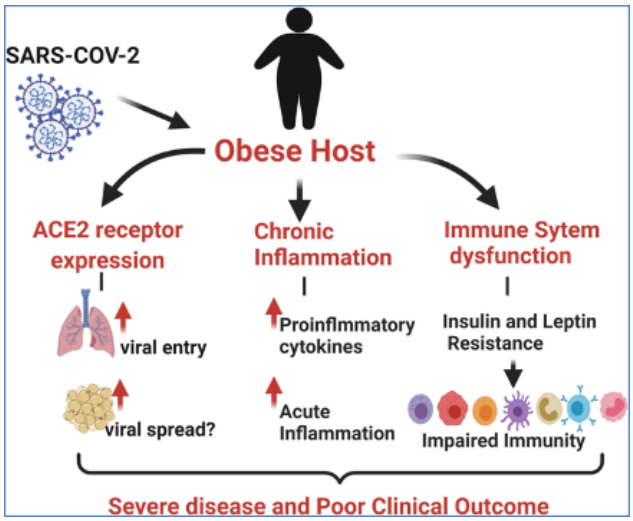
Al Sabah Hospital Kuwait

Diabetes mellitus has been associated with poor outcomes in patients with COVID-19, with a high prevalence of acute respiratory distress syndrome (ARDS), fast disease progression and high mortality. This association becomes even stronger in patients with diabetes and other comorbidities like hypertension, cardiovascular disease, chronic kidney disease and severe obesity.



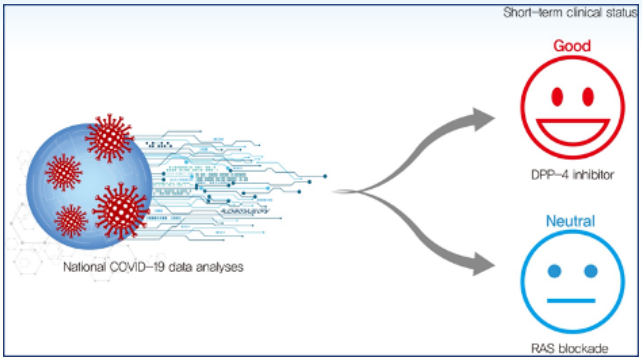
Uncontrolled Diabetic Patients

- Chronic hyperglycemia and obesity may lead to immune dysfunction and a subsequent susceptibility to infections.
- Overproduction, such as interleukin 6 (IL-6), as well as increased levels of C-reactive protein (CRP) and ferritin, could possibly explain the vulnerability of diabetic patients to the cytokine storm, shock.
- High D-dimer levels in patients with diabetes and COVID-19 may serve as a marker for the over-activation of the coagulation cascade, which increases mortality through major thromboembolic events.
- Ongoing damage to vital organs like kidney, heart and blood vessels.
- Activation of stress hormones: renin–angiotensin–aldosterone system (RAAS).



Diabetes Medications and COVID-19 risks

There is no evidence supporting discontinuation of medication prescribed for hypertension, diabetes or dyslipidemia; regular intake of antidiabetic drugs and insulin is recommended. Although many theories suggesting that chronic use of ACE inhibitors and angiotensin 2 receptor blockers (ARBs) may increase the risk and the severity of COVID-19 infection, the Council on Hypertension of the ***European Society of Cardiology (ESC Council)*** strongly recommends the continuation of the usual chronic anti-hypertensive treatment

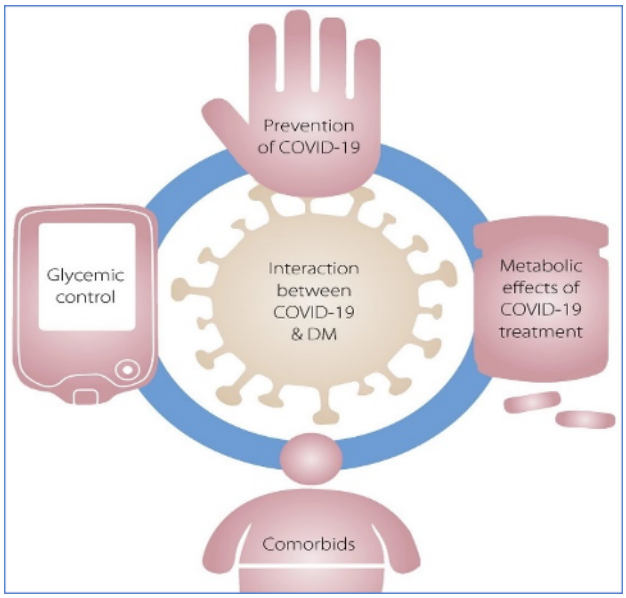


Treating patients with Diabetes and COVID-19 infection

- In most cases of mild COVID-19 infection, antidiabetic treatment should be followed as usual.
- Insulin therapy seems to be the primary strategy for hospitalized patients.
- Most hospitalized patients should discontinue all oral antidiabetic medication.
- Insulin doses may need to be adjusted, based on the individualized therapeutic plan; risk of hypoglycemia, and corticosteroid treatment.
- Blood glucose fluctuation during insulin therapy requires strict and frequent monitoring

Specific Instruction for Diabetes Patients

1. Must follow regular doctor instructions, tight control of glucose levels, prevention of diabetes complications.
2. Continuation of existing oral antidiabetic medications such as metformin (Glucophage), DPP4 inhibitor (Sitagliptin-Januvia, Vildagliptin-Galvus) in mild symptomatic patients.
3. However, diabetes treatment is generally switched to Insulin in severely symptomatic admitted patients as most oral medications are either ineffective or contraindicated.
4. **Please remember** that many medications used for the treatment of COVID-19 can affect glucose status in patients with diabetes mellitus e.g. glucocorticoids; therefore, frequent blood glucose monitoring and personalized adjustment of medications are required.



If you have diabetes

- Prepare in case you get ill.
- Pay extra attention to your glucose control.
- Seek early help from healthcare professional if you have suggestive symptoms.
- Any infection is going to raise your glucose levels and increase your need for fluids, so make sure you can access a sufficient supply of water.
- Practice regular physical activity, diet rich in anti-oxidants, vitamins and minerals to boost immunity.
- Make sure you will be able to correct the situation if your blood glucose drops suddenly (hypoglycemia).

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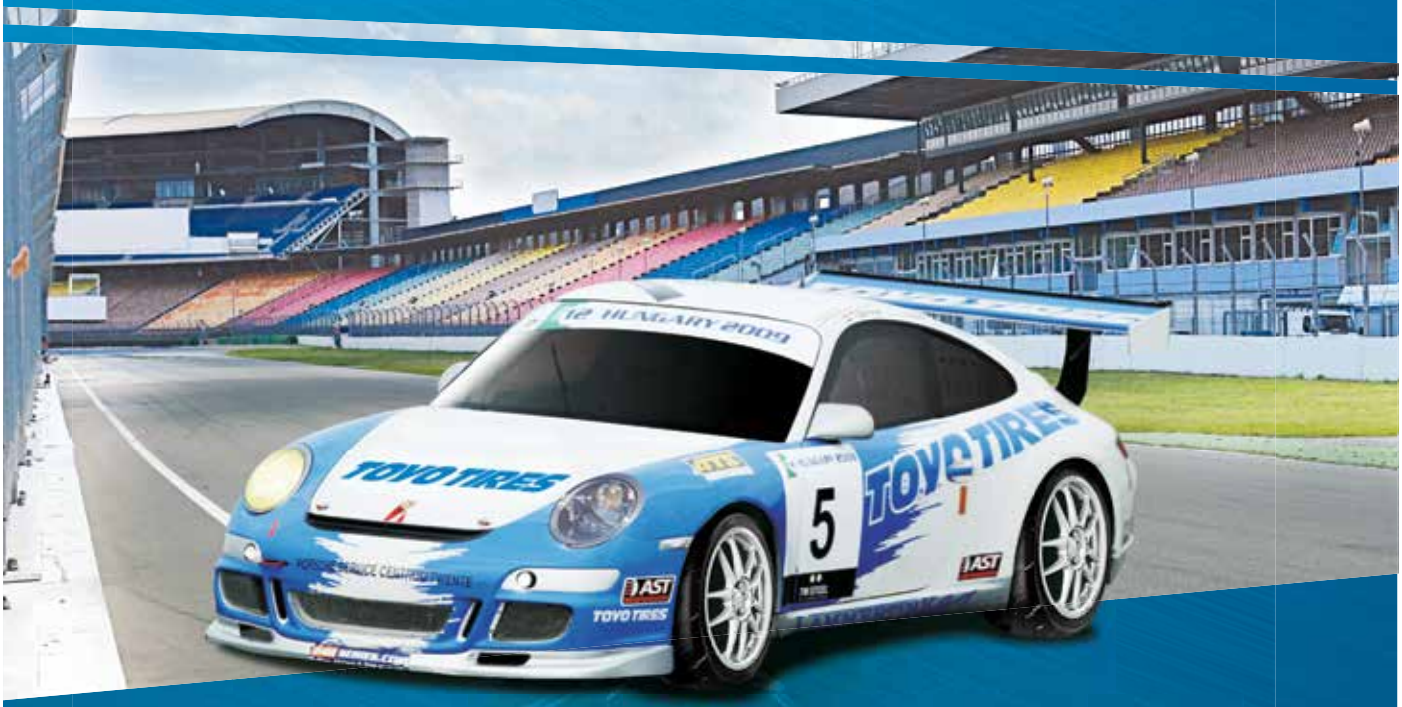

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COVID-19 AND RESPIRATORY COMPLICATIONS

Dr. Radhakrishna Panicker
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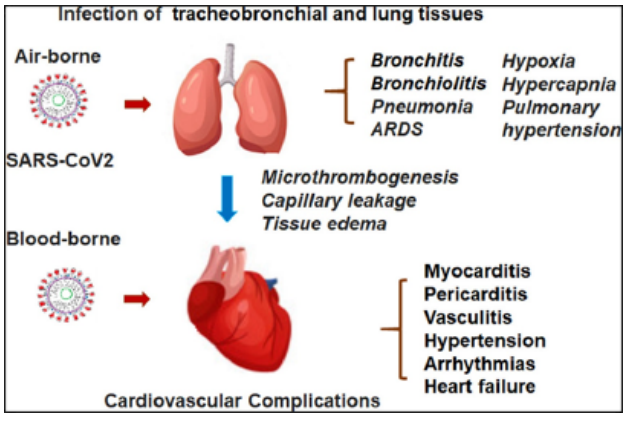
Ministry of Health (MOH), Kuwait

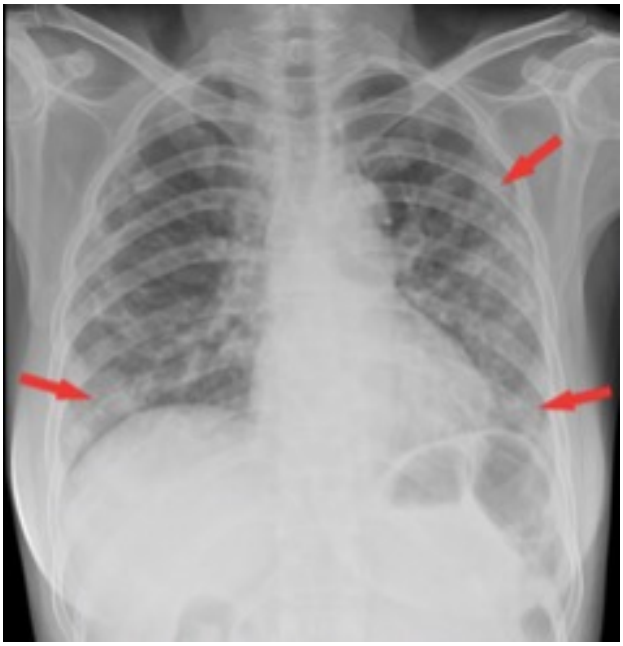
HOW does COVID-19 affect the Respiratory System?

COVID- 19 primarily infects the lungs in a variety of ways, depending on a person's immune system, age and comorbidities (other underlying diseases). Symptoms can range from mild, such as cough, shortness of breath and fevers, to pneumonia and critical disease, including respiratory failure, shock and multi-organ system failure. Severe cases cause' death due to pneumonia or Acute Respiratory Distress syndrome (ARDS). It is important to remember that it does not lead to pneumonia and ARDS in all the cases. The majority of the cases i.e., 80% exhibit mild symptoms, 14% pneumonia, 5% septic shock and organ failure mostly respiratory failure and in 2% cases it will be fatal.



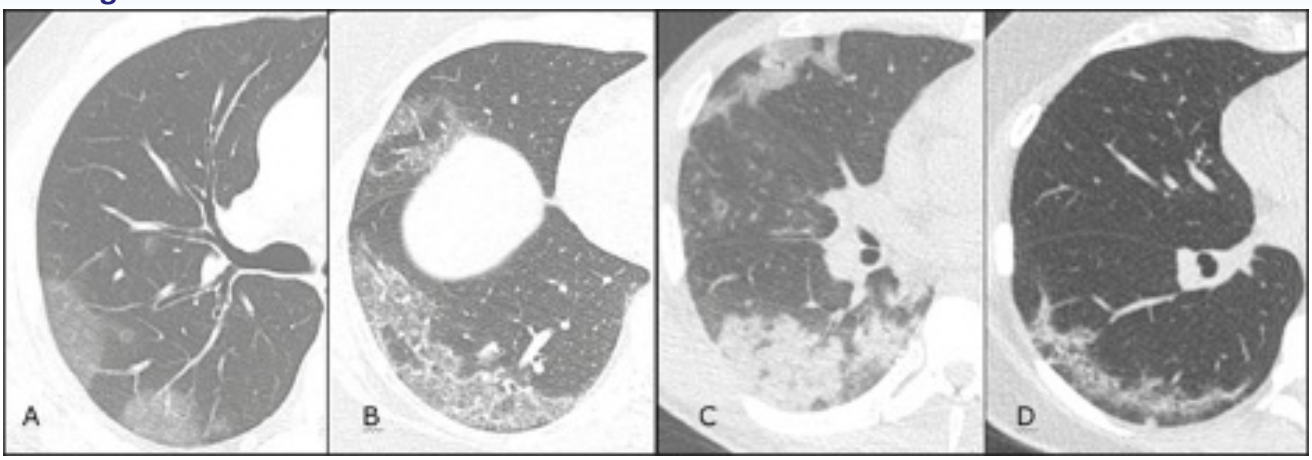
COVID-19 Pneumonia

The pneumonia that COVID-19 causes the lungs fill with fluid, limiting their ability to take in oxygen and causing shortness of breath, cough and other symptoms. While most people recover from bacterial pneumonia without any lasting lung damage, the pneumonia associated with COVID-19 may be severe. Due to the novelty of the COVID-19 strain, there is no immediate treatment to directly cure pneumonia in COVID-19 patients and are mostly given supportive care.



Chest radiography of confirmed Coronavirus Disease 2019 (COVID-19) pneumonia A 53-year-old female had fever and cough for 5 days. Multifocal patchy opacities can be seen in both lungs (arrows)."

CT images of COVID- Pneumonia



A.In the initial phase (0-4 days after symptom onset), ground-glass opacities can be seen, although the chest CT may be normal overall., B.In the progressive phase (5-8 days after symptom onset), chest CT shows diffuse ground-glass opacities, a crazy-paving pattern, and consolidation., C. In the peak phase (9-13 days after symptom onset), consolidation foci become more prevalent; diffuse ground-glass opacities and a crazy-paving pattern persist; and some residual parenchymal bands appear, D.In the absorption phase (≥ 14 days after symptom onset), there is gradual absorption of the consolidation foci, diffuse ground-glass opacities still being seen, and the crazy-paving pattern is no longer observed

Can we treat COVID-19 pneumonia like a common pneumonia?

NO. The common pneumonia is mainly caused by different types of bacteria and can usually be treated with antibiotics, COVID-19 pneumonia is viral, and unfortunately, anti-viral drugs have not been effective. Although several treatment options are being tried, for now, treatment is supportive care.

Superinfection

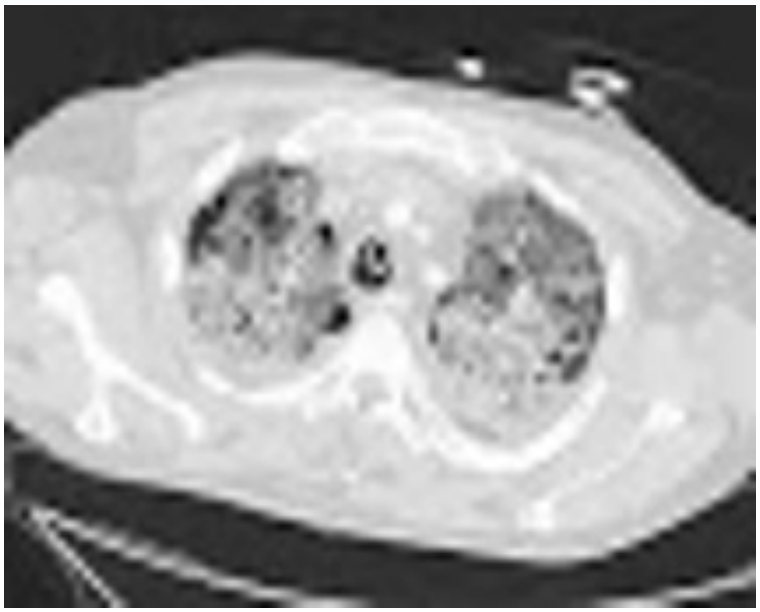
When a person has COVID-19, the immune system is working hard to fight the invader. This can leave the body more vulnerable to infection with another bacterium or virus on top of the COVID-19 — a superinfection. These secondary infections by bacteria may cause additional burden to the already damaged lungs and may not respond to treatment with antibiotics and lead to respiratory failure.

Pulmonary thrombosis and Thrombo-embolism

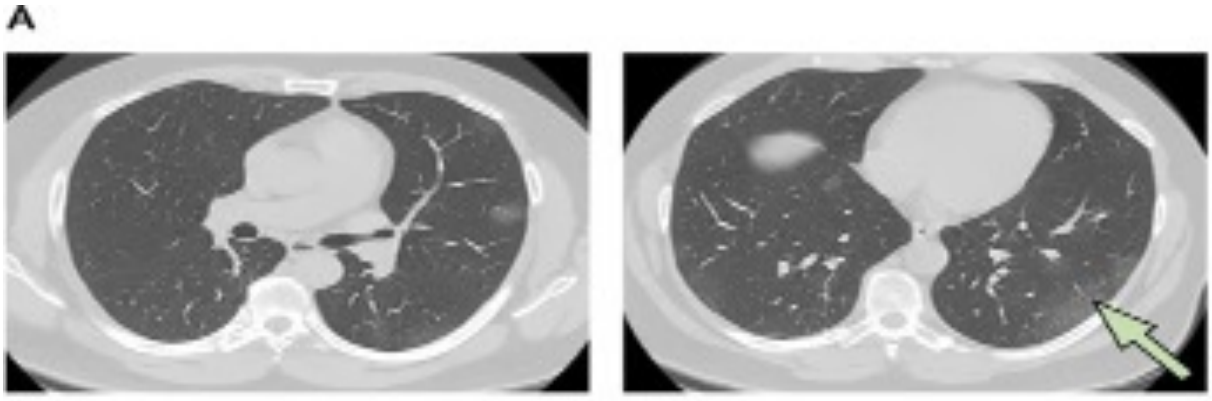
In COVID- 19 there is state of hypercoagulability of the blood i.e. the tendency of the blood to clot because of the extreme inflammation. This leads to the blockage of the vessels in the lung thus the oxygen transport is impaired. Also, the clot from the legs will dislodge and enters into the lung vessels known as pulmonary thrombo-embolism which is very critical and fatal.

Acute Respiratory Distress Syndrome (ARDS)

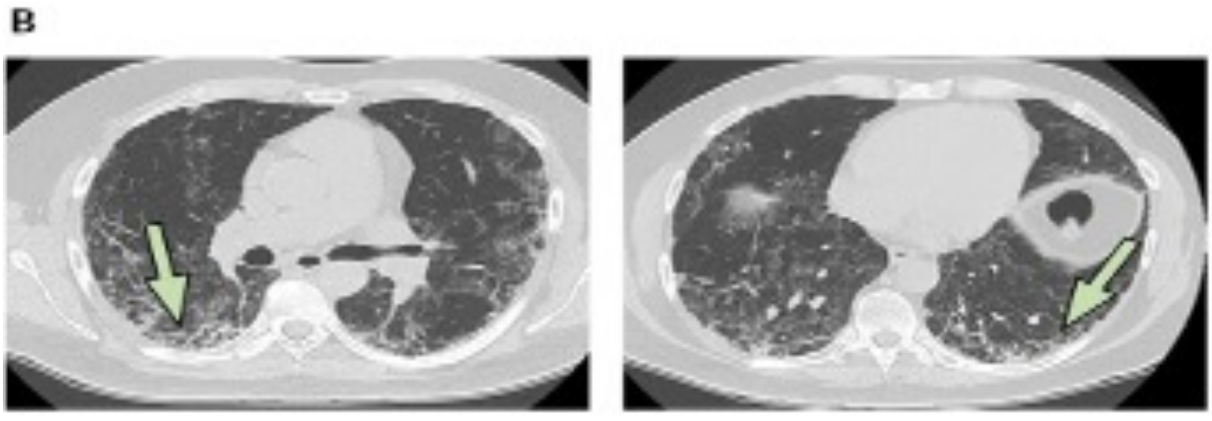
The term Acute respiratory distress syndrome (ARDS) denotes severe disease, more of the alveoli (air sacs) become filled with fluid leaking from the tiny blood vessels in the lungs. Eventually, shortness of breath sets in, and can lead to acute respiratory distress syndrome, a form of lung failure. Patients with ARDS are often unable to breath on their own and may require ventilator support to help circulate oxygen in the body. As fluid collects in the lungs, they carry less oxygen in the blood. That means blood may not supply all organs with enough oxygen to survive. This can cause kidneys, lungs, and liver to shut down and stop working.



CT image of ARDS. Both Lungs are completely filled with fluid.



A. Images of peripheral mild ground glass opacities in the left lower lobe (arrow).



B. Three weeks later, at the same lung zones, the disease has rapidly progressed and fibrotic changes are now evident (arrows)

How ARDS is Suspected?

1. Hypoxia – Means low oxygen levels in the blood, due to damage to the alveolus (we can check oxygen saturation with a simple device known as pulse oximeter)
2. Breathing difficulties and shortness of breath
3. Chest x-rays of the lungs exhibit an opaque and glassy look against the black background
4. Worsening symptoms over the course of time, from the day of detection of the virus.

Risk Factors in Coronavirus Lung Damage

1. **Disease severity.** "The severity of the coronavirus infection itself" — whether the person has a mild case, or a severe one. Milder cases are less likely to cause lasting scars in the lung tissue.
2. **Health conditions.** Underlying health problems, such as chronic obstructive pulmonary disease (COPD) –a form of lung disease usually found in smokers or heart disease that can raise the risk for severe disease. Older people are also more vulnerable for a severe case of COVID-19. Their lung tissues may be less elastic, and they may have weakened immunity because of advanced age.
3. **Are Smokers at High Risk of Severe COVID-19 Infections?**

   Yes.Cigarette smoking and vaping (electronic cigarette) can cause inflammation in the lungs, as well as reduced lung and immune function. Long-term smokers and e-cigarette users are at a high risk for developing chronic lung conditions and serious infections. Smokers are more likely to get serious lung conditions such as pneumonia. They're also at higher risk of acute respiratory distress syndrome (ARDS).

   People who smoke are more likely to have chronic obstructive pulmonary disease (COPD) and heart and blood vessel disease, which raises their risk of serious complications.

4. **Asthma**

a). The frequency of SARS-CoV-2 infection has been low in patients with asthma, although higher than in the general population. **(ERS observation)**

b) The increased risk for hospitalization due to COVID-19 in patients with asthma is largely associated with age and related comorbidities; mortality mainly affected elderly patients

c) Inhaled steroids used in asthma showed a safe profile;

5. **COPD and COVID-19:** Chronic obstructive pulmonary disease (COPD) is a chronic respiratory disease manifested with shortness of breath seen in smokers or exposure to air pollution. First, it is well known that COPD patients are prone to viral exacerbations. and current evidence shows that COPD patients have increased severity of COVID- 19 pneumonia

For those people who are diagnosed with COVID-19 and then recover, what are the short-term effects of COVID-19 on the lungs?

The recovery time appears to be around two weeks for mild infection and three to six weeks for severe disease. However, this is variable and depends on a patient's pre-existing comorbidities in addition to illness severity. Several surveys conducted in the U.S. and Italy are showing that only 39% of those who had been hospitalized reported a return to baseline health by 14-21 days after diagnosis. However, there have been reports of persistent severe illness with weeks of fevers and pneumonia persisting in immunosuppressed patients. Symptoms that can persist include cough (43%), fatigue (35%) and rarely fevers and chills in those with prior mild infection.

Can COVID-19 cause permanent lung damage? For those who have underlying health conditions, what does long-term lung damage mean for them?

Yes, it's possible and perhaps likely that people with chronic lung injury are at higher risk of long-term complications.

Post-COVID- pulmonary fibrosis.

A major complication and damage of the post COVID-19 pneumonia is lung fibrosis. Their lungs are stiff unlike the normal spongy appearance. This makes the patient breathless especially after exertion. They may require continuous oxygen and in severe cases lung transplantation is the only answer.

Is COVID-19 lung damage reversible?

After a serious case of COVID-19, There's the initial injury to the lungs, followed by scarring. Over time, the tissue heals, but it can take three months to a year or more for a person's lung function to return to pre-COVID-19 levels.

Can lung damage be reversed?

Current treatments are effective in reducing the amount of initial damage, reducing the severity. Depending on the severity of respiratory inflammation and damage, as well as patient comorbidities, duration of injury and genetics, patients can see improvement in their lung function.

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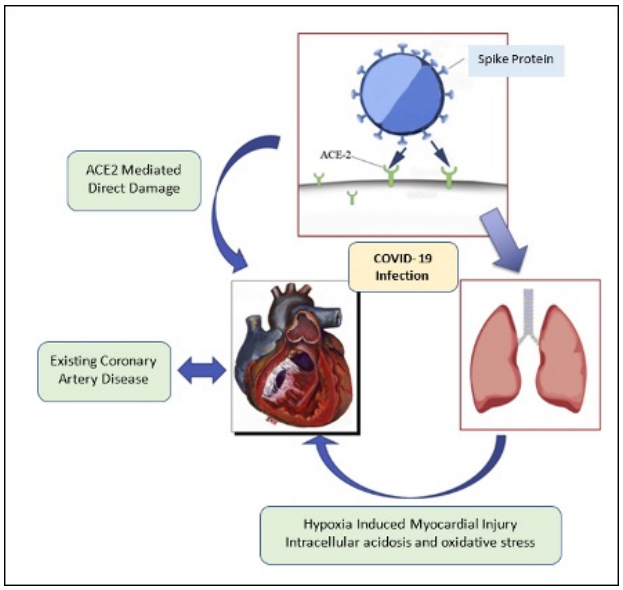
CARDIO VASCULAR COMPLICATIONS OF COVID-19

Dr AM Shukkur
Cardiologist
Chest Disease Hospital Kuwait

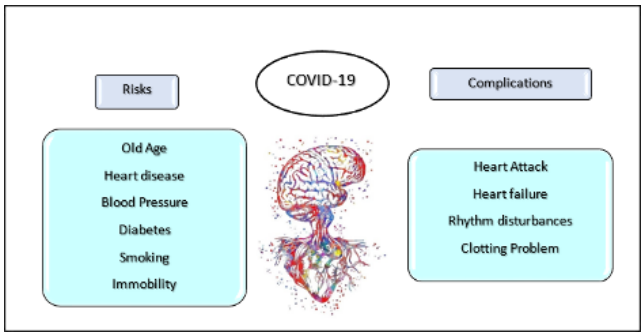
SEVere COVID-19 disease may lead to multi organ dysfunction particularly lung (pulmonary) and heart (cardiovascular) complications.



What are the Cardiovascular Complications of COVID-19?

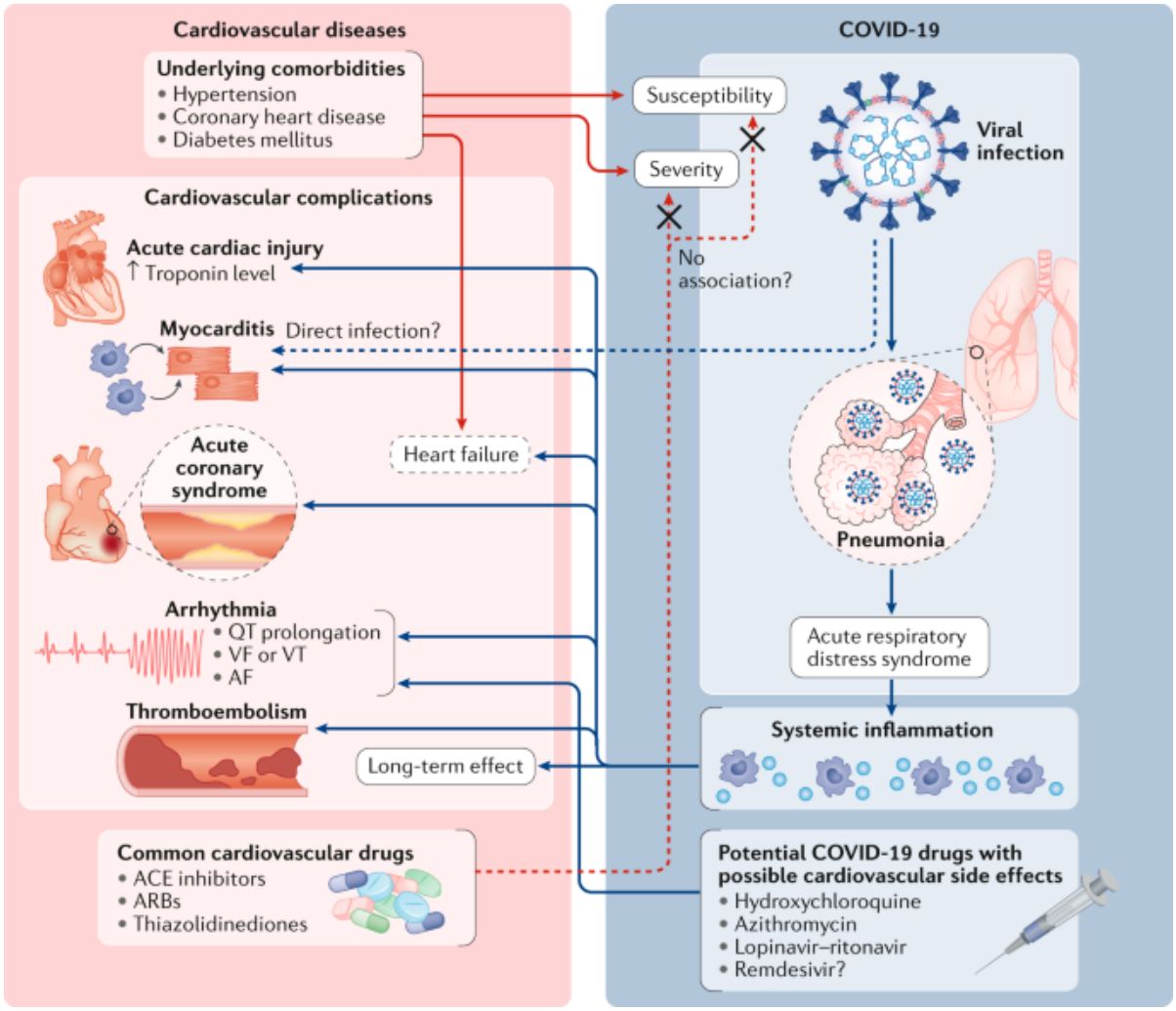
1. **Injury to the Heart (Myocardial injury)** due to coronary artery vasospasm, hypoxic injury to the vasculature, direct endothelial or formation of micro thrombi and atherosclerotic plaque rupture.
2. **Acute Myocardial Infarctions** (Sudden Heart attack): non-ST segment Elevation Myocardial Infarction (NSTEMI –Heart Attack) and ST-Elevation Myocardial Infarction (STEMI –Heart Attack).
3. **Myocarditis:** (Inflammation of the Heart muscle).
4. **Abnormal heart rhythms** (Arrhythmias) include
   - Polymorphic ventricular tachycardia (Torsade de pointes)
   - Sustained ventricular tachycardia and Ventricular Fibrillation.
   - Atrial Fibrillation
   - QT Prolongation
   - Bradycardia (Slow heart rhythm)
   - Transient AV block and Sinus node dysfunction
5. **Stress Induced Cardiomyopathy** Intense emotional or physical stress that affects the heart muscle
6. **Heart Failure and Cardiogenic shock**
7. **Thromboembolic disease** (Blood clotting issues) and **Stroke.**
   - Microvascular thrombotic processes
   - Deep venous thrombosis (DVT): Blood clot in Veins
   - Pulmonary Embolism: Blood clot in pulmonary vessels.

- **Disseminated Intra vascular complications (DIC):** the condition in which blood clots form throughout the body blocking small blood vessels



1. **Lab investigations and ECG**
   - CBC: Lymphopenia, thrombocytopaenia
   - CMP: Elevated liver function tests
   - Coagulation: PT/INR, D dimer
   - LDH, CRP; fibrinogen, ferritin, procalcitonin
   - Infection: viral panel, blood, urine, sputum cultures, symptom specific cultures and imaging.
   - Telemetry: Continuous QTc monitoring on high-risk therapy or Pathology
   - Cardiac biomarkers

Bidirectional interaction between cardiovascular diseases and COVID-19



- ECG to assess ischaemia, myopericarditis, QTc, rhythm
- Echocardiogram if clinically indicated (symptoms, BNP troponin elevation, ECG changes, shock.
- CT chest without contrast for pneumonia evaluation, with contrast to rule out PE in suspected cases with significant D dimer elevation or atrial arrhythmias

2. Follow-up tests: as needed

- ECG: Repeat if QTc prolonging medications.
- ESR, CRP, LDH, ferritin, D dimer, IL-6, pro-calcitonin, Troponin; NT Pro-BNP
- Mixed/central venous saturation (daily if shock)

3. Supportive therapy

- Supplemental oxygen to maintain oxygen saturation 90–96%
- Early intubation in acute respiratory distress syndrome (ARDS), lung protective strategy
- Avoid aerosolisation.
- Do not disconnect from ventilator without following the precautionary steps even during code.
- Avoid unnecessary transportation; encourage bedside procedure when feasible with full PPE.

Investigation and Definitive Treatment of Cardiovascular (Heart) Complications in COVID-19

1. Ischemic heart disease, Myocarditis, Myocardial Injury- Suggested Management

A. NSTEMI (Non-ST Elevated Myocardial infarction)

- Check ECG and troponin if clinical suspicion of acute coronary syndrome (ACS)
- Guideline directed medical therapy: aspirin, heparin, statin, beta blocker (if no brady- cardia or cardiogenic shock)
- Assess drug interaction of antiplatelet or anticoagulants
- Cardiac catheterization if high clinical suspicion of acute coronary occlusion
- Coronary CT angiogram in hemodynamically stable NSTEMI

B. STEMI (ST-segment Elevation Myocardial Infarction)

- Activate STEMI team per hospital protocol
- Primary PCI for STEMI, thrombolytic therapy is controversial, use for low-risk STEMI only if interventional cardiologist unavailable
- Bedside echocardiogram if any clinical uncertainty
- If no angiographic disease- monitor and treat myocarditis; heart failure; arrhythmia; thromboembolism and risk factor modification.

C. **Myocardial injury** Echocardiogram to assess Left ventricular (Left heart) function, Left Ventricular Ejection Fraction and Wall motion abnormality

D. **Myocarditis** Troponin tend to differentiate from myocardial infarction and BNP assess prognosis

E. **Stress induced Cardiomyopathy** Monitor for arrhythmia, consider EP consult if malignant arrhythmia

F. **Cardiomyopathy** Inotropes and vasopressor support if hemodynamic instability with LV dysfunction. Discuss antiviral and anti-inflammatory therapies approved to use. Guideline directed medical therapy for cardiomyopathy. Exercise limitation for 3–6 months to prevent sudden cardiac death.

2. Cardiac arrest

- Address goals of care early and periodically in all patients

- Follow standard Advanced Cardiovascular Life Support (ACLS) protocol
- Consider mechanical Cardio pulmonary Resuscitation (CPR) device if available. (American Heart Association CPR and First Aid protocol.
- Use proper Personal Protective Equipment (PPE) per hospital protocol prior to initiating resuscitative efforts
- Minimize code team size to prevent exposure to health care providers

3. **Heart failure and cardiogenic shock**
   - BNP (Brain Natriuretic peptide), Troponin and Echocardiogram to assess new onset Heart failure.
   - Telemetry for arrhythmia detection and monitoring.
   - Standard Heart Failure management with daily weight, intake/output, diuresis, monitoring electrolytes and renal function.
   - Limited fluid and blood product administration due to high risk of cardiopulmonary decompensation. Concentrate drips when available.
   - Coronary CT angiogram for ischemic workup for new LV dysfunction if no ongoing ischemia.
   - Cardiac catheterization if Heart Failure suspected due to acute coronary syndrome (Acute heart attack symptoms)
4. **Shock** Conservative fluid resuscitation, crystalloid preferred over colloid. Norepinephrine to stabilize shock; transition to inotrope when clinically indicated. Discuss with interventional cardiologist and Shock Team regarding Extra-Corporeal Membrane Oxygenation (ECMO) and mechanical circulatory support device in highly selected cases.
5. **A. Arrhythmia Prolonged QT** (Irregular life-threatening heart beats)
   - Telemetry monitoring and at least daily QT assessment
   - EP evaluation if QTc450msec in the absence of bundle branch block or 500 with bundle branch block if being started on antiarrhythmic or other QT prolonging medication.
   - Monitor electrolytes; Keep K 4.5, Mg 2.2
   - Monitor for QT prolongation if on QT prolonging medications

   QTc=QT/ORR interval (in sec, Bazett correction). QTc will approximately be equal to QT if HR 60–70 bpm.

   B. Polymorphic VT, Sustained VT, Ventricular fibrillation & Torsades de Pointes (TdP) Life threatening irregular heart rhythm

Key thresholds:

- If QTc 470 ms in males and 480 ms females but ,500 ms: close surveillance and stop QT prolonging medications
- If QTc 500ms or 550 ms with BBB or increase in QTc 60 ms after drug initiation: place pacer pads, stop QT prolonging medication and maintain HR 80 bpm with isoproterenol or dobutamine.
- Advanced cardiac life support protocol if hemodynamic compromise
- Follow guideline recommended antiarrhythmic therapy for specific conditions.
- Discussion with cardiology electrophysiology team.
- Amiodarone bolus 150 mg IV in non-code setting; Isoproterenol, Lidocaine or temporary pacing if bradycardia induced Torsade de pointes (TdP-polymorphic irregular heartbeats).

- Monitor electrolytes: Keep K 4.5, Mg 2.2
- **Ventricular tachycardia** (Form of life-threatening irregular heart -beats): Amiodarone 150 mg bolus then infusion 1 mg/min if QTc,450 ms (300 mg IV if code); Avoid amiodarone if QTc markedly prolonged.
- Lidocaine if QTc.550 ms: bolus 75–100 mg then infusion 0.5–2 mg/min, avoid if poor hepatic function or severe heart failure
- Discuss antiarrhythmic drug choice if QTc borderline (450–550 msec) with cardiology/electrophysiologist
- **Torsades De Points (TdP/polymorphic VT)**: Maintain heart rate of 80 bpm (may need beta agonist such as dobutamine, isoproterenol or epinephrine; transvenous pacing).
- Magnesium IV 2–4 gm for Torsade de Pointes
- Limited bedside Echo for LV dysfunction evaluation.
- Non-sustained polymorphic VT requires immediate patient assessment as cardiac arrest may follow.

Conclusion

COVID -19 infection is associated with a number of Cardiovascular manifestations such as myocardial injury, acute myocardial infarction (Heart attack), coronary artery spasm (temporary tightening of muscles in the wall of arteries that sends the blood to the heart) fulminant myocarditis, life- threatening arrhythmias, Heart failure, venous thromboembolic manifestations and cardiogenic shock. Emergency clinicians should be aware of cardio vascular complications when assessing and managing the patient with COVID-19. Some of the drugs utilized to treat COVID-19 patients also have potential cardiovascular complications All patients require close electrocardiographic and haemodynamic monitoring for particularly those patients on COVID -19 drug treatment. There is currently on going few clinical trials to support any definitive therapeutic strategy with antimicrobials or immunomodulators.

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1. XGEVA® (denosumab) summary of product characteristics April 2018, Amgen.
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THROMBOEMBOLISM AND COVID-19

Dr Ramesh Pandita
Hematologist
Kuwait Cancer Control Center (KCCC)

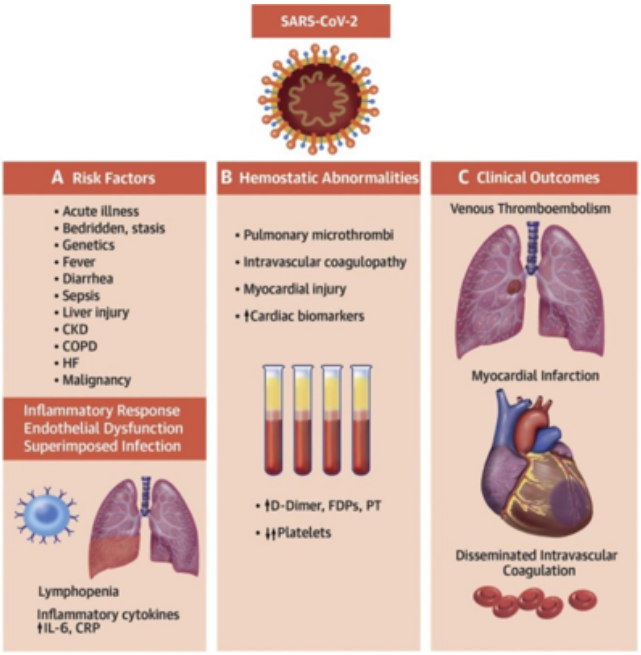
The first case of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was reported in December 2019. In March 2020 World Health Organization declared coronavirus disease, COVID-19 a pandemic. Respiratory symptoms are the cardinal feature of the disease; however, the disease is associated with increased risk of both venous and arterial thromboembolism and as a consequence potentially increased risk of mortality.

What is thromboembolism and what is its frequency in COVID-19 infection?

Thromboembolism refers to formation of a clot (thrombus) in a blood vessel which gets dislodged and is called an embolus. The embolus is carried to other parts of the body like lungs, brain, gastrointestinal tract, kidney, legs etc. In a large pooled study of 8271 patients, the overall thromboembolism rate was 21% and 31% in ICU patients. Thromboembolism was associated with higher mortality.

How does COVID- 19 cause thromboembolism?

The reasons for thromboembolism in COVID-19 is not fully defined and are possibly multiple. There is increased tendency to clotting (hypercoagubility), clotting markers like fibrinogen, factor VIII and D-dimer are increased. There are also antiphospholipid antibodies in many patients. The normal anticoagulants present in the blood like protein C, protein S and antithrombin are decreased. The coagulation abnormalities are associated with **stroke, peripheral arterial ischemia** (reduced blood flow) and **venous thromboembolism.** SARS-CoV-2 RNA has been found in platelets causing increased platelet activity. Increased platelet and neutrophil (white blood cells) activation leads to thrombus formation. Direct viral infection of cells lining the blood vessels, endothelial cells lead to thrombosis and distinguishes COVID-19 infection from other respiratory virus infections. Severe COVID-19 infection results in marked increase in various substances involved in inflammation known as cytokines like interleukins, granulocyte colony stimulating factors etc. This cytokine storm triggers the coagulation system and leads to thromboembolism.



How is thromboembolism diagnosed?

Venous thromboembolism is suspected in patients with typical symptoms and signs of deep vein thrombosis like pain, swelling and skin discoloration,

disproportionately low blood oxygen level to the known lung findings, unexplained low blood pressure, increased heart rate and abnormal right heart function. Bilateral compression ultrasonography of the legs, echocardiography and usual modalities like CT pulmonary angiography or nuclear scan are used. However, in critically ill patients doing special studies like CT scan or nuclear scan can be challenging. High D-dimer level is a common finding in COVID-19 and is currently not used as an indication for investigations for acute venous thromboembolism in absence of manifestations described above.

How is thromboembolism prevented in COVID-19 patients?

Many published guidelines are available. Currently all hospitalized adults with COVID-19 should receive prophylactic low molecular weight heparin. Fondaparinux is indicated in patients in the setting of heparin induced thrombocytopenia. If anticoagulation is contraindicated use of pneumatic compression devices is indicated.

Empiric use of therapeutic intensity anticoagulation is not recommended.

Prophylactic anticoagulation is not recommended for nonhospitalized patients.

How is venous thromboembolism in COVID-19 patients treated?

Low molecular weight heparin is recommended in view of drug-drug interaction between oral anticoagulants and drugs used for treatment of COVID-19

Is there a risk of developing blood clots after COVID- 19 vaccination?

Very rare cases of venous blood clots in brain (cerebral venous thrombosis) and abdomen (splanchnic vein thrombosis) with drop in platelet count, condition termed as thrombosis with **thrombocytopenia syndrome (TTS)** have been reported after Cha Dox 1nCOV-19 Astra Zeneca (AZ) 5 cases per million vaccination, 2 cases per million after AD26. COV2.S Johnson & Johnson (JJ) vaccination. No cases receiving Moderna or Pfizer BioNtech mRNA vaccination have been known to develop TTS as of 23rd April 2021. The development of an antibody against a platelet protein called as platelet factor 4 is the cause of low platelet count (thrombocytopenia) and formation of clots (thrombosis). The benefits of vaccination far outweigh the risk of TTS.

What are symptoms of TTS and How it is diagnosed?

Mild to moderate symptoms such as fever, headache, muscle pain and fatigue are common in first 24-48 hours after vaccination and do not suggest TTS. Patients after 4-30 days after Astra Zeneca or Johnson & Johnson COVID-19 vaccination with severe, recurrent, or persistent symptoms like headache, abdominal pain, vision changes, changes in mental state, shortness of breath, leg pain with swelling or bleeding need urgent evaluation. Investigations required include complete blood counts with platelet count, D-dimer, fibrinogen, PF-4 heparin ELISA, MRI, CT scan, venograms.

How is TTS treated?

The treatment of TTS includes intravenous immunoglobulin, non- heparin anticoagulant. Aspirin is avoided.

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CLEARING THE FOG FROM NEUROLOGICAL MANIFESTATIONS OF COVID-19

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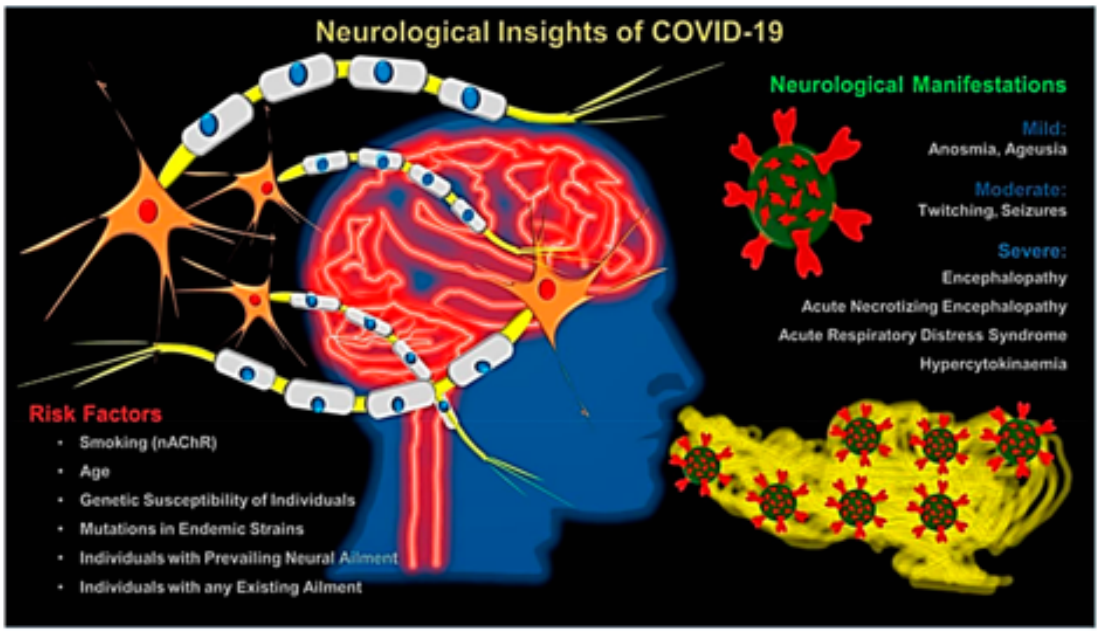
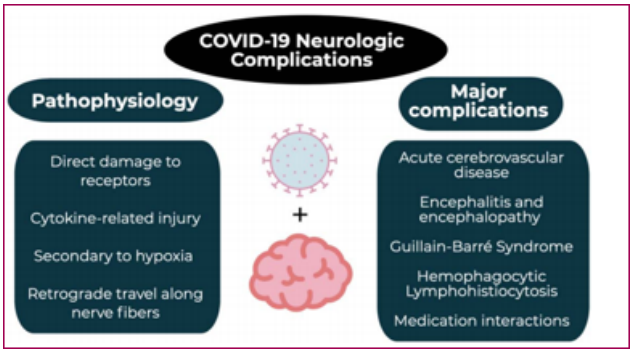
THE human brain, it's coverings, it's blood vessels, spinal cord, peripheral nerves and muscles could all be victims of Neurological onslaught from the novel COVID-19 virus infection. Since the publication of initial reports of the manifestations of this novel virus infection, more and more reports of various neurological manifestations are being reported worldwide.

The minimum prevalence of Brain and Spinal cord complications from two types of Corona virus infections such as severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) and COVID-19 collectively has ranged from 0.04%, for SARS to 0.2% for MERS and the peripheral nerve and muscle complications varied from 0.05% for SARS and 0.16% for MERS. If we extrapolate from these figures then the number of cases of neurological complications from COVID-19 would project to a world-wide prevalence of 1850-9671 patients with brain and spinal cord disease and 2407- 7737 cases with peripheral nerve and muscle disease symptoms due to COVID-19. This has been calculated until September 2020, given that there were 4.8 million cases of this viral infection.

In many cases, neurological manifestations have been reported even without respiratory symptoms. Over 80% of COVID-19 patients in a hospitalized United States' cohort experienced neurological symptom during the course of their illness and these manifestations were associated with a four-fold higher risk of severe COVID-19 in this cohort. An observational case series from France found that 65% of people with COVID-19 in ICUs showed signs of confusion (or delirium) and 69% experienced agitation.



Neurological Complications documented so far and include:



1. **LOSS OF SMELL [Anosmia] and LOSS OF TASTE [Ageusia]** are very common symptoms of COVID-19 infection up to 80%-90% of symptomatic patients; indicating the affection of the OLFACTORY nerve by the virus which could also mark as its entry point to the brain.
2. **STROKE** Up to 5% of COVID-19 infections could result in ischemic Stroke (Brain Attack) and <1% were reported to develop Intra Cranial Hemorrhage and again less than 1% were reported to develop venous STROKES. Most patients who presented with Stroke were above the age of 60 years and had several vascular risk factors such as Hypertension, Diabetes Mellitus and Hyperlipidemia. Blood inflammatory markers like D-Dimer, C- Reactive protein, serum ferritin was high in these patients indicating that COVID-19 induces a pro-inflammatory hypercoagulable state in the setting of critical illness.
3. **ENCEPHALOPATHY** Consists of changes in personality, behavior, and consciousness, which may vary from Delirium to Coma. It is usually caused by secondary causes from COVID-19 infection, such as reduced oxygenation (Hypoxia), changes in blood chemistry such as high or low glucose or electrolytes disturbances or sub-clinical seizures.
4. **ENCEPHALITIS** Inflammation of the brain itself, caused directly by COVID-19 virus infection or it could also be secondary to body's immune attack on the brain. Neurological features include fever, headache, reduced level of consciousness, seizures neck stiffness. Difficulty swallowing and breathing difficulties requiring ventilator support could ensue.
5. **POST-INFECTIOUS COMPLICATIONS** occur after the patients have apparently recovered from the primary COVID-19 infection and some time would have elapsed after it. They are divided into Brain and spinal cord affection or the involvement of peripheral nerves and muscles.
6. **ACUTE DISSEMINATED ENCEPHALO-MYELITIS [ADEM]:** Rare post-infectious neurological complication causing reduction in the level of consciousness, seizures, may cause difficulties in swallowing or breathing, unsteadiness, weakness of all limbs and bladder disturbances. Patients may need ventilator support. This usually improves with treatment.
7. **TRANSVERSE MYELITIS:** This is usually a post-infective autoimmune complication resulting in inflammation of the spinal cord. Occurs few weeks after the primary systemic infection. Patients present with weakness and stiffness of the limbs, urinary retention and a sensory impairment. It improves with treatment.
8. **GUILLAIN BARRE SYNDROME [GBS]:** Is a post infectious weakness of limbs with flaccidity and bilateral facial weakness. This may progress to swallowing and breathing difficulties and may require ventilator support. This disease results from demyelination of peripheral nerves and usually improves with treatment.
9. **MYOSITIS:** Muscle injury with varying increase in weakness and elevation of muscle enzymes in the blood. May result in renal failure. Again, it is an autoimmune disease and responds to treatment.

*Quotes on Febrile illnesses by **Sir William Osler***

Humanity has but three great enemies; fever, famine and war; of these by far the greatest, by far the most terrible, is fever.

CONCERNED AND CORNERED BY COVID-19: A DIAGNOSTIC VIEWPOINT

Dr Kaushik Majumdar
Pathologist
Al Sabah hospital, Kuwait

When should we advise COVID-19 tests?

COVID-19 testing may be considered, if one has symptoms like fever, chills, cough, fatigue, muscle or body aches, headache, sore throat, recent onset loss of smell or taste, congestion or running nose, Testing at present may not be required for asymptomatic patients or those who have come in contact with a positive symptomatic patient at home or office. However, strict isolation practices are mandatory in all such circumstances.

Testing may be recommended by healthcare professionals under certain special circumstances, like

- After attending social gatherings without precautionary measures where positive cases have been detected,
- For a healthcare worker in a hospital where there has been an outbreak.
- Prior to a medical or surgical procedure.

Whom should I contact to get my test done?

As mentioned, the app-based system or website provided by the state or local health department can be used to report symptoms and be in touch with the health care provider. Different clinics have been set up according to zones, and based on residential address, the app will guide the patient to reach the proper zonal clinic for getting the tests done and for further course of management.

What are the different methods of laboratory evaluation? Are the methods of collection of samples painful?

There are predominantly two methods of laboratory evaluation.

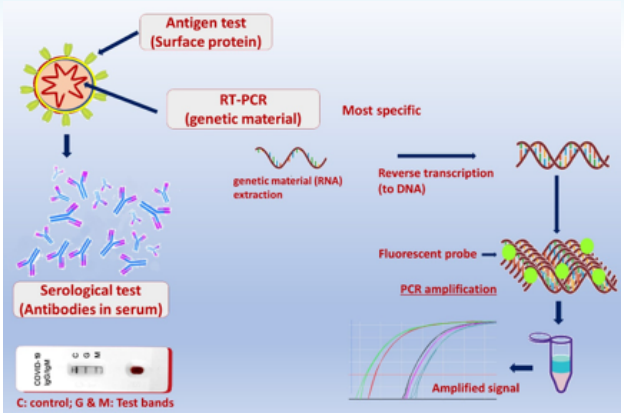
i) Diagnostic molecular test (RT-PCR) or antigen test (for viral proteins)

ii) Antibody (serological) test

Name of the test	Parameter which is tested	Sample/ Patient material
RT-PCR (most specific)	Viral genetic material (RNA)	Nasopharyngeal/ Saliva swab
Antigen test	Viral surface spike protein	Nasopharyngeal/ Saliva swab
Serological test	Antibodies in blood	Blood

For **molecular tests** like RT-PCR (reverse transcriptase polymerase chain reaction), nasopharyngeal swab with or without a throat swab is taken. It is highly accurate, considered as the **'gold standard',** and can show active Corona virus infection. Collection of nasopharyngeal swabs (inserted posteriorly through one of the nostrils) may be distressing at the time of the procedure, but can be bearable, especially when weighed against the benefit offered to the individual and community.

During shipping, temperature should be maintained and the test should be conducted within 4 hours. The genetic material on the swabs after extraction are subjected to multiple cycles of heating and cooling, in presence of primers and probes (RT-PCR). The amplified genetic material emits fluorescent light on combination with specific probes, which gives the 'positive' signal.



Rapid antigen test is another diagnostic test for viral proteins, but are less sensitive than the molecular (RT-PCR) test.

Serological (antibody) tests are done on blood samples and due to less reliability, not much practiced at present.

How long does it take to get the test results?

Ideally test results are expected within 24 hours. Sometimes reports may be communicated online through email or messages at night, on the same day.

Can I test myself at home?

In India COVID-19 Self-testing kits are commercially available. Even sample collection at home is also provided. However, it is best to seek healthcare services to minimize errors during sample collection.

What should I do if I get a positive test result?

There is no reason to be scared if anyone gets a positive result. But quarantine or strict isolation from other family members and the community as a whole is strongly recommended, and severity of symptoms should be reported as mentioned.

Use separate washroom if possible. Use masks mandatorily even at home, cover coughs and sneezes with elbow; take care of secretions with proper hand hygiene with the help of soap and sanitizer. The room where the person is isolated should be cleaned and surfaces sanitized every day. Take prior appointment, use masks and maintain social distancing while visiting your doctor's clinic.

Is a positive test result confirm that I have the disease?

No laboratory test can be 100% accurate even in the renowned accredited centers. Although RT-PCR for COVID-19 is highly specific, on rare instances results may be **false-positive** (testing positive without being infected with the virus). Under these circumstances, even if the patient is asymptomatic, there is no harm in following the usual guidelines of isolation.

On the other hand, a negative RT-PCR is almost confirmatory that the person is not infected at the time of sample collection. However, due to improper collection, storage or transport, results may be **false negative** (testing negative despite being infected with the virus). If the patient is symptomatic the test may be repeated; if asymptomatic but there is a definite history of exposure, usual guidelines of isolation should apply.

If I am tested positive but don't have any symptoms, can I still spread the disease?

Yes. Covid-19 is known for having asymptomatic carriers in the community. Even if the person is asymptomatic, he or she can still be contagious and spread the virus. Hence, the period of quarantine as mentioned earlier is absolutely necessary.

If I am tested positive, should my family members be tested also?

If your family members are asymptomatic or mildly symptomatic, only isolation is recommended at present, as mentioned before. If anyone in the family is severely symptomatic, be in touch with the healthcare provider.

What further laboratory evaluations are done?

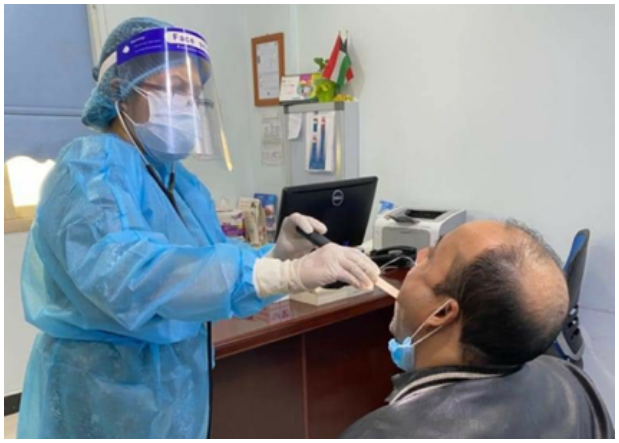
In addition to the RT-PCR for COVID-19, when a symptomatic person reaches the clinic, his blood

pressure and oxygen saturation are measured. Additional tests ordered: complete blood count (CBC), WBC count particularly lymphocyte count, pro-calcitonin, CRP, Interleukin 6, Ferritin, Erythrocyte sedimentation rate (ESR) and Lactate dehydrogenase (LDH), Coagulation parameters; FDP, D-Dimer.

How laboratory parameters can detect that my immunity is adequate?

Antibody tests for COVID-19 are not much reliable, and the serum antibody levels have not been proven to confer protective immunity. The count of the lymphocyte fraction of the white cells can provide an indirect evidence of the patient's immune status.

What are the basic precautions a healthcare provider can undertake at the time of sample collection and handling patient materials?



Use of personal protective equipment (PPEs), face masks, protective face shields and double gloves are recommended **(Figure).** Strict biosafety guidelines (hygienic and aseptic/free from infection) should be maintained, with proper disposal of used equipment, kits and patient material.

Can I get infected for the second time?

There have been instances of people getting symptomatic for the second time, which may be due to fresh infection. Hence all precautionary measures should continue for the person concerned and the family after recovery from the illness.

How much different and difficult is this new strain which is being reported?

I came across an interesting quote: '**after a year of stress, now we have new strains'.**

Many commercial **nucleic acid amplification tests (NAATs)** that use reverse transcription polymerase chain reaction **(RT-PCR)** have multiple targets to detect the virus, such that even if a mutation impacts one of the targets, the other RT-PCR targets will still work. However, there are some tests that rely on only one target, and mutations may impact their ability to work.

The **US Food and Drug Administration (FDA)** has acknowledged that SARS-CoV-2 mutations could interfere with COVID-19 tests and continues to monitor variants and evaluate potential effects on diagnostic assays. The agency has also provided recommendations to developers to design tests so that viral mutations have minimal evasion, such as by including multiple genetic targets. The FDA also advises developers to watch for mutations that could alter test performance and clearly convey test limitations. CDC also actively tracks and characterizes coronavirus variants through genomic surveillance efforts.

"As long as the virus keeps changing—which is a natural thing—you just need to keep monitoring".

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Useful Tips

ROLE OF IMAGING IN COVID-19

Prof. Renu Gupta
Radiologist
Faculty of medicine, Kuwait university

Dr. Venugopal NK Chavan
Radiologist
KOC, Hospital

COVID-19 (coronavirus disease 2019) is an infectious disease caused by **severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2),** a strain of coronavirus.

- The incubation period for COVID-19 ranges between 5 days to 11 days in the majority of cases.
- Presentation in adults included fever, headaches, abdominal symptoms, rash, and conjunctivitis. It was recognized that clinical and laboratory features were similar to those of Kawasaki disease, Kawasaki disease shock syndrome, or toxic shock syndrome.
- The definitive test for SARS-CoV-2 is the real-time reverse transcriptase-polymerase chain reaction (RT-PCR) test. This is performed as throat and nasal swabs obtained from the patient, and corona virus antigen is detected in the swabs through the special laboratory technique.
- The laboratory findings that are commonly seen in COVID-19 infection are lymphopenia, thrombocytosis, increased PT, LDH, D-dimer, CRP, ESR, AST, ALT.
- In summary, the COVID-19 infection is diagnosed basing on
  - clinical symptoms,
  - RT-PCR and supported with
  - serological and
  - Lab findings.
- **Role of imaging** is to mainly assess the severity, extent of disease and complications after COVID-19 infection is confirmed by RT PCR.
- Many imaging organizations worldwide consider that X-rays or CT chest *are not primarily a screening or diagnostic tool.* Their role is well documented in assessing the *complications, severity of the disease and as a follow up.*
- X ray chest can be performed initially when there are chest symptoms in a PCR+ve case.
- It is advisable to perform portable X-rays.
- Typical imaging findings **are bilateral, peripheral, and basal predominant distribution of ground glass opacities (GGO) in the adult population.**
- The non-specific imaging findings are most commonly of **atypical or organizing pneumonia.**

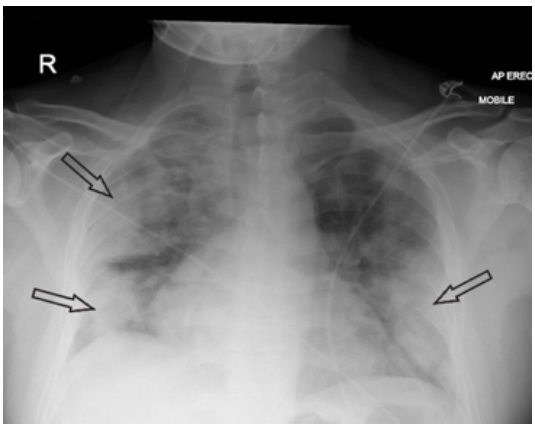

Figure 1: Anterior-posterior (AP) chest radiograph of *a man in his 50s, with severe COVID-19 pneumonia, showing bilateral dense peripheral consolidation and loss of lung markings in the mid and lower zones (outlined arrows)*

Chest radiography scoring system

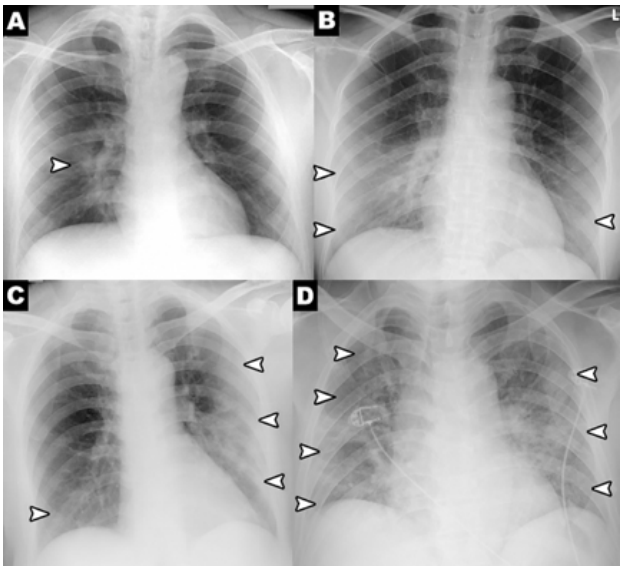

Figure 2: *Chest radiography scoring system. A score of 0–4 was assigned to each lung depending on the extent of involvement by consolidation or ground-glass opacities (0, no involvement; 1, <25%; 2, 25%–50%; 3, 50%–75%; and 4, >75% involvement). The scores for each lung were summed to produce the final severity score. Arrowheads indicate areas of consolidation or ground glass opacities*

Progression of X-ray findings

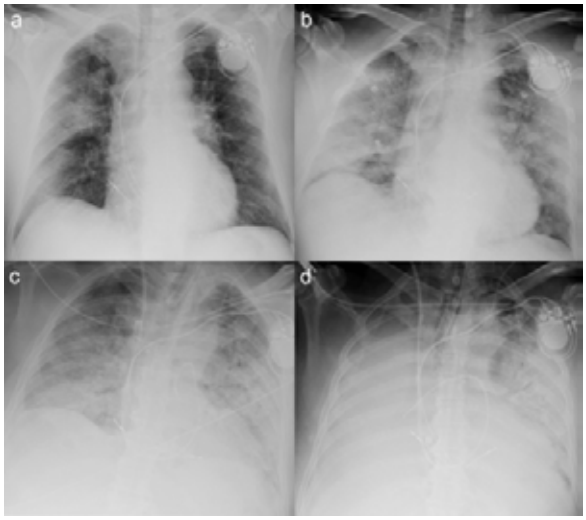

Figure 3: *Temporal progression of x ray findings. Patient initially (a) presented with patchy ground glass opacities in right mid and peripheral lower zone. Two days later (b) bilateral large confluent opacities are seen, further increasing in size on day 7 (c). White out of lungs (d) noted indicating ARDS before patient expired.*

CT chest has a higher sensitivity but lower specificity and can play a role in the diagnosis and treatment of the disease.

Table 1: Initial CT-Patterns in COVID-19

Patterns	%
Ground-glass opacification	88
Bilateral involvement	88
Posterior distribution	80
Multilobar involvement	79
Peripheral distribution	76
Consolidation	32

Table 2: CT Changes Over Time

Stage	Duration (days)	Changes
Early stage	0 – 4	GGO, partial crazy paving, lower number of involved lobes
Progressive stage	5 – 8	Extension of GGO, increased crazy paving pattern
Peak stage	10 – 13	Consolidation
Absorption stage	>= 14	Gradual resolution

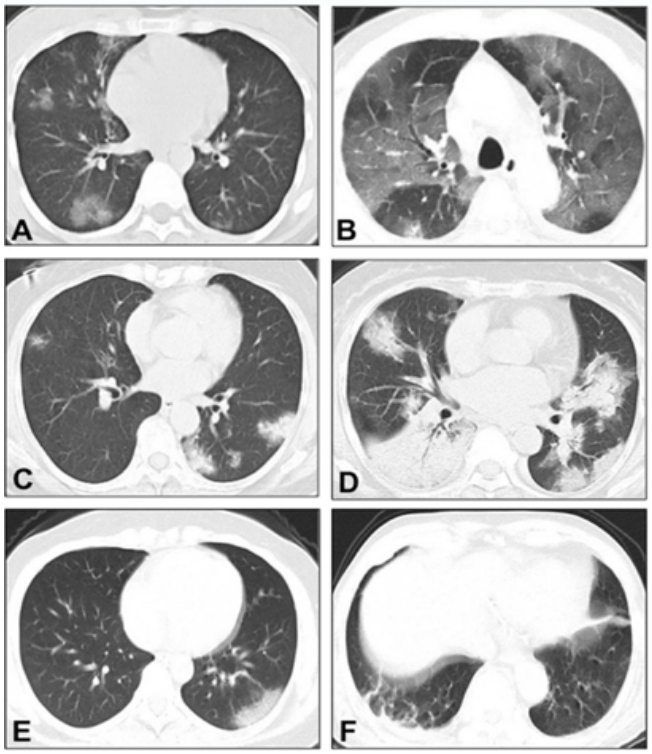

Figure 4: *CT findings in COVID- 19 patients: Mutiple bilateral, scattered areas of ground glass opacities are seen in different patients with associated organising pneumonia. These are the most common pattern of presentation.*

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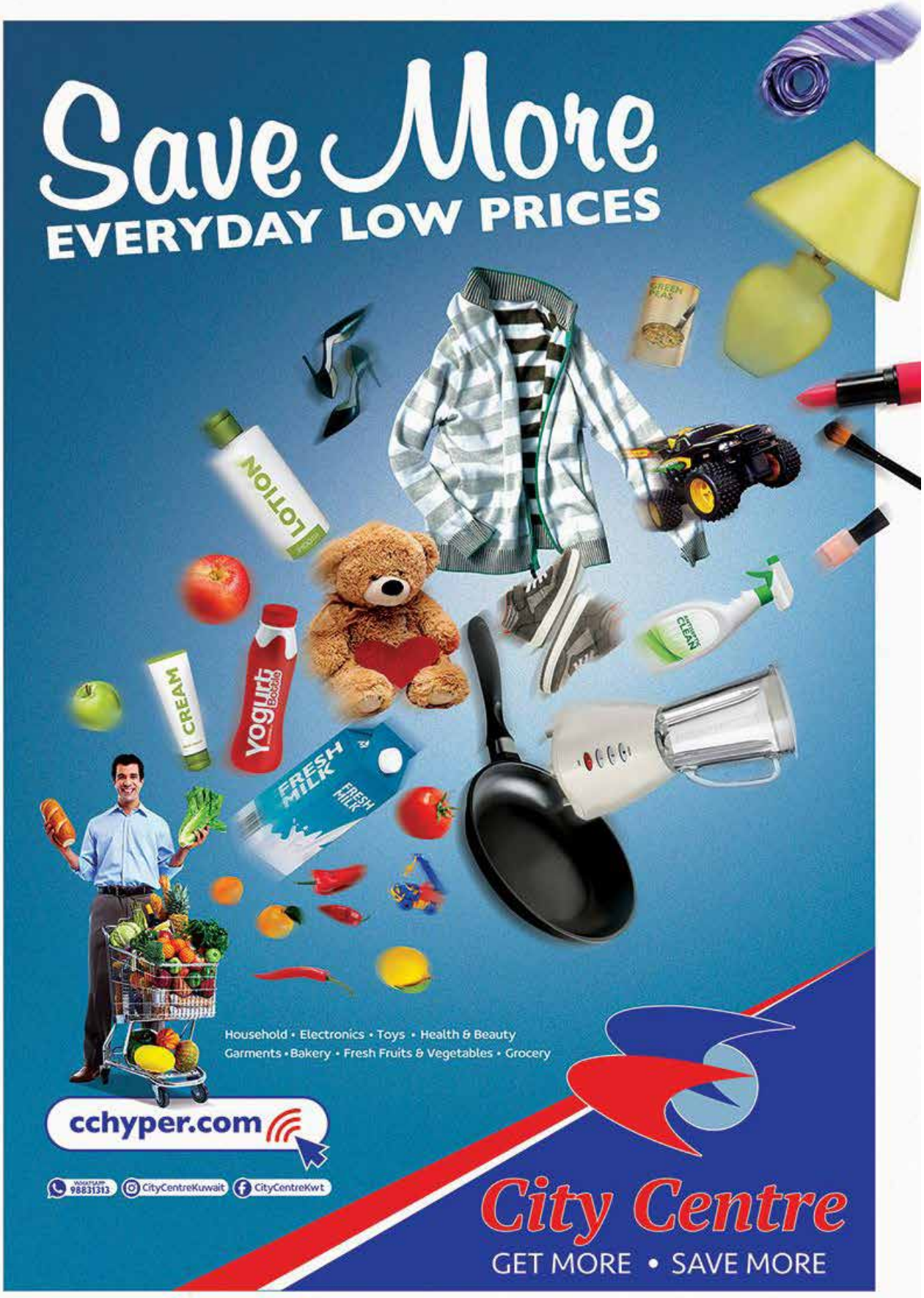
COVID- 19 Reporting and data system (CO-RADS) classification:

Table 3: Based on the CT findings, the level of suspicion of COVID-19 infection is graded from very low or CO-RADS 1 up to very high or CO-RADS 5.

Score	Level of suspicion of pulmonary involvement of COVID-19	Summary
CO-RADS 0	Not interpretable	Scan technically insufficient for assigning a score
CO-RADS 1	Very low	Normal or non-infectious
CO-RADS 2	Low	Typical for other infection but not COVID-19
CO-RADS 3	Equivocal/unsure	Features compatible with COVID-19, but also other diseases
CO-RADS 4	High	Suspicious for COVID-19
CO-RADS 5	Very high	Typical for COVID-19
CO-RADS 6	Proven	RT-PCR positive for SARS-CoV-2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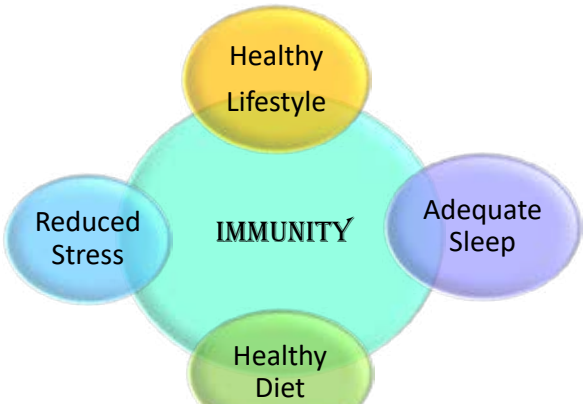
TREATING COVID-19 PATIENTS

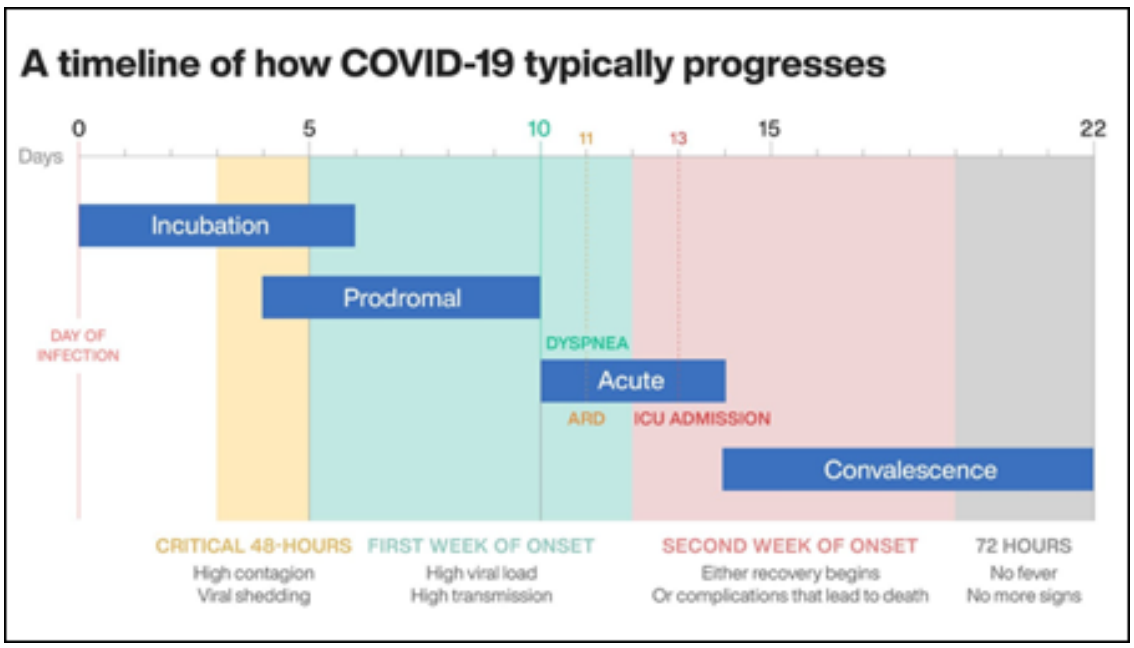
Dr Pradep Mathew
Physician
Al Sabah Hospital Kuwait

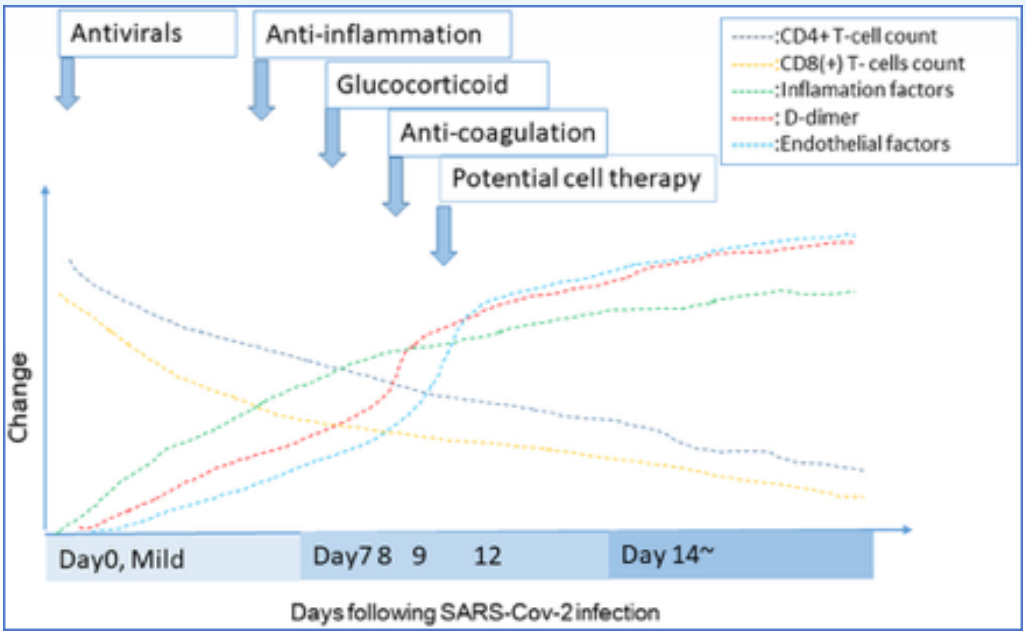
COVID 19: Treatment Principle

- **Adaptive Immunity:** Generation of both Cell mediated and Humoral immunity
- **Boost Your Immunity:** Adequate sleep, reduced stress, Exercise, Healthy diet.



- **Multivitamins:** Vitamin D has immunomodulatory role, Vitamin C, Zinc
- Anti-virals: Lopinavir-Ritonavir, Flapiravir, Remdesivir
- Antibiotics to prevent secondary infection
- **Anti-coagulants** (LMWH & NOAC): required to prevent Low grade DIC with primary lung injury
- **Corticosteroid:** One of the mainstays of treatment in COVID 19 pneumonia.
- **Drugs to prevent Cytokine storms** (IL6 antagonists): Toclizumab, Anakinra.
- *Drugs not Useful based on current evidence: Hydroxychloroquine, Ivermectin, Plasma therapy.*





Not-Hospitalized Mild to moderate COVID-19	• Supportive and symptomatic treatment for stable patients • For high risk patients: Casirivimab plus imdevimab, Bamlanivimab plus etesevimab
Hospitalised but doesn't require supplemental Oxygen	• Remdesivir for high risk patients
Hospitalised and require Oxygen	• Dexamethasone plus Remdesivir
Hospitalised and require Oxygen through High flow Device or non-invasive ventilation	• Dexamethasone • For patients with rapidly increasing oxygen needs and systemic inflammation: Add Toclizumab
Hospitalized and Require Invasive Mechanical Ventilation or ECMO	• Dexamethasone plus Toclizumab

1.Mild Symptomatic (Home Isolation) [75 % Cases]

- **Stay home** from work, school and other public places. Patient need to follow strict home isolation practice.
- No Admission, Patient are required to remain Home Isolation for at least 14 Days.
- **Oral antibiotics:** Amoxycillin-Clavulanic Acid/ Moxifloxacin/ Azithromycin/ Doxycycline
- Paracetamol for Fever
- Adequate Hydration

- Tab Vit. C, Zinc, Vitamin D
- If complaining of breathlessness (SOB) or persistent high-grade fever: must visit Medical Casualty

2. COVID -19 with Chest Infiltrate (Pneumonia)

- Usually require Admission in Isolation facilities
- IV Antibiotics: Ceftriaxone + Azithromycin or Doxycyclin
- Anti-Virals Remdesivir
- Anticoagulation: Standard therapeutic dose of LMWH
- Supportive treatment.

3. COVID 19 with Significant Chest Infiltrate, Hypoxia

- Admission
- Oxygen, Prone position
- IV Antibiotics: Ceftriaxone/ Tazocin/ Meronem, Azithromycin/ Doxycyclin
- Anti-virals
- Baricitinib plus remdesivir for the rare circumstances in which corticosteroids are contraindicated
- Anticoagulation: Standard therapeutic dose of LMWH
- Require specialized treatment Corticosteroids, & Toclizumab.

4. Severe Acute Respiratory Illness: Potential Candidate for ICU admission

- ICU assessment & Admission
- Oxygen, Prone position
- IV Antibiotics: Ceftriaxone/ Tazocin/ Meronem, Azithromycin/ Doxycyclin
- Anticoagulation: Standard therapeutic dose of LMWH
- Consider Corticosteroids & Toclizumab.

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ICU MANAGEMENT OF COVID-19

Dr Rohit Lohani
Anesthesiologist
Al-Sabah Hospital, Kuwait

Seven decades before COVID-19, a similar crisis strained the city of Copen Hagen. In August 1952, the city was overwhelmed by the amount of polio cases admitted every day. The patients were in respiratory failure needing artificial breaths. In those days the only technique they knew was bagging (forcing the air via mouth using a plastic or rubber air bag). It was described as a war like situation. This crisis gave rise to the modern ventilators and ICU management.

The **COVID-19 pandemic** has a similar effect even with the availability of all the modern medicine and equipment that the ICU have in this modern era. The ICU have the highest aerosol generating procedures and manipulation and therefore the staffs and doctors are more prone to get infected. The COVID-19 virus infects many systems (kidneys, heart, brain, blood) but the most striking one is respiratory system 'lungs'.

Who is a Candidate for ICU Care?

COVID- 19 infected patients are admitted with increasing requirement of oxygen supplementation which has been described as **"Happy hypoxia".** Initially they display very low measurements of oxygen saturation on the monitor without significant respiratory distress. Patients are given respiratory support in an escalating manner once they fail to improve their oxygen levels in blood by conventional oxygen supplementation in COVID-19 wards.

Many serious patients require high flow nasal oxygen (HFNO) which gives up to 60 litre/min of O2 with maximum of 100% O2. The conventional oxygen mask gives 15 litre/min. The patients who worsened are put ventilators and then need to be highly sedated or even put on muscle relaxants.

For patients who initially received remdesivir monotherapy and progressed to requiring invasive mechanical ventilation or ECMO, dexamethasone should be initiated and remdesivir should be continued until the treatment course is completed. Most Hospitalized Patients with COVID-19 Who Require **Invasive Mechanical Ventilation or Extracorporeal Membrane Oxygenation (ECMO), dexamethason**e or equivalent doses of alternative corticosteroids such as **prednisone, methylprednisolone, or hydrocortisone** may be used. In addition, blood thinners (clexane, or heparin), broad spectrum antibiotics and Interleukin inhibitors (Toclizumab or Anikinra). Patients also have to be investigated for other organ involvement like kidney (urea, creatinine) heart (troponin level, ECHO Cardiogram), coagulation system (D-dimer levels).

Prognosis and Outcome

The prognosis of patients in ICU depends on extent of viral load and damage caused by initial onslaught. The progress of illness was measured on the trend of biochemical markers and ventilator response. Our personal experience was that those patients weaned off mechanical ventilation within two weeks recovered completely. The course of illness is complicated with multi-organ failure and secondary infection. In addition to ventilator support, many patients require other intensive support like 'dialysis'.

The lung affection of COVID-19 patients put on ventilation depended also on types:

COVID- 19 'L – Type'	ARDS like Pheno-type 'H – Type'
PEEP - Non-Responsive	PEEP - Responsive
Prone position	Prone position
Low lung volumes	Lung recruitment strategies helpful (PEEP)

Hypoxemia refractory to prone position and recruitment for > 6 hrs have a poor prognosis. This stage patient could be considered for a bypass machine (ECMO, extra corporeal membrane oxygenation). This is where the blood is oxygenated by a bypass machine outside the body.

ICU Challenges during COVID- 19 Pandemic

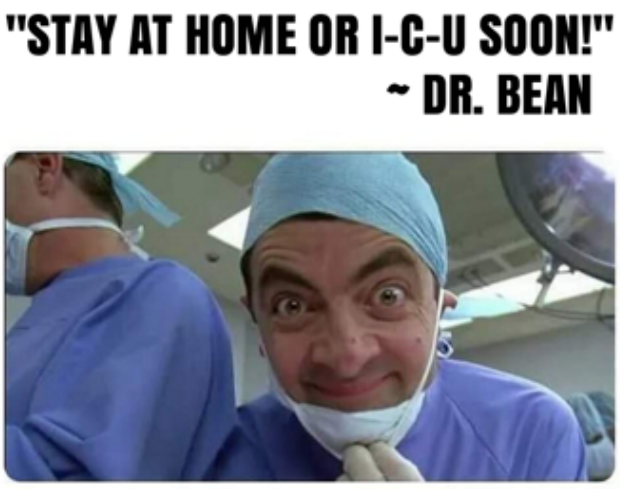
The biggest challenges apart from the overwhelming number of patients are limited critical care beds all over the world, needing increased staffing and new facilities.

- Doctors and Nurses are overburdened with patients. Long working hours that lead to both physical and mental fatigue.
- Demands of costly medications: antibiotics, anti-virals, blood thinning agents, PPE Kits and masks.
- Aerosol generating procedures that expose Health Care Workers (HCW): Doctors, Nurses, supportive staff all at risks.
- Strict infection control measures and safety precautions
- Transfer of patients to different locations; Isolation from friends and relatives. Occasionally, no reporting about their status to the relatives.

Conclusion

To conclude, the management of critical patients with COVID-19 pneumonia during the pandemic has been the greatest challenge faced by intensive care medicine in all its history.

Management of COVID-19 ICU patients is demanding because of the heterogeneous lung pathology that requires an individualized lung protective ventilation strategy to improve outcome.



PROGNOSIS AND RECOVERY OF COVID-19 PATIENTS

Dr. Syed M Rahman
Physician
Farwaniya Hospital, Kuwait

The leading cause of death is respiratory failure from acute respiratory distress syndrome (ARDS). The overall pooled mortality rate from ARDS in COVID-19 patients is 39%; however, this varies significantly between countries (e.g., China 69%, Iran 28%, France 19%, Germany 13%).

People <65 years of age have relatively small risk of death even in pandemic epicentres, and deaths in people <65 years of age without any underlying conditions is uncommon.

Prognostic factors

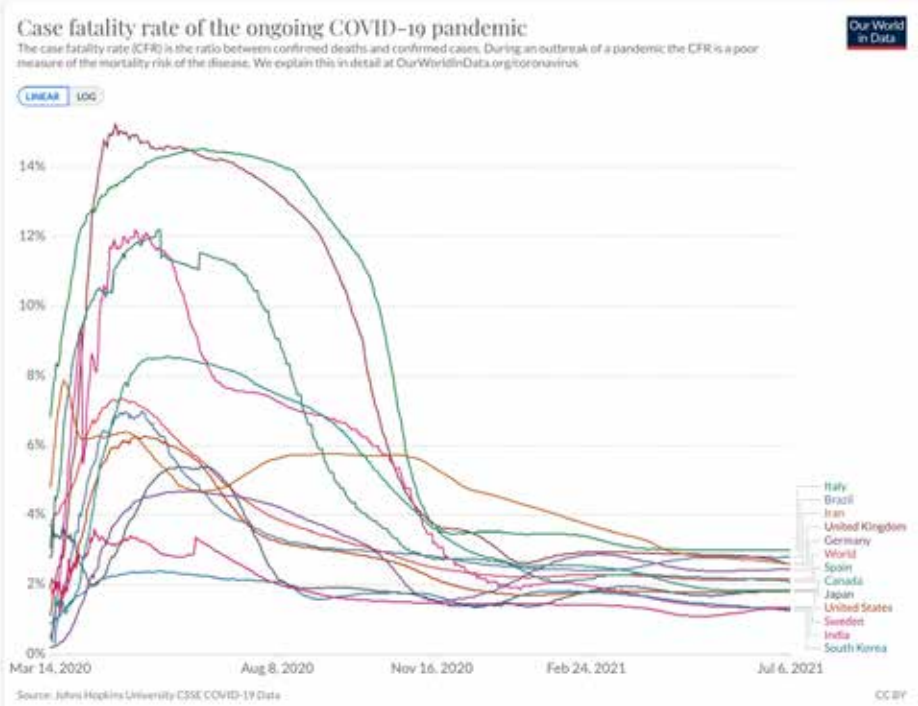
Patient Characteristics	• Increasing age, Male sex, Smoking, Presence of comorbidities e.g., hypertension, diabetes, cardiovascular or cerebrovascular disease, arrhythmias, COPD, dementia, malignancy
Disease Severity	• Dyspnoea, Tachypnoea, Hypoxaemia, Respiratory failure, Hypotension, Tachycardia
Laboratory Findings	• Lymphopenia, Leukocytosis, Neutrophilia, Thrombocytopenia, Hypoalbuminaemia • Elevated creatine kinase (CK), Elevated cardiac markers, Elevated D-dimer
Inflammatory Markers	• Elevated inflammatory markers: C-reactive protein (CRP), procalcitonin (PCT), erythrocyte sedimentation rate(ESR), Elevated lactate dehydrogenase (LDH) • Elevated interleukin-6 (IL 6)
Vital Organ Involvement	• Liver, kidney impairment, or cardiac injury • Consolidative infiltrate or pleural effusion • High sequential organ failure assessment (SOFA) score.

Case fatality rate (CFR)

- Defined as the total number of deaths reported divided by the total number of detected cases reported. CFR is subject to selection bias as more severe /hospitalised cases are likely to be tested.

Mortality

The leading cause of death is respiratory failure from acute respiratory distress syndrome (ARDS). The overall pooled mortality rate from ARDS in COVID-19 patients is 39%.



- The World Health Organization's current estimate of the global CFR is 2.3%. This is much lower than the reported CFR of severe acute respiratory syndrome coronavirus (SARS), which was 10%, and Middle East respiratory syndrome (MERS), which was 37%.
- CFR varies considerably between countries.
- CFR increases with the presence of comorbidities.
- CFR increases with disease severity.
- The CFR is highest in patients with critical disease, ranging from 26% to 67% in studies.

Hope moving forward with the Pandemic

- The present outbreak has been caused mainly by the mutated strains of the Covid virus, and as such, the previous infection might not be useful for protecting against the current strain. This is why it is suggested we get the vaccine.
- Getting vaccinated can decrease the chances of hospitalisation and requirement of supplementation of oxygen with more chances of recovery at-home.
- It's been suggested vaccinated people have less chance to develop symptomatic Covid infection.
- Vaccinated individuals can have a faster recovery after two doses of vaccine.

COVID-19 LONG TERM SEQUELAE

Dr. Mohammed Yousuf Dar
Physician
Kuwait National Guard

COVID-19 pandemic continues unabated. More than 165 million patients have recovered; however, clinicians are observing persistent symptoms and substantial end organ dysfunction long after SARS-CoV-2 infection. A patient wrote on the 95th day of his illness." **I am unable to be out of my bed for more than 3 hours at a stretch, my arms and legs are permanently fizzing, and I have ringing in my ears, intermittent Brain Fog, Palpitations and dramatic mood swings".** Other patients have also described similar complaints as I have tried to summarize in the following passages.

Post Intensive Care Syndrome

Post-acute COVID-19 syndrome is not only observed among patients who had severe illness and were hospitalized but also in people with mild disease. So far there has been a lot of emphasis on the treatment of acute manifestations but now we are seeing a **"long tail"** of COVID-19 related illnesses. Many patients not admitted to hospital are reporting a prolonged and debilitating course of illness lasting for weeks and months. The most commonly reported symptoms are fatigue and SOB especially with exertion; chest tightness; persistent cough; skin rashes; raised temperatures; tingling in the ears; and neurological disturbances.

COVID-19 and Diabetes mellitus

The relationship between COVID19 and diabetes is bidirectional. On one hand DM is associated with increased risk of severe disease and on the other hand new onset diabetes and severe metabolic complications of preexisting diabetes including diabetic ketoacidosis and hyperosmolarity have been observed in diabetic patients with COVID-19.

Cardiovascular Complications

Myocardial injury has been described in many patients with severe acute illness along with thromboembolic disease. Myocardial inflammation and myocarditis as well as cardiac arrhythmias have been reported after a median interval of 71 days. The durability and outcome of these findings are not yet known and needs continued follow-up. Heart failure as a major sequela of COVID-19 can have considerable implications in older adults with comorbid conditions as well as in young athletes.

Pulmonary complications

More than 60% patients continue to have symptoms like persistent cough; shortness of breath on mild exertion and decreased respiratory muscle strength even three months after discharge and more than 70% have radiological evidence of pulmonary dysfunction such as interstitial thickening and fibrosis. 25% had decreased diffusion capacity for carbon monoxide (DLCO). Pulmonary fungal infections like CAPA (COVID Associated Pulmonary Aspergillosis). It has been estimated that 20% to 30% of severely ill and ventilated patients with COVID-19 develop CAPA.

Neurological Sequelae

Different neurological complications like headache, vertigo, loss of smell (anosmia), encephalitis, seizures, mood swings and "brain fogg" have been reported even 3 months after initial illness. Past pandemics involving viruses like {SARS-CoV-1; Middle East Respiratory Syndrome (MERS) & Influenza} have

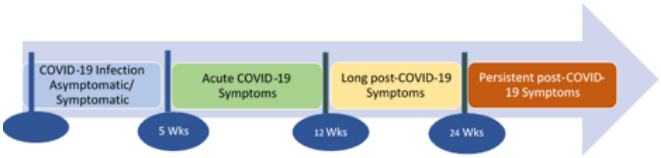
involved neuropsychiatric sequelae that could linger for months and even years in recovered patients and can seriously threaten cognitive health and overall well-being and day to day functional status of these patients.

Emotional health and well-being

A diagnosis of COVID-19 and subsequent physical distancing has resulted in

1. Feeling of Isolation and Loneliness.
2. Social stigma and hopelessness.
3. Lingering malaise and exhaustion like chronic fatigue syndrome with physical debility and emotional disturbances.
4. Depression; anxiety and posttraumatic stress disorder and substance abuse disorder.
5. Exacerbation of Obsessive-compulsive Disorder. These combined issues have the potential for a global health crisis given the magnitude of this pandemic.

Long COVID Syndrome or COVID Haulers



There are no formal guidelines to diagnose long COVID, and the syndrome can manifest in many ways. Therefore, patients need to be able to spot the symptoms and discuss them with their doctor.

It can happen to anyone who has had COVID-19, even if the illness was mild, or asymptomatic. Patients with long COVID report experiencing different combinations of the following symptoms:

- Tiredness or fatigue (80%)
- Difficulty thinking or concentrating ("brain fog") (81%)
- Headache (68%)
- Numbness and Tingling (60%)
- Loss of smell or taste (59%)
- Dizziness on standing
- Fast-beating or pounding heart (also known as heart palpitations)
- Chest pain
- Difficulty breathing or shortness of breath
- Cough
- Joint or muscle pain
- Depression or anxiety
- Fever
- Symptoms that get worse after physical or mental activities
- Symptoms mimicking chronic fatigue syndrome.

Brain fog

One in five long-haulers experienced brain fog six months after having COVID-19,

Fatigue

One out of 10 survivors of COVID-19 who'd been hospitalized reported muscle fatigue and weakness six months later. Both brain fog and fatigue are hallmarks of chronic fatigue syndrome as well!

Trouble with sleep

One in five long COVID patients reported having trouble sleeping six months after getting sick.

Shortness of breath and persistent cough

Shortness of breath and persistent cough are common among COVID-19 survivors one to six months after infection.

Heart problems

Palpitations and irregular heartbeat were common among COVID-19 survivors, according to the study of US veterans. COVID-19 survivors were also at an increased risk of developing heart failure, atherosclerosis, and blood clots within six months after infection. Myocarditis, an inflammation of the heart muscle, has also been observed in long COVID patients.

Neurological symptoms and mental illness

Over a third of COVID-19 survivors experience neurological symptoms or mental illness within six months of infection. Anxiety and mood disorders, such as depression, were the most common.

Loss of smell

Among those who lost their sense of smell after COVID-19, about a third didn't regain the sense for two months or more.

Gut symptoms, such as loss of appetite and diarrhoea

About 40% of patients hospitalized with COVID-19 reported issues related to the gut three months after primary infection. The most common symptoms were loss of appetite, nausea, acid reflux, and diarrhea.

Skin rashes and hair loss

COVID-19 survivors reported skin rashes six months after infection. Hair loss reported among of patients six months after hospitalization for COVID-19.

Chest tightness, joint and muscle pain

Chest tightness, muscle aches, and joint pain one month after infection. These symptoms may persist for several months for some respondents.

Diabetes

Long COVID patients were 39% more likely to get a new diabetes diagnosis within six months after infection.

Kidney Disease

Those who survived COVID-19 were also at higher risk of developing acute kidney disease.

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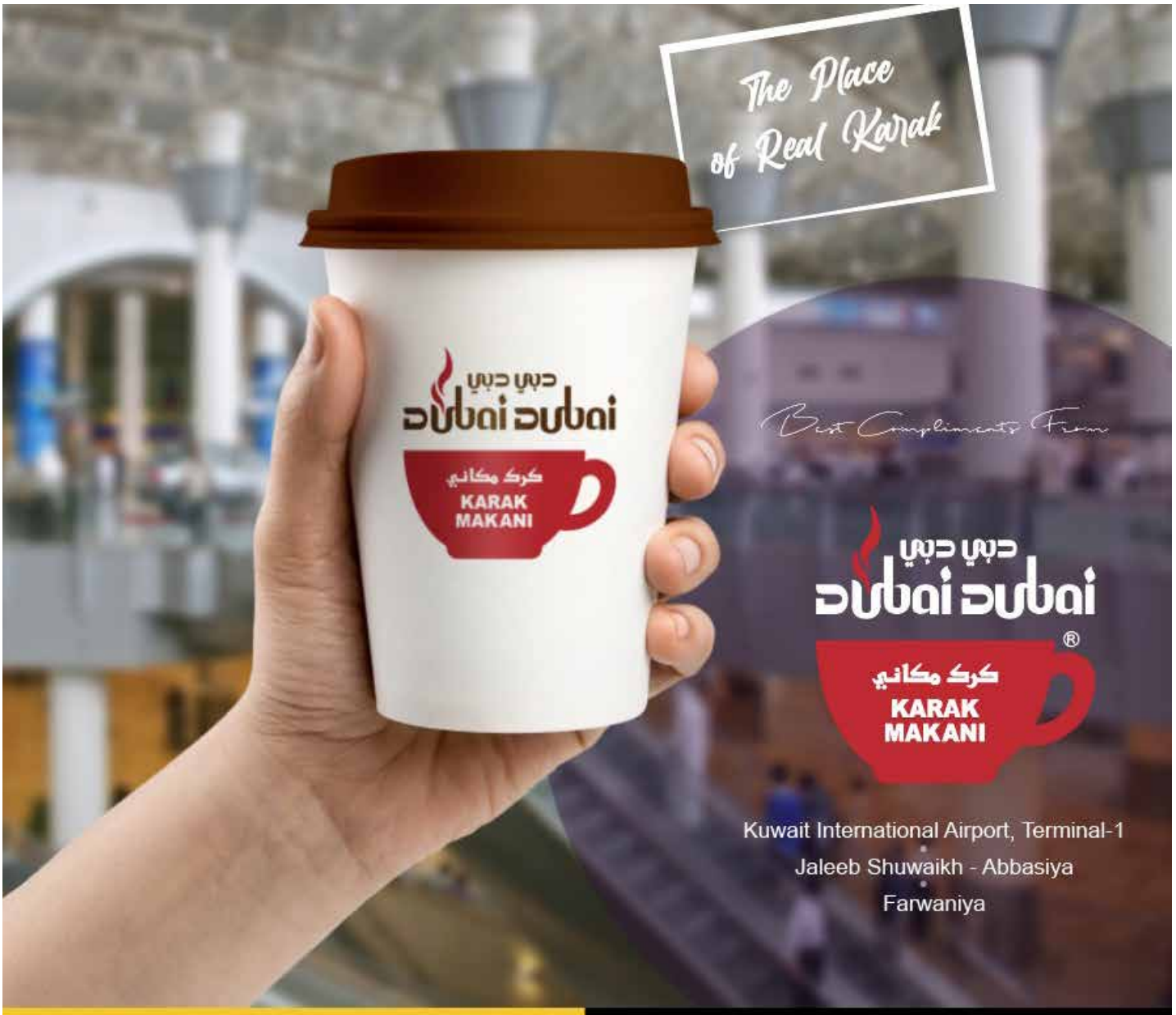

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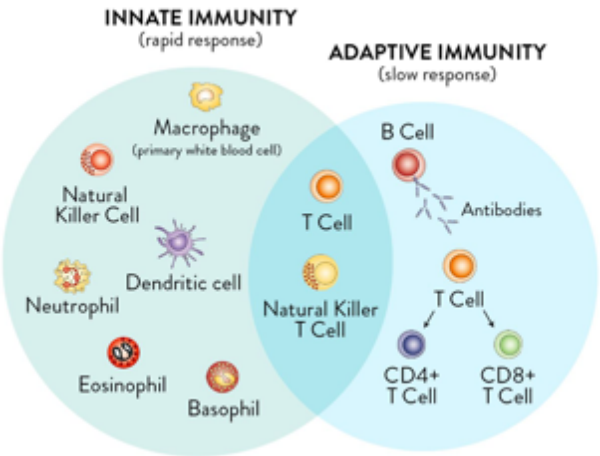
IMMUNE RESPONSE IN COVID-19

Dr. Mohammed Yousuf Dar
Physician
Kuwait National Guard

Immune response is of 2 types. **1. Innate or Natural immunity** 2. **Adaptive** or acquired **immunity.** Innate immunity is present at birth and does not have to be learned through exposure to an invader. It provides an immediate response to an invader which is nonspecific and less potent. It includes physical barriers like Skin; the gastrointestinal tract and respiratory tract, cilia and eyelashes and other defense mechanisms like Saliva; Tears; Sweat; Gastric juice; Gut flora and various white blood cells like mast cells; phagocytes; dendritic cells and natural killer cells and interferons.



The adaptive or acquired response is specific against pathogens, starts 6 to 8 days after infection and mainly consists of 2 types of blood cells the T lymphocytes (cellular immunity) and B lymphocytes (humoral immunity).

T cells: -They recognize the cells infected with a virus and rapidly increase in numbers. The two most important cells are **CD8+ cytotoxic** T cells which kill the infected cells and help to slow down or stop the infection and **CD4+ helper T** cells which bring in other cells of our immune system and stimulate B cells to produce antibodies specific to that virus.

B cells: - They produce antibodies specific to the virus. **IgM** antibodies appear first and disappear after a few weeks while **IgG** antibodies appear later and stay for longer period. Some antibodies may block the virus while others may not be able to do so depending upon their quality and numbers (Titre). In COVID-19 patients these antibodies decline rapidly in the first 4 months after infection and then more gradually over following 7 months remaining detectable at least 11 months after infection.

Memory Cells: - Once the infection is over the T and B cells decline in numbers but some cells remain as memory cells. Memory cells respond rapidly and robustly if they come in contact with the same virus again, killing the virus and accelerating antibody response. Long lived bone marrow plasma cells are a persistent and essential source of protective antibodies. This has been demonstrated in a recent study published in the Journal Nature on 24th of May 2021 wherein they demonstrated that majority of these cells reside in the bone marrow once the threat of the pathogen subsides but can launch a robust counter attack when the body encounters the pathogen again.

Q. What does a positive antibody test tell us?

Ans. If both IgM and IgG are positive, the infection is recent and if only IgG is positive, the infection occurred more than a few weeks ago. However, it does not tell us whether the person has recovered, or the antibodies are neutralizing (unless a specific test is used) or the antibody levels (unless a specific test is used).

Q. What doses a negative antibody test tell us?

Ans. It could mean

* The person has not been infected
* The person was infected very recently and has yet to mount an immune response
* The antibody response is below the level of detection by the test
* The person was infected but cleared the virus without mounting an antibody response.

Therefore, a negative test does not tell us if a person is susceptible to infection.

Q. What do we know about the antibody response to COVID-19?

* Most patients who recovered have antibodies to the SARS-CoV-2 virus in their blood.
* Most patients develop antibodies 1-3 weeks after the onset of infection.
* Patients with more severe disease tend to have higher levels of antibodies.
* Patients with mild or asymptomatic COVID-19 have low levels of antibodies.
* It is possible that the innate immune response and T cells cleared the virus in these patients.
* Recent studies have shown that neutralizing antibodies may persist for up to 11 months after infection.

Q. Does the presence of antibodies mean that he is immune and protected against reinfection?

No one knows yet for sure if these antibodies are protective, what antibody levels are required but they do last for up to 11 months as demonstrated in a recent study.

Q. What is HERD immunity in the context of COVID-19?

Herd immunity is indirect protection of people from an infectious agent when a high proportion of population becomes immune (usually through immunization). Persons who have not been infected are protected because there are enough immune people around them to slow or stop person to person transmission.

COVID-19 and Reinfection

The subject of reinfection by SARS-CoV-2 has become very important because there have been several cases of documented reinfection since the first case was reported from Hong Kong. Genome sequencing identified several potential variations between the viruses in these separate episodes in many of the documented cases of reinfection.

Q. How is reinfection differentiated from a single attack of prolonged illness?

To prove it the scientists, have to isolate the virus each time and check its genetic fingerprint and show that there are several variations in the genome of the virus in separate episodes as noted above.

Q. Is reinfection by a virus unusual?

It is not unusual at all. Only some viruses like Measles virus gives lifelong immunity after a single attack. Most of the respiratory viruses are prevalent largely because of their ability to reinfect. A number of factors can account for reinfection like a) insufficient immune response b) waning immunity c) mutations by the virus.

Q. What are the reasons for SARS-CoV-2 reinfection?

The reasons could be a) mutation by the virus which unfortunately has become a big concern now especially in India, United Kingdom and many other countries because some of these mutant strains are more infectious and more virulent b) though some studies have suggested that patients produce antibodies for up to 11 months after infection but it is not clear if the levels are enough to prevent reinfection. In fact, here in Kuwait we have noted that antibody levels fall off rapidly especially in those who have had mild disease. c) In cases of reinfection reported so far, the majority had mild illness or were asymptomatic during the first attack.

Q. What does reinfection tell us about the efficacy of vaccines?

At this stage we can't be sure of anything. The number of cases of reinfection reported so far globally is not very high (just a few dozen in more than 180 million cases) and needs to be evaluated further before any conclusions can be drawn. Several vaccines prompt production of a less well-known immune player the T Cells. While prevention of infection is multifactorial researchers feel that most of the vaccines do offer high percentage of protection against infection; higher protection against getting a serious disease and even higher chances of preventing deaths and would be useful to control this pandemic.

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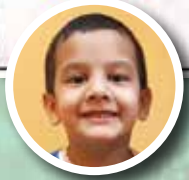
Creative Corner

Anaheeta Chattopadhyay

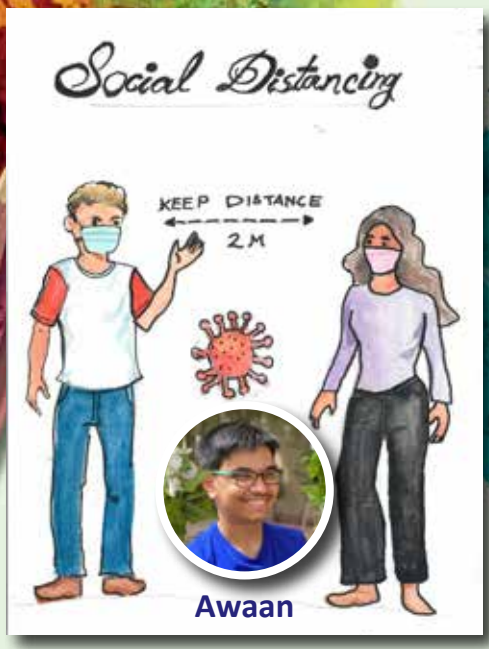
Yashita Loya

Zainab Murtaza Rampurwala



Burhan Mutaza Rampurwala

Creative Corner



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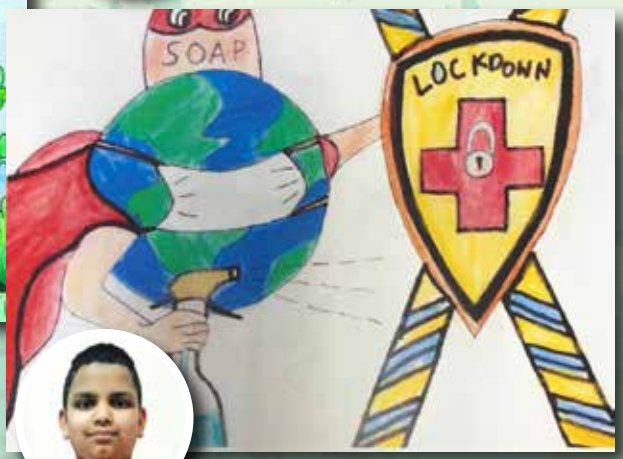

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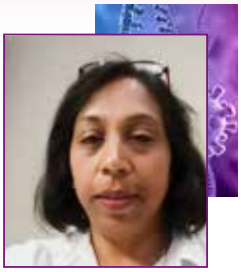
COVID-19 AND PREGNANCY



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THE COVID-19 pandemic has led to dramatic repercussions on human life worldwide and has left a serious impact on people's livelihoods, economic status and their physical and mental health. It has caused anxiety in pregnant women and has raised many queries which are answered here along with facts.

What effect does the Coronavirus have on Pregnancy?

Although the overall risk of severe illness is low, pregnant people are at an increased risk for severe illness from COVID-19 when compared to non-pregnant people. Having certain underlying medical conditions and other factors, such as higher age, asthma, obesity, high BMI (>35) can further increase a pregnant person's risk for developing severe illness.

Does being pregnant put me in a vulnerable group?

There is current evidence that pregnant women are at higher risk for severe illness compared with non-pregnant women. Severe illness means that a person with COVID-19 may require hospitalization, intensive care, or ventilator support in some cases. Pregnant women with COVID-19 might also be at increased risk for preterm birth (delivery before 37-weeks). Combined studies data have shown 23% to 27% preterm deliveries in pregnant women getting infected with COVID-19. Very rarely abortions and still births have been reported. The 2,059 published cases with pregnancy outcomes resulted in 42 abortions, 21 stillbirths, and 2,015 live births. Till June 2020, Around 6% of pregnant women required admission to an intensive care unit and 28 died. There were 10 neonatal deaths. From the 163 cases with amniotic fluid, placenta, and/or cord blood analyzed for the SARS-CoV-2 virus, 10 were positive. Sixty-one newborns were positive for SARS-CoV-2. Four breast milk samples from 92 cases showed evidence of SARS-CoV-2.

What should I do if I develop symptoms like fever and cough?

If you have a new continuous cough, temperature and not feeling well, call your healthcare provider and discuss your further care. Meanwhile self-isolate and follow precautionary measures. Do not delay getting emergency care because of COVID-19 fear.

Can I plan pregnancy during the pandemic?

It is safe to plan a pregnancy during this pandemic as long as you abide by all the safety measures and care. You should discuss with your doctor about your evaluation risk assessment and modified care when pregnant. If you are a front desk worker, you should request your employer for a job where exposure to people is less.

Can I travel and what precaution should I take?

At present as COVID-19 infection rate is still at rise, avoid the travel unless absolutely necessary. Risk depends upon the number of COVID-19 cases in the destination country, medical facilities and your activities at the destination.

Should I take the flu vaccine?

It is safe to take the flu vaccine during any stage of pregnancy. This also passes some protection to your babies, which lasts for the first few months of their lives. This vaccine reduces the risk of flu-associated acute respiratory infections in pregnant women by up to one-half.

What about the upcoming COVID- 19 vaccine? Can I take it while I am pregnant?

You may be vaccinated while you are pregnant to prevent severe illness. There is growing information on the safety of COVID-19 vaccination during pregnancy.

Even if you have received the COVID-19 vaccine, it's important to continue preventive measures as before vaccination.

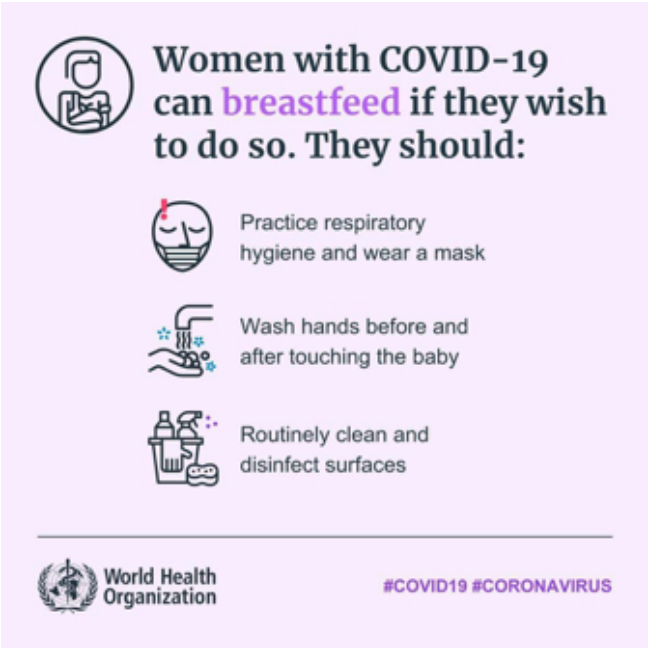
How can I protect my mental health during a pandemic?

Uncertainties about virus, isolation, financial difficulties, insecurity and inability to access support systems are all predisposing factors that can affect mental health adversely during the vulnerable perinatal phases. The family members should support pregnant women. There should be no hesitation to report to hospital where you will be helped by dedicated team to come over the situation.

Is my newborn baby at a high risk of infection?

If you have confirmed or suspected coronavirus when the baby is born, doctors who specialize in the care of newborn babies (neonatologists) will examine your baby and advise you about their care, including whether your baby needs to be tested. Transmission from a woman to her baby during pregnancy or birth is uncommon. There might be small increased risk of preterm birth (delivery before 37 weeks) and associated sequelae.

Can I feed my baby if I have suspected or confirmed coronavirus?



There is no evidence showing that the virus can be passed on in breastmilk. The main risk of feeding is close contact. If you cough or sneeze, this could contain droplets which are infected with the virus, leading to infection of the newborn baby.

Breastfeed safely, with good respiratory hygiene;

- Hold your newborn skin-to-skin, and
- Share a room with your baby
- You should wash your hands before and after touching your baby, and keep all surfaces clean. Mothers with symptoms of COVID-19 are advised to wear a medical mask, during any contact with the baby.

What should I do if I test positive?

If you test positive for coronavirus, you should contact your maternity team to make them aware of your diagnosis. If you have no symptoms or mild symptoms, you will be advised to recover at home. If you have more severe symptoms, you might be treated in hospital. You will be advised for self-isolation and centered care by the health care team. Do not delay the emergency care if it is needed.

Is the healthcare system geared to deal with pregnancy and childbirth care?

The Ministry of health (MOH), Kuwait has made arrangements to ensure that women are supported and cared for throughout the pregnancy, during childbirth and the period afterwards during this pandemic. Visits to hospitals should be minimized while maintaining the optimal care.

Key advice for pregnant women during the pandemic:

- Follow the guidance on staying alert and safe (social distancing)
- Appropriate use of face covering masks
- Keep mobility and good hydration to reduce the risk of blood clots in pregnancy
- Stay active with regular exercise, a healthy balanced diet, and folic acid and vitamin D supplementation to help support a healthy pregnancy
- Attend all of your pregnancy scans and antenatal appointments based on advice of your Doctor
- Encouraged to receive COVID-19 vaccine to prevent severe illness. Discuss with your Doctor to make an informed decision.
- Contact your maternity team if you have concerns about the wellbeing of yourself or your unborn baby

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NEWBORNS, INFANTS & CHILDREN,
Our Little Treasures and COVID-19 GIANT

Dr. Usha Rajaram
Department of Neonatology
Jahara Hospital, Kuwait

Dr. Aditya Raina
Department of Neonatology
Maternity Hospital, Kuwait

ONce upon a time, this wonderful world, was alive with all its beautiful blue skies, green gardens, bright flowers with butterflies, lovely little children running around with happy faces and gleeful laughter, under mom and dad's watchful eye.

There came A Big Ugly Giant Round Ring Virus hiding his face with a Spiky Crown, stealthily entering here there and everywhere ---forcing the children into their homes wearing masks and shields, staring at computer screens ---no more schools or classmates, no more laughter in the streets!!! Moms and dads, doctors and nurses, aunts and uncles, kings and queens, ministers and chiefs, all geared up, standing up, with one quivering voice pledged---We will win, we shall protect our little ones, our dearest kith and kin from this rough, ruthless, rounded, giant ring Virus. Young expectant mothers, mothers of infants, parents of school going kids do have many questions in their hearts and heads, mainly aspects of protection and prevention, and curative if affected.....

Newborns and COVID-19!!!

➢ Can my baby or child get this Corona Virus?

We know it is possible for people of any age to be infected with the virus, but so far there are relatively few cases of COVID-19 reported among children. Although rare, children under age 1, appear to be at higher risk of severe illness with COVID-19 than older children. This is likely due to their immature immune systems and smaller airways, which make them more likely to develop breathing issues with respiratory infections.

➢ What are the methods of transmission to the neonate?

Contact, Droplet spread, and vertical transmission from mother to baby is very rare.

➢ A COVID-19 positive, pregnant mother fondly stroking her abdomen and with eyes welling with unshed tears asks, what are the chances doctor that my baby will be free of COVID-19 or can be affected?

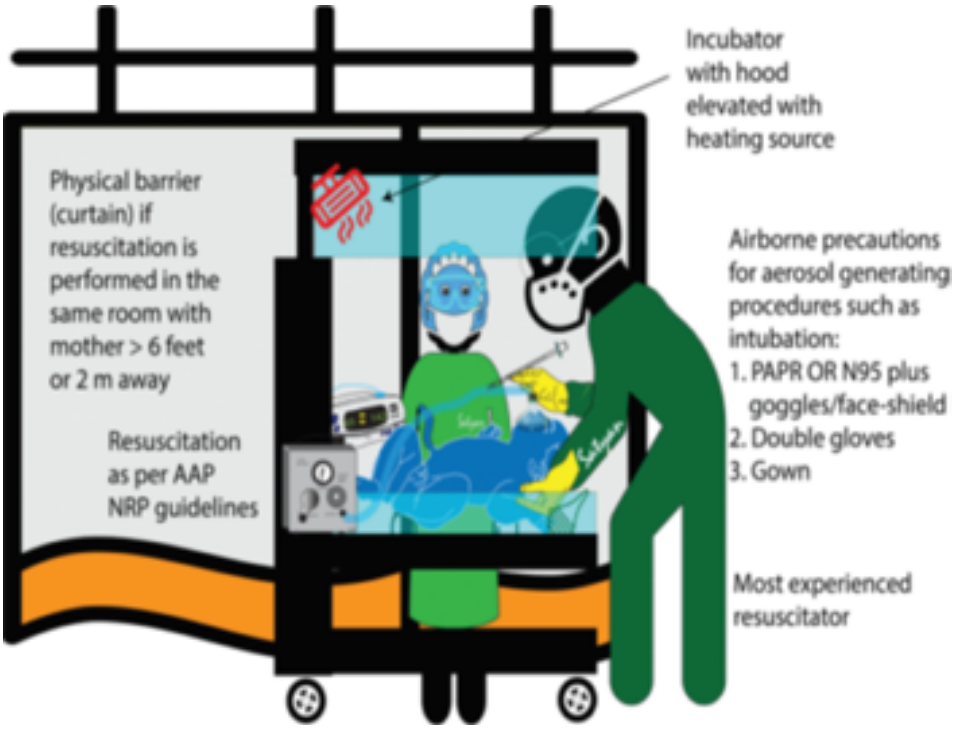
- Review of recent published studies indicate that the newborn can be affected.
- In an elegant study, new born of COVID 19 positive mothers, published in journal of Perinatology August 2020, of 118 mothers, 45 newborns were born to COVID-19 positive mothers, of which 42 neonates (93.7%) tested negative and 3 neonates (6.3%) were COVID 19 Positive.

- These three newborns were monitored in the NICU until two consecutive tests obtained at least 24 h apart were negative and they remained asymptomatic, thus suggesting transient colonization.
- None of the 45 newborns needed NICU admission for COVID-19-related symptoms.
- The Risk is present but low incidence.

➢ Special Management:

How will my baby be managed if I am COVID -19 positive?

- Designated Team: with appropriate PPE. Special Prenatal Consultations.
- Delivery Room Management: Special Protocols, Visitor limitation
- Delivery Mode and Anesthesia: according to maternal respiratory status.
- Transport Team: with intensive care equipment and PPE. Viral Filters
- Equipment: for aerosol generating, Powered air purifying Respirator, PPE
- Special Eye protection for Neonatologists and Nurses.
- Umbilical Cord Management: Delayed Cord Clamping recommended
- Admissions: Special Centre with NICU/SCU/ Isolation Facilities.



➢ Will I be transferred to a specialized center for delivery and how will my baby be taken care of?

- At present, the policy is that delivery occurs in the Regional Hospital with a designated COVID-19 Care team.
- There is a designated Neonatal Resuscitation Team with specialized equipment for all gestational ages ranging from 23 weeks of gestation or 500grams to 42 weeks of gestation.
- The New Jahra hospital is the Neonatal COVID-19 Centre for Kuwait.
- From the regional hospitals a designated team from their respective neonatal departments, transports the neonates

born to COVID-19 positive mothers, by ambulance to this center.

- The mother remains in the main regional hospital but on discharge is allowed to visit for counselling and Breast feeding.
- In case of preterm of low gestational age 32 weeks and less, may mean baby's and mother's separation for more than 6 weeks.
- This situation is handled efficiently by a counselling team of doctors, nurses, and other health care workers for social and psychological support with special helplines 24/7and on line counselling.

➢ Will my baby be submitted to many testing procedures?

- Diagnosis should be confirmed by testing for COVID-19 RNA by reverse transcription polymerase chain reaction (RT-PCR).
- Detection of SARS-CoV-2 RNA can be collected using nasopharynx, oropharynx, or nasal swab samples.
- Both symptomatic and asymptomatic neonates born to mothers with suspected or confirmed COVID-19, regardless of mother's symptoms, should have testing performed at approximately 24 hours of age. If initial test results are negative, or not available, testing should be repeated at 48 hours of age.
- In addition, the basic complete blood counts, CRP, PCT, Liver functions, Renal functions, serum ferritin, serum lactate, coagulation profile and D-dimer are done to detect organ dysfunction.
- Chest Xray is a must in all newborns for detecting pneumonia and surfactant deficient RDS, since the virus hooks on to the type 2 cells in the alveolar walls and causes severe respiratory distress and breathing problems. This may need special intensive care ventilatory support and appliances.

➢ Clinical presentation and disease severity

- Reported signs among neonates with COVID -19 infection include Fever, Lethargy, Running Nose, Cough, Fast Breathing with difficulty in breathing, Vomiting and diarrhoea, poor feeding.
- Current evidence suggests that COVID-19 infections in neonates are uncommon.
- If neonates do become infected, the majority have either asymptomatic infections or mild disease, and they recover.
- Severe illness in neonates, including illness requiring mechanical ventilation, has been reported but appears to be rare.
- Neonates with underlying medical conditions and preterm infants (<37 weeks gestational age) may be at higher risk of severe illness from COVID-19.

➢ When can I see, hold my baby and feed him/her

- The neonatologist will discuss jointly with parents. The discussion will also include the facts about the risk to neonate and health care worker.

➢ Special Tips for Lactating mothers and mothers rooming in

Precautions to be taken while sharing a room with your newborn

- Wash your hands with soap and water for at least 20 seconds before holding or caring for your newborn.
- Wear a mask when within 6 feet of your newborn.
- Discuss with your healthcare provider about using a physical barrier (for example, placing the newborn in an incubator) while in the hospital.
- If your isolation period has ended, you should still wash your hands before caring for your newborn, but you don't need to take the other precautions. You most likely

won't pass the virus to your newborn or any other close contacts after your isolation period has ended.

- If you had symptoms, your isolation period ends after 10 days, since appearance of first symptoms, 24 hours with no fever and without fever-reducing medications. Other symptoms of COVID-19 are improving.
- If you never had symptoms, your isolation period ends after10 days since the date of your positive COVID-19 test.
- Others in your household and caregivers who have COVID-19 should isolate and avoid caring for the newborn as much as possible. If they have to care for the newborn, they should practice hand hygiene and wear a mask.

➢ Helpful tips for breastfeeding

- You may find it harder to start or continue breastfeeding if you are not sharing a room with your newborn in the hospital.
- Frequent hand expression or pumping, ideally with a hospital-grade pump, will help you establish and build milk supply if you are separated from your newborn.
- Pump or feed every 2-3 hours (at least 8-10 times in 24 hours, including at night), especially in the first few days. This signals the breasts to produce milk and prevents blocked milk ducts and breast infections.
- Wear a mask while breastfeeding

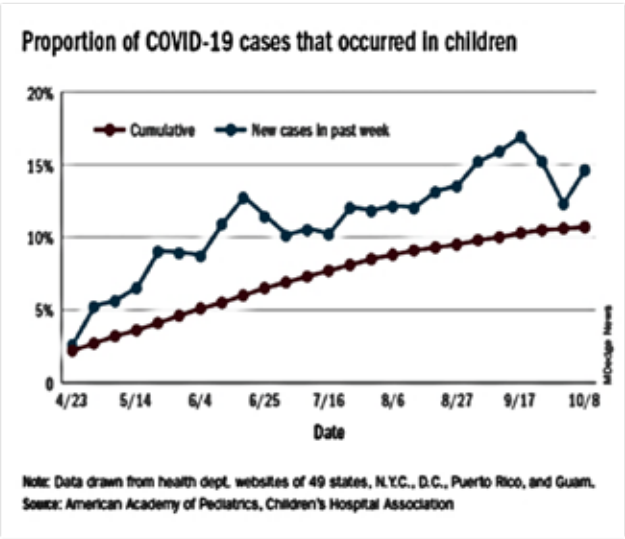
If you have COVID-19 and choose to express breast milk

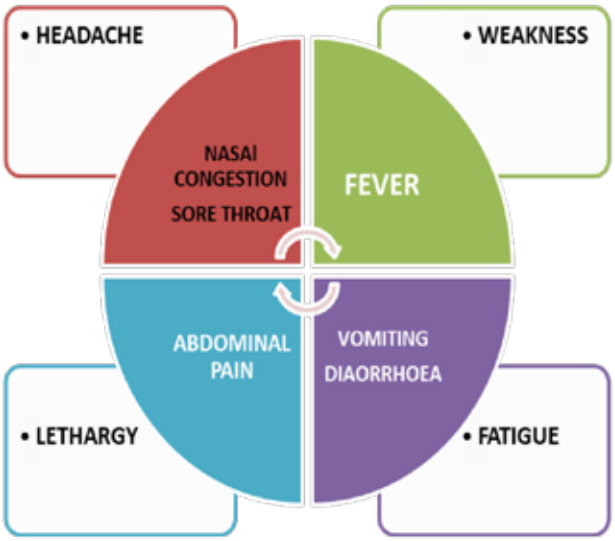
- Use a dedicated breast pump (not shared).
- Wear a mask during expression and wash your hands with soap and water for at least 20 seconds before touching any pump or bottle parts and before expressing breast milk.
- Clean pump after each use, cleaning all parts that come into contact with breast milk.

➢ Do not put a face shield or mask on your baby

- A face shield could increase the risk of sudden infant death syndrome (SIDS) or accidental suffocation and strangulation.
- Babies move frequently. Their movement may cause the plastic face shield to block their nose and mouth, or cause the strap to strap the nose

CHILDREN AND COVID-19 !!!





➢ Face Masks and children

- Children aged 5 years and under should not be required to wear masks. This is based on the safety and overall interest of the child and the capacity to appropriately use a mask.
- Masks for children aged 6-11 should be based on the following factors:
- Whether there is widespread transmission in the area where the child resides.
- The ability of the child to safely and appropriately use a mask.
- Access to masks, as well as laundering and replacement of masks in certain settings (such as schools and childcare services).
- Adequate adult supervision and instructions to the child on how to put on, take off and safely wear masks.
- Potential impact of wearing a mask on learning and psychosocial development, should be in consultation with teachers, parents/caregivers and/or medical providers.

➢ What about Regular Vaccination?

- The regular vaccination has to be continued; the COVID-19 Vaccine has now been approved in children 12-18 (Pfizer-BioNTech)

➢ Nutrition and activity

- Nutrition: A balanced, complete, fresh and wholesome diet with all nutrients to boost the immune system should be preferred rather than the stale junk foods.
- Activity: Inactivity and long hours at online classes may predispose to obesity, which increases the risk of COVID-19 infection by changing the immune response.
- Physical Exercise should be a mandatory part of daily routine as it not only affects the physical but also the mental health of a child.

➢ What are the psychological effects of COVID-19 on children?

- Children are likely to be experiencing worry, anxiety and fear of impending loss of loved ones, a fear of what it means to receive medical treatment.
- If schools have closed as part of necessary measures, then children may no longer have that sense of structure and stimulation that is provided by that environment, and now they have less opportunity to be with their friends and get that social support that is essential for good mental well-being.

Conclusion to our story: All is well that ends well, the new year brings an end to the BIG UGLY GIANT COVID-19, children free to play in the parks, schools reopen and there is music, laughter and fun in the world!!!

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COVID-19 IN CHILDREN – GETTING EQUIPPED FOR THE THIRD WAVE

Prof P S N Menon
Pediatrician
Jaber Al-Ahmed Armed Forces Hospital, Kuwait

THE second wave of COVID-19 triggered more fear and concern than the first outbreak. The rapid spread of infections during the second wave of the pandemic overwhelmed the health system globally. Many governments were forced to impose restrictions so that the health crisis does not get worse. There was constant upgrading of treatment protocols. The much-anticipated vaccination programs had run into temporary supply constraints, but hopefully half of the world population will be able to receive two doses of vaccination by the end of this year, through committed global initiatives.

Let me share some pearls of wisdom that I picked up from the perspective of caring for children during COVID-19.

COVID-19 variants and children – Are they of concern?

The World Health Organization (WHO) announced in the last week of May 2021 a new categorization for coronavirus variants, to be used in public and scientific communications. The WHO experts recommended using the Greek alphabet to describe 'variants of interest' — which are coronavirus strains that lead to increased infections locally — as well as the more dangerous 'variants of concern'.

This nomenclature is intended also for use by the media, policymakers and the public — and is published in Nature Microbiology. It should have come earlier, because its absence had fuelled the practice of naming variants after the places in which they were discovered — such as the 'Kent variant' for B.1.1.7. Under the WHO's new system, B.1.1.7 is called Alpha. The B.1.617.2 lineage, first identified in India and called "Indian variant', is now called Delta.

A summary of the common variants is provided in Table 1.

Table 1. COVID-19 Variants of concern

Variant	Old name	Place of origin	Key concerns
Alpha	B.1.1.7	Kent, UK	Increased transmissibility (~50-70%) Increased severity/fatality (>30%)
Beta	B.1.351	South Africa	No evidence of increase in lethality Immune evasion
Gamma	P.1	Brazil/Japan	Increased transmissibility No evidence of increased severity/lethality Immune evasion
Delta	B.1.617	India (double mutant)	Increased transmissibility No evidence of increased lethality Immune evasion
Epsilon	B.1.427 / B.1.429	California, USA	-
Iota	B.1.526	New York, USA	-

Some consequences of emerging variants in children include:

- Potential for quicker spread (increased transmissibility)
- Potential to cause milder or more severe disease
- Potential to evade detection by viral diagnostic tests (e.g., B 1.1.7 has S gene target failure)
- Diminished susceptibility to therapeutic agents (e.g., monoclonal antibodies)
- Potential to evade natural or vaccine-induced immunity (the current vaccines maybe not protective against the new variant).

Variants of concern call for one or more appropriate public health actions such as notification to WHO/ CDC/ national agencies, local or regional efforts to control spread, increased testing for new variants, or research to determine the effectiveness of vaccines and treatments against the variant. It is not clear whether the new variants are more infective or lethal in children compared to adults. Based on the characteristics of the variant, additional considerations may include the development of new diagnostics or the modification of the available vaccines or treatments.

Treatment for COVID-19 infection in children?

The continuing COVID-19 pandemic due to SARS-CoV-2 brought into focus a previously unknown antiviral **Remdesivir**. This is a nucleotide analog administered routinely to adults in need of oxygen that reduces the duration of hospitalization, though not the need for ventilation or mortality. It's indication in children remains controversial and is presently indicated only for severe and critically ill COVID-19 children. For children weighing less than 40 kg, the dose is 5 mg/kg (maximum 200 mg) initially followed by 2.5 mg/kg daily (maximum 100 mg) for 5 days (10 days if critically ill). Adult doses are used if children are greater than 40 kg weight. Dose adjustments are required in renal insufficiency and it is contraindicated in significant hepatic insufficiency. No other antiviral is presently recommended.

Tocilizumab is an IL-6 receptor inhibitor that mediates inflammatory responses and has been tried in children greater than 12 months of age with severe disease. **Baricitinib**, an anti-inflammatory agent has antiviral effect by inhibiting viral entry. This is a Janus kinase inhibitor and may be considered only along with Remdesivir in children hospitalized and aged over 24 months. At present, there is no role for **Lopinavir/Ritonavir** with or without Ribavirin.

Colchicine, ivermectin, chloroquine and hydroxychloroquine are also not recommended in children. The focus thus remains in the small proportion of children requiring hospitalization on supportive care, judicious use of steroids and optimizing oxygen. Routine administration of antiviral agents and other medications including outpatient monoclonal antibodies for asymptomatic and mild COVID-19 infection in children is unwarranted.

Should we worry about Multisystem Inflammatory Syndrome (MIS-C) among children infected with SARS-CoV-2?

SARS-CoV-2 infections in most children result in less severe COVID-19 infections than in adults. However, a subset of children presents with severe multisystem inflammation associated with current or recent SARS-CoV-2 infection or COVID-19 exposure in the weeks before. Multisystem inflammatory syndrome in children (MIS-C) is a disorder where different body parts can become inflamed, including the heart, lungs, kidneys, brain, skin, eyes, or gastrointestinal organs. We do not yet know what causes MIS-C. However, we know that many children with MIS-C had SARS-CoV-2 infection, or had been around someone with SARS-CoV-2. MIS-C can be serious, even deadly, but luckily so far most children who were diagnosed with this condition have got better with medical care.

In a recent cohort study in USA during April to June 2021 of 248 persons with MIS-C, the incidence was 5.1 persons per 1,000,000 person-months and 316 persons per 1,000,000 SARS-CoV-2 infections in persons younger than 21 years. Incidence was higher among Black, Hispanic, and Asian persons compared with white persons and in younger persons compared with older persons.

The Intensive Care Chapter of Indian Academy of Pediatrics (IAP) has reported more than 2000 cases of MIS-C during the second wave. The febrile inflammatory type and gastrointestinal manifestations were much more commonly reported than cardiac involvement. We do not have information about population-based incidence of MIS-C in children. Some state governments in India have opened a registry for recording all children with MIS-C.

In general, MIS-C is a rare complication of SARS-CoV-2 infection and is rare in children; further studies are needed to understand why its incidence varies by ethnicity and age group. The best strategy would be to sensitize pediatricians regarding this post-Covid life threatening disease in children and strengthening the tertiary care facilities for its diagnosis and management.

Getting ready for the Third Wave

Predicting or speculating when the third wave of the pandemic will occur has become a national pastime especially in media. The first wave of COVID-19 in UK lasted for only 3 months due to drastic measures but the 'biphasic' second wave continued for eight months. Variants of concern alpha, beta, gamma and delta variants were detected at various points of time during the second wave. Italy had a similar pattern of two waves. USA did not have a typical two-wave pattern, but a prolonged three-wave pattern. In contrast, the first wave in India lasted for almost 191 days with nearly one million cases per month. The second wave was noted in March 2021 peaking in May 2021 with one million cases per 6 days (5 times faster than first wave, **Figure 1)**.

Children were at high risk during the second wave, probably by the delta variant with a high family secondary infection rate. We have no precedents to go by to predict the third wave. SARS-CoV-2 is different from influenza, which had multiple waves with most severe disease during the second wave. The other pandemics were not studied for emergence of wave patterns and their probable etiology. The herd immunity generated by the first and second waves appear to be inadequate to prevent a third wave. Vaccination of 20-30% of population with two doses will avert to a great extent the possibility of a third wave. There is a need to consider whether a third booster will help with hyperimmunization and thus increase herd immunity.

There is no clear evidence that the third wave will severely affect children. The expression of the disease in first and second waves was less in children than adults as they were spared mostly from severe lung disease. Children carry high viral loads in upper respiratory tract. More than 95% of the children were either asymptomatic or had mild disease, up to 5% moderate and less than 1% severe. High risk of severity was observed in children with co-morbid conditions like chronic systemic disorders, immunosuppression, obesity, and severe undernutrition. The data from USA showed that the total children with COVID-19 were 3.9 million cases contributing to 14% of the total cases **(Figure 2)**.

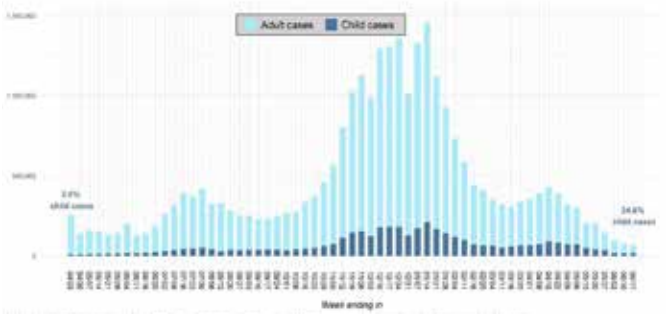

Figure 2. The number of cases observed with SARS-CoV.2 (USA) during the current wave – Total and pediatric cases

The hospitalization rate was less than 2% indicating a significant number could be managed from home. The mortality rate ranged from 0 to 0.21%. There are other extremes such as Brazil where a higher mortality of 0.5% deaths in children below 10 years were reported in media attributed to the increased virulence of the gamma (P.1) variant in pregnant women and infants. In general around 10% of the population had pediatric disease globally during the first wave and 13-18% during the second wave in many countries. The Indian data (ICMR) on SARS-CoV-2 positivity among 0-19 years old children was

4.2% during the first wave and 9.8% during the second wave. There are reports of higher numbers of children especially younger age groups being increasingly affected by SARS-CoV-2, but we have no reliable data on hospitalization and mortality.

If we go by these observations globally, there is no clear indications that the next wave will be much more severe, last longer and involve significantly large number of pediatric population requiring hospitalization, critical care and high mortality. Equally it is important to be watchful and be on the constant look out for new variants of the virus.

Vaccinate and vaccinate – A priority for children!

Also preparation to vaccinate children need to be taken a war footing to prevent a third wave. CDC recommends that every child 12 years and older should get COVID-19 vaccination to protect against SARS-CoV-2. Vaccines such as Pfizer-BioNTech COVID-19 have been approved for this specified age group, but other vaccines are still waiting for clearance and official recommendation by WHO. Vaccine makers claim that Moderna's COVID-19 vaccine is safe between ages 12 to 17, but both Moderna and Johnson and Johnson are not authorized below 18 years as of now. Vaccine trials have been initiated by Indian Council of Medical Research (ICMR) in India for children from the ages of 2 to 12 using the Covaxin locally produced by Bharat Biotec in the first week of June 2021. In addition there is a felt need to vaccinate pregnant mothers to decrease the burden of disease in infants and consequent infant mortality.

Summary

Children account for 5 to 11% of total COVID-19 cases during the second wave in India. Over 95% of the infected children continue to be either asymptomatic or have mild disease. Those with comorbidities need close follow up. Periodic assessment for new variants of SARS-CoV-2 is imperative to decide the course of management and effective preventive strategies. Antimicrobials including azithromycin, favipiravir, chloroquine, hydroxychloroquine and ivermectin have not been observed to be useful in the management of children with COVID-19. Use of Remdesivir is restricted for very sick hospitalized children. MIS-C though rare, is a rare post-COVID-19 life threatening condition and can be successfully managed if detected early. There is a felt need to improve the vaccination of the community especially the children, which will reduce community transmission and safe school attendance. Vaccination of pregnant women need urgent attention and will help to reduce under-5 mortality.

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DERMATOLOGIC ASPECTS OF COVID-19

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Skin rashes are characteristic features and common manifestation of many viral infections. SARS-CoV 2 virus has been a very unusual virus in many ways. It affects many organ systems in different ways and so is true for skin involvement. A wide variety of skin lesions have been reported in COVID-19 but they are not diagnostic/ pathognomonic. However, six common patterns as described in **Table 1**, if present in a person having symptoms suggestive of or coming in contact with COVID-19 patient should alert the doctor and the patient to the possibility of SARS-CoV-2 as the potential underlying cause.

Opportunist fungal infection: Serious and fatal opportunist infections like mucormycosis (black fungus) are covered in a separate chapter

Major/common clinical patterns of skin manifestations in COVID-19 patients.

Skin manifestation pattern	Onset	Lasts for	Prevalence	COVID severity	Treatment
1. Urticarial rash: Wheals/hives on trunk, limbs.	○ Appears along with systemic symptoms, fever. ○ One of the early/prodromal symptoms. ○ Adults and children	7-8 days	8 - 26%.	Intermediate	○ Low-dose systemic ○ corticosteroids + ○ non-sedating ○ antihistamines
2. Erythematous rashes **Confluent macular erythema** Irregular large red patches (few to many cms). **Maculopapular:** numerous scattered red small few mm to <1 cm red flat lesions (macules) or raised (papules) spots on chest, back, abdomen. **Morbilliform rash:** Measles like.	Frequently appears after onset of systemic symptoms	Few days	16-55%	Intermediate Pneumonia common in up to 8% showing morbilliform rash.	○ **Mild cases:** ○ Topical corticosteroids ○ **Severe cases:** ○ Oral systemic ○ corticosteroids
3. Papulovesicular rash: **A. Widespread type:** polymorphic (different shapes, forms, appearances); Few scattered red macules (flat), papules (raised bumps), vesicles (fluid filled), pustules (pus filled), crusted erosions. Sometimes itchy, on chest, back, abdomen. **(like varicella/ chickenpox). They leave no scarring & clear in 3 to 8 days** (unlike in varicella)	○ 3 days after onset of systemic symptoms. ○ Clears in 8 days ○ Adults 40 to 65 years	Self-limiting	4-18%	Intermediate	○ Wait and watch ○ No specific treatment ○ Self-limiting ○ Cleansing and topical antibiotics to avoid secondary infection.

More common than localized type. **B. Localized type:** Monomorphic (single type of lesions), on chest, mid back, & upper abdomen.					
Chilblain like acral pattern (COVID- toes) Red-violaceus flat patches or raised lesions (sometimes with blisters) on feet. Pain burning common.	Young adults, children.	Clears spontaneously within few days	1.9 – 6.2%	Asymptomatic stage or individuals with mild disease.	○ Wait and watch ○ No specific treatment
Livedo reticularis-like lesions: symmetrical, lace-like or net-like, dusky patches forming complete rings surrounding a pale center. **Livedo racemosa-like lesions:** large, irregular and asymmetrical, incomplete purple round lesions (broken net/lace-like patern) in patients with severe coagulopathy	Middle aged & elderly	Starts 2 weeks after diagnosis of COVID-19. Lasts for few days	2.5 to 6%	**Livedo reticularis: lesions: intermediate Livedo Racemose: high severity**	○ Wait and watch ○ No specific treatment
Purpuric "vasculitic" pattern: Dusky red, non-blanchable lesions (pressure by a glass slide does not make them pale) • **Generalized OR** • **Acral (hands, feet, ears) OR** • **Localized intertriginous** (groin, axilla, inframammary). **Types of lesions** • **Palpable purpura:** Non-blanching red flat or raised spots. • **Dengue like rash** • **Hemorrhagic blisters** (blood filled vesicles) • **Necrosis:** break down of skin causing **ulcers.**	Elderly patients.	During acute stage.	8-15%	**High Severity, Maximum mortality severe COVID-19**	**Mild cases:** ○ Topical Steroids **Severe cases:** ○ Oral systemic Steroids ○ Oral and topical antibiotics to avoid secondary bacterial infection.

Skin manifestations in children with COVID-19

COVID-19 is distinctly uncommon (incidence 0-7.4%) and is less severe in children than in adults. Approximately 20% of infected children are asymptomatic. More than 75% acquire infection from family members and skin lesions are seen in only 0.25 – 3%. Latency period of skin findings (time from appearance of general symptoms to the appearance of skin lesions) varies from one day to several weeks. Most skin lesions in children are asymptomatic (no itching/ pain) and clear spontaneously between 3 days to 3 months without any specific treatment. Skin lesions reported in children with COVID-19 are as follows:

a. Pseudo-chilblain (chilblain-like, popularly known as COVID- toes): Dusky red bluish cold induced skin discoloration on toes.

b. Erythema multiforme: Target like lesions on hands, feet, trunk, face.

c. Dactylitis: Inflammation of fingers or toes (swelling and/or pain).

d. Acral erythema: Dusky redness on feet, hands, ears, nose.

e. Acute urticarial rash.

f. Miliaria (prickly heat like rash).

g. Varicelliform rash: Chicken pox like rash.

h. Petechiae/purpura: Bleeding into the skin due to blood vessel wall damage

i. **Multi-system inflammatory syndrome in children (MIS-C):** A severe but very rare form of clinical presentation has been reported in 0.14% of children with COVID-19. It causes severe inflammatory damage in many organs. It is seen in the late stage of infection, usually many days after the acute phase has subsided. Only 38% are RT-PCR positive but 90% show IgG antibodies on serological testing indicating past infection. Fever, features of shock (low blood pressure), need for oxygen and single or multiple organ failure (heart, kidney, respiratory, gastrointestinal) and skin symptoms are seen. Skin manifestations include skin rash (75-80%) (Maculopapular rash, swelling of hands and feet), redness of eyes (conjunctivitis) and oral mucosa. The findings resemble Kawasaki Disease (KD) Shock syndrome, another life-threatening viral condition seen in very young children (majority < 2 year) whereas MIS-C affects older (majority around 7-10 years). In KD there is fissuring of lips, swelling of hands and feet and raw tongue (strawberry tongue).

Skin lesions indirectly caused by the use of personal protective gear and practices:

Although not caused by COVID-19 directly, prolonged wearing of protective masks and repeated use of hand sanitizers has resulted in the following skin manifestations:

i. Impression marks: on cheeks, forehead, nose, chin, sides of face and neck. Transient, lasting for few minutes to hours or days.

ii. Contact dermatitis: Redness, scaling, itching on cheeks or nose from allergic or irritant reaction to the material of the mask.

iii. Irritant Contact Dermatitis of hands: Dryness, exfoliations, irritation and cracking of skin of hands caused by repeated washing with soaps or antiseptic (chlorhexidine) solutions.

iv. Aggravation of existing facial skin conditions: Acne, seborrheic eczema, psoriasis, rosacea.

Issues related to practice of dermatology

Many surgical and cosmetic procedures are performed in dermatology on different parts of body, especially face requiring close proximity of the treating doctor and the patient. This exposes the treating dermatologist and the patient to the risk of getting infection. Following changes have been adopted to minimize this risk: pre-procedure COVID-19 testing, strict use of PPE, hand hygiene, reducing number of patients seen, spacing follow-up visits, special ventilation equipment in the office/operating room, adopting innovative ways of isolating the area to be operated upon and utilizing tele-dermatology (consulting and prescribing through video conferencing, sharing pictures and clinical details as per local regulations and requirements).

COVID-19 Vaccines and use of immunosuppressives, immunomodulators and biologics in dermatology patients:

A number of skin conditions are immune mediated and are treated with immune-suppressives (medicines that reduce immunity) and immune-modulators (drugs that alter the immune functions; enhance or reduce) and biologic drugs that have great impact on the immune system of the body which generates antibodies against pathogens in response to different vaccine agents. Fortunately, most patients who need these drugs can safely start them, and if already taking continue to take them when receiving any COVID-19 vaccine. Taking the vaccine is safe and effective while being on these medications. Some of these drugs can be stopped for 2-weeks prior and after receiving the vaccine dose. The impact of reducing the dose or stopping these medicines for short period before or after and the risk of flare up of the underlying condition should be discussed with the treating doctor. Consider checking antibody titers after vaccination and using additional doses, if needed, to boost the level of protective antibodies.

REPRESENTATIVE PICTURES OF SOME SKIN LESIONS IN COVID- 19

Urticaria like lesions: 	Confluent Macular Erythema: 	Morbilliform: Measles like 	Papulovesicular: Red papules and vesicles (chickenpox like) 
Erythema multiforme like: Target like 	Pityriasis rosea like rash: Scaly red annular/oval lesions 	**COVID- Toes** 	

Effects of prolonged wearing of masks, gloves and sanitizers on the face and hands of health care workers




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MUCORMYCOSIS & OTHER OPPORTUNISTIC INFECTIONS IN COVID-19 PATIENTS

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Opportunistic bacterial and fungal infections have long been associated with seriously ill patients especially those hospitalized and on ventilation. A number of underlying factors such as patient's general health, underlying diseases (cancers, diabetes, transplant patients, kidney failure) and type of treatment (e.g. immunosuppressives: immunity lowering). Aspergillosis, Candidiasis and Mucormycosis causing serious infections in such patients have been well recognized. The very first cases of mucormycosis among COVID-19 patients started appearing more than a year back, however, recently an alarmingly large number of serious and fatal cases has been reported in India forcing the health authorities to declare it as an epidemic.

What is opportunistic infection?

Infections caused by organisms that are not able to cause disease in persons with normal immunity but are able to do so in patients with conditions (disease, treatment, hygiene factor) causing reduced immunity.

What are the common opportunistic infections in COVID-19 patients?

Secondary bacterial and fungal infections are likely to occur in many of these patients especially those who are seriously ill, are hospitalized in ICU and are on ventilators.

Following are the 3 common opportunistic fungal infections seen in COVID- 19 patients.

1. Aspergillosis: Causes fungus balls in the nasal sinuses, without invading the tissues
2. Candidiasis
3. Mucormycosis: COVID-19 associated mucormycosis (CAM) causes invasive disease.

What are the causes for such opportunistic infections in COVID- 19 patients?

i. Damage to lung tissue by SARS-CoV-2 virus.

ii. SARS-CoV-2 virus induced impaired/disturbed immune system.

iii. Underlying uncontrolled diabetes.

iv. Indiscriminate and injudicious use of steroids in COVID-19 patients.

Steroids are one of the most effective, inexpensive and easily available medicines recommended for treating severe COVID-19 patients who are moderately to severely ill and require supplemental oxygen therapy and/or hospitalization and ventilation. They are life-saving but at the same time they lower the immunity of the patient, increase blood glucose levels even in non-diabetic patients and disrupt the glucose control in diabetic patients. Injudicious and indiscriminate use of steroids has led to increased number of cases with mucormycosis in COVID-19 patients.

v. Use of broad-spectrum antibiotics in patients of COVID-19:

Unwarranted use of antibiotics without evidence of secondary bacterial infection also promotes fungal infections like mucormycosis, candidiasis and aspergillosis.

vi. Use of biologic agents like Tocilizumab can also alter the immune response of COVID-19 patients and predispose to opportunistic infections.

Mucormycosis (Zygomycosis) It invades and blocks the blood supply and causes ischemic destruction to the affected tissues. The point of entry of infecting spores of the fungus is through the injured lining covering the nasal or oral cavity/eye conjunctiva, skin (mucocutaneous) or through inhalation directly into the lungs (pulmonary) and/ or ingestion of contaminated food into the gut (gastrointestinal) from there it spreads to adjacent organs (nose, sinuses, eye cavity, brain). The fungal spores are present in the soil, food and air which can be inhaled, ingested or introduced by instrumentation (intubation) or minor dental trauma. In normal individuals they don't cause disease but in patients with low immunity they can cause serious and fatal illness. Mortality rate is very high (approximately 50%). Early diagnosis and institution of appropriate treatment is of paramount importance.

Clinical features of mucormycosis: Depend upon the organs/systems invaded by the fungus.

Rhino-orbital-cerebral mucormycosis (ROCM): Rhino (nose), orbital (eye socket), cerebral (brain tissue): ROCM is the most common reported and the most fatal one.

Mucormycosis affecting nose and around eyes

Black ulcer due to mucormycosis around eye.

Orbital (eyeball) mycormycosis

Symptoms of mucormycosis in Sinuses and Brain: Facial swelling around nose, Headache, Nasal or sinus congestion, Black lesions on nasal bridge or upper inside of mouth, pain, fever.

Symptoms of eye mucormycosis: Swelling around eye socket, prominent protruding eyes and abnormal reactions of pupils, swelling of eyelids, redness of eyes and dryness of cornea.

Symptoms of mucormycosis in Lungs: Persistent fever, cough, chest pain, shortness of breath, increasing respiratory rate.

Cutaneous (skin) mucormycosis: Swelling, redness, pain, warmth, blisters or ulcers covered with black crust.

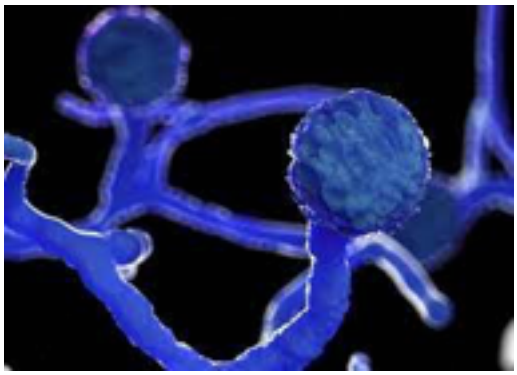
Gastrointestinal mucormycosis: Abdominal pain, nausea and vomiting and gastrointestinal bleeding.

Disseminated mucormycosis typically occurs in people who are already sick from other medical conditions, so it can be difficult to know which symptoms are related to mucormycosis. Patients with disseminated infection in the brain can develop mental status changes or coma.

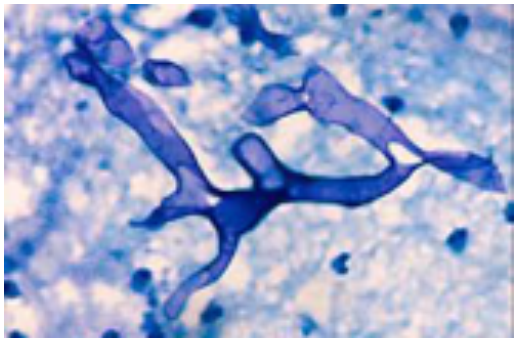
These symptoms can develop during hospital stay or even after discharge. Urgent consultations by eye/ ENT/neurologist should be arranged and relevant investigations and treatment started at the earliest (even empirically awaiting confirmation by culture that may take time).

Diagnosis:

a. **KOH examination:** A simple technique of demonstrating the fungus under the microscope in the tissue samples. **Typical broad aseptate hyphae branching at right angle are seen.**



Fungal hyphae of mucormycosis



Fungal hyphae of mucormycosis

b. Culture: of tissue sample taken by biopsy gives definitive diagnosis but takes time. In appropriate setting, treatment is started empirically awaiting confirmation.

c. Radiological investigations: CT scan and MRI provide early diagnosis.

Treatment:

High index of suspicion, early diagnosis, institution of treatment and team approach is needed.

a. Surgical debridement/removal

b. Antifungal treatment

i. **Intravenous Amphotericin B**: Two types are available. Conventional and liposomal. Latter is very expensive but more effective against mucormycosis.

ii. Posaconazole is recommended for use in Candidiasis and Aspergillosis.

c. Good supportive care

d. Control of diabetes and hydration

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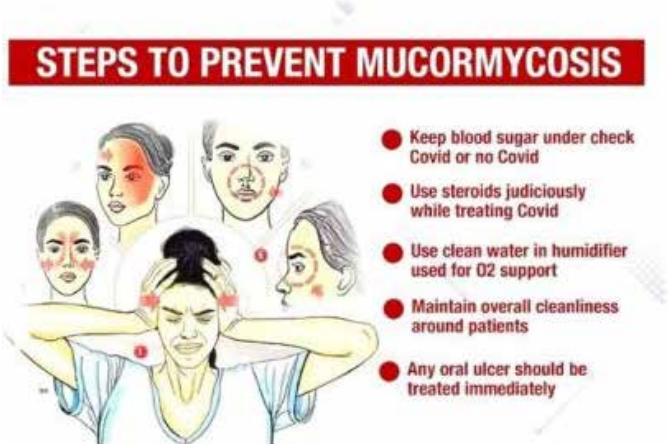

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ENT MANIFESTATIONS OF COVID-19

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What is COVID-19 infection?

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) started in Wuhan at December 2019. It was declared as a pandemic disease on March 11, 2020. It is a highly contagious zoonosis produced by a beta coronavirus (SARS-CoV-2) that spreads from human-to human, largely by respiratory secretions.

I have lost my sense of smell. Is it related to COVID-19 infection?

Loss of smell (anomia) and taste (ageusia) are common symptom that have been seen in up to 70-80% of COVID-19 positive patients compared to 20% of those with COVID-19 negative test. A combination of loss of smell and taste, fever, persistent cough, fatigue, gastrointestinal symptoms are predictive of a COVID-19 positive test. Anosmia in particular, has been seen in patients testing positive for the coronavirus with no other symptoms. So it was recommended, considering patients with anosmia without nasal obstruction or runny nose or other symptoms as having COVID-19 infection and initiating testing or self-isolation for them. Oral corticosteroids are to be used in the treatment of moderate or severe disease. Nasal steroids are also recommended.

What are the other likely common ENT related complaints?

The most common ENT manifestations for COVID-19 were sore throat (23%), nasal discharge (16%), hyposmia (decreased sense of smell) or anosmia (9%), nasal block (8%), pharyngeal (throat) congestion (10%), tonsillar enlargement in (3%), dizziness (0.2%) and nasal bleed in (0.5%) and worsening of tinnitus (ringing sound in the ear).

All the reported ENT manifestations in COVID-19 patients are nonspecific and so could be easily missed and no emergency ENT symptoms such as stridor (noisy difficulty in breathing) was reported in COVID-19 cases. Laryngeal manifestations (cough, irritation) were documented and ear related complaints (ear pain, hearing loss) were uncommon.

Neuro-auditory (related to the nerve of hearing) problem is a possibility. COVID-19 infection could have deleterious effects on cochlear hair cell functions despite being asymptomatic as reduction of high frequency pure-tone thresholds as well as the TEOAE (Transient Emission Otoacoustic Emission) amplitudes were detected and worsening of existing tinnitus.

I have an ENT out patient appointment. Can I go ahead with the appointment?

Patients not requiring urgent ENT consult, especially those treated for chronic ENT diseases, shall be consulted by phone. In case of an emergency, you will be examined by otolaryngologist who would be fully equipped with the required personal protective equipment (PPE) includes FF3/N95 mask, gloves, gown, eye protection and a cap.

I was advised ENT endoscopy (examination of the nose through insertion of tubular instruments) during my out-patient visit. Will I still be able to have it?

All non-emergency ENT endoscopies will not be done. Only emergency lifesaving situations (breathing difficulty) warrant urgent endoscopy.

I have been advised ENT surgery as an emergency case? What will be the general precautions taken by the hospital?

All the patients suspected of COVID-19 and for surgery need to be admitted in a separate dedicated ward of the hospital away from the non-COVID-19 wards. Pre-emergency surgery sample for COVID-19 testing will be taken. If the condition is not serious then the result of the COVID will be awaited, if it is life threatening, the surgery will be performed with all the precautions while still awaiting the result. Once they are proved as non COVID-19 they need to be shifted to the general category ward or else they need to be retained in the same ward itself. They are transferred to the operating theater through a separate entrance meant only for COVID-19 patients and same route to be used as exit too.

Does the Black Fungus (Mucormycosis) involve ENT?

Nose and oral cavity can be the route of infection by the deadly opportunist fungal infections **mucormycosis**, and **candida** commonly called **'black fungus'** and '**white fungus**' by the nonscientific media and ordinary persons. This life-threatening condition can present with redness, swelling, around nose, cheeks, in side the mouth, ulcer, not responding fever, and worsening condition, despite adequate treatment in some patients of COVID-19 with underlying two major factors (uncontrolled diabetes and inappropriate use of high dose steroids).

If you had tested positive for COVID-19, then we need to perform nasal endoscopy followed by CT scan of the sinuses to rule out black fungus.

If clinical examination and imaging shows findings suggestive of black fungus we need to start on antifungal therapy at the earliest followed by emergency surgery.

If you had COVID-19 infection and you need to prevent black fungus infection, then you need to follow the following:

- Strict control of blood sugar, regular check of blood sugar
- Avoid self-medication; Consult doctor for medication
- If on steroids then taper the dose and discontinue.
- If on antibiotics then consult your physician and try to stop at the earliest and take-home remedies for nasal block and cough
- Avoid over steam inhalation
- Balanced diet, Regular sleep pattern, Adequate rest, Adequate hydration.
- Regular use of double mask and gloves
- Betadine nasal drops two times daily for 2 to 3 weeks
- **MOST IMPORTANT** - Advice others to get vaccinated

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COVID-19: UROLOGICAL MANIFESTATIONS AND SPECIAL CONSIDERATIONS

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As cases of Coronavirus Disease 2019 (COVID-19) reaches the 104 million-mark, Severe Acute Respiratory Syndrome Corona virus 2 (SARS-CoV-2) has caused over 2.3 million deaths worldwide. Typical symptoms of COVID-19 include fever, cough, sore throat, fatigue, sputum production, shortness of breath and headache. Although, urinary symptoms are not the presenting symptom of COVID-19, it can be a concomitant symptom due to other urological conditions.

Acute kidney injury (AKI)

Acute kidney injury (AKI) can be a manifestation of COVID-19 patients, with a prevalence of AKI being 7.58%. The underlying pathophysiological mechanism is that COVID-19 has a strong interaction with Angiotensin Converting Enzyme 2 (ACE2), and ACE2 has been shown to be a major receptor involved in the entry of COVID-19 into human cells. Besides type II alveolar cells, proximal tubular cells of kidney also have an abundant expression of ACE2 receptors. Hence, the virus might be able to spread to the kidneys via the blood stream. ACE2 were also expressed in other organs including testis and bladder, therefore it was postulated that these organs might be at risk of damage upon COVID-19. However, up to date, there are no reported cases of testicular or bladder manifestations following COVID-19 infection.

Renal transplant recipients and COVID-19

Most of these patients had fever (94.7%) and cough (94.7%), while diarrhea was present in 16.7% of them. 73.7% of the renal transplant recipients had elevated serum creatinine, and 31.6% required non-invasive ventilation. Almost 84.6% of them recovered with a mortality rate of 15.4%. The proportion of patients requiring non-invasive ventilation and the mortality rate appeared to be higher than the general population. Hence extra caution is advised in renal transplant patients.

Urolithiasis and COVID-19

There have been no reports on possible associations between COVID-19 and urolithiasis. However, non-steroidal anti-inflammatory drugs (NSAIDS), a medication commonly used to alleviate stone-related colicky pain has raised concerns in the community. Reports of upregulation of ACE2 might increase the risk of developing severe and fatal COVID-19. NSAIDS also increases ACE2 and there is a worry that it might induce similar effect. US Food and Drug Administration recently announced that there was not enough scientific evidence connecting the use of NSAIDs, such as ibuprofen, with worsening COVID-19 symptoms. Therefore, the use of NSAIDs in renal colic management should still follow established indications.

Urological cancers and COVID-19

There have been no reports demonstrating a definite association between COVID-19 and urological cancers. However, cancer patients were found to have a higher risk of requiring invasive ventilation or death (39% in cancer patients vs 8% in non-cancer patients).

Transmission of COVID 19 through Sexual Activity

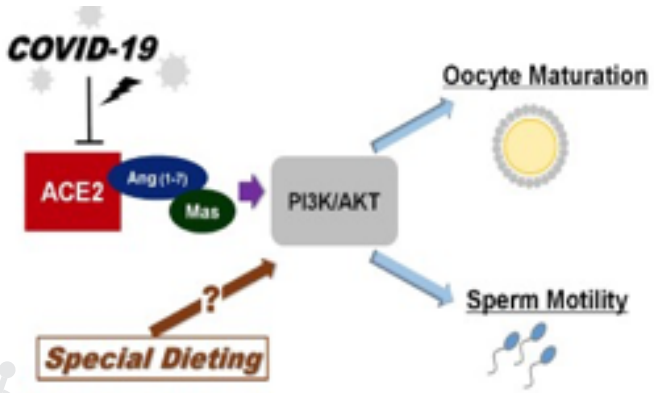
The short answer is yes. The novel coronavirus disease (COVID-19) is more contagious than any STD because it is spread by droplets in the air or contact

that involves direct transmission of bodily fluids, such as kissing. Simply getting close enough to have intercourse puts you at risk, regardless of whether you have sex. There is currently no evidence that the COVID-19 virus is transmitted through semen or vaginal fluids, but the virus has been detected in the semen of people who have or are recovering from the virus. Positive urine sample have also been reported for a patient as early as the 7th day of symptom onset, while other reports showed urine samples remained positive even after throat swabs had converted negative.

Based on the current world published information, COVID-19 is not an STD and further research is needed to determine if the COVID-19 virus could be transmitted sexually.

COVID 19 and Infertility

It is a well-known fact, that any acute state of stress like viral infections, can lead to a decline in fertility parameters like sperm concentration, motility, and morphology. COVID-19 may also negatively affect sperm quality and reduce fertility in men because the angiotensin-converting enzyme 2 (ACE2) receptor used by the SARS CoV-2 virus to enter cells is found in the testes and in other male reproductive organs like the prostate gland, seminal vesicles, and bulbourethral glands, that contribute seminal fluid to the semen. However, the magnitude of that effect may depend on the severity of disease. Furthermore, most of these patients receive treatment with corticosteroids and/or antiviral therapies, which have been associated with testicular dysfunction. Fortunately, these risk factors have proven treatment strategies like quitting smoking, limiting alcohol intake, weight loss through exercise, special diet modification and focusing on mental wellness.



In **conclusion**, the data published to date seem broadly reassuring that any measurable effect of coronavirus on male fertility is probably only slight and temporary

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SURGERY DURING COVID-19 PANDEMIC

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THE **Surgical Disciplines** face challenges during the COVID-19 pandemic. Providing care for patients with surgical disease requires a unique and intimate relationship between patient and surgeon, and this interaction and contact cannot be replaced by telehealth. Further COVID -19 has substantial effect on surgeon and patient who require surgical care.

Evidence revealed that perioperative mortality, morbidity and complications were very high among patients with COVID- 19. This is due to low immunity and prolonged immobility while patients were on ventilator. Patients with **co-morbidities:** chronic lung disease, TB, diabetes, hypertension, renal disease, hepatic disease, cardiac disease, smoking, history of substance use, obesity, male gender and age over 70 years more likely to die or develop undesirable outcome.

Prevalence of perioperative mortality in COVID-19 patients – Number of deaths in patients having COVID-19 and undergoing surgery is more than double in comparison to patients not having COVID-19; between 6% to 20%. In subgroup of emergency operation, mortality is as high as 29%. Mortality was mainly in those who had postoperative pulmonary complications; pneumonia, acute respiratory distress syndrome (ARDS), unexpected postoperative ventilation or extracorporeal membrane oxygenation after initial extubation after surgery (ECMO) or patient could not be extubated after surgery, pulmonary embolism - which is about 50% of the patients- mortality in these patients was 38%, accounting for about 80% of all deaths.

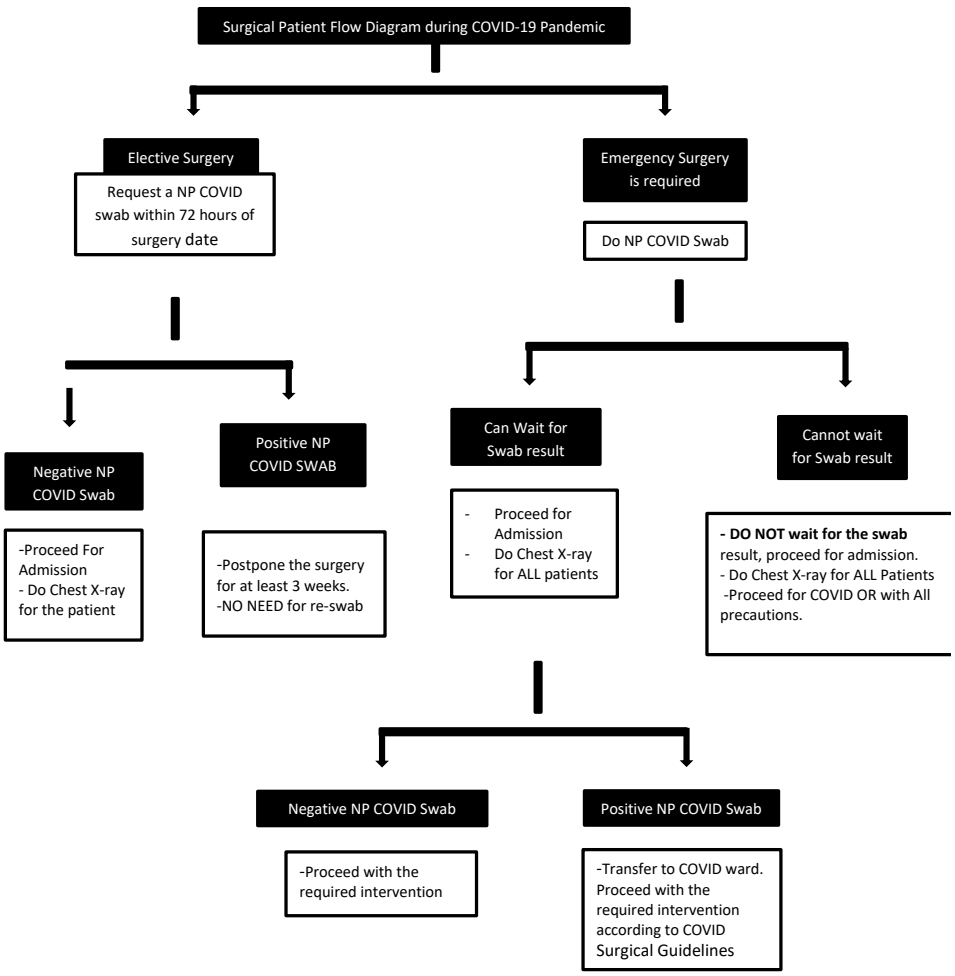
Prevalence of perioperative morbidity / complications– is 14%- 50%, common being thromboembolic complications, infection, sepsis/ shock, respiratory failure, acute kidney injury. About 15% to 30% needed ICU admission. In one study 31% of the ICU patients had thrombotic complications, including pulmonary embolism, stroke, right ventricular thrombosis, renal vein thrombosis, coeliac artery thrombosis and aortic thrombosis with leg ischemia (arterial thrombosis in 3.7%.)

Hospitals have postponed/reduced nonemergency operations to avoid putting patients at risk and ensure that hospital resources, beds and equipment are available to treat patients who are critically ill with COVID-19. Some elective surgery may be postponed during pandemic- surgeon will consider risk of waiting- it should not put your health at risk or allow worsening of your condition. Even delaying surgery for some types of early cancer for 3 to 6 months will not affect survival. Surgery may be urgently needed for people with some types/ stage of cancer. Surgical team should discuss with the patient the benefits and risks of surgery, risk of catching COVID-19, risk of any preexisting medical conditions and alternative option for treatment as part of **shared decision making.**

Many patients with confirmed or suspected COVID-19 infection will require **emergency surgical treatment.** In these situations, special measures need to be adopted in order to minimize possibility of transmission between patients, exposure to health care personnel, and developing postoperative complications. All the patients suspected of COVID-19 and for surgery need to be admitted in a separate

floor/ ward of the hospital away from non-COVID-19 wards. Once they are proved as non-COVID-19 they need to be shifted to the general category ward or else they need to be transferred to COVID-19 ward. They are transferred to the operating theatre through a separate entrance meant only for COVID-19 patients and same route to be used as exit too. Separate operation theatre is reserved for these patients.

Although unproven in people with COVID-19, preference of regional anesthesia over general anesthesia has advantage such as minimal aerosol generation and its effect on respiratory system, avoidance of intubation related seeding of pathogen to lower respiratory tract, decreased thromboembolic complications and reduce surgical stress response under regional anesthesia. For general anesthesia cuffed endotracheal tube should be used to minimize COVID-19 from aerosolizing. The procedure, irrespective of regional or general anesthesia, needs appropriate DONNED PPE for the person performing the procedure. Performing the anesthesia and surgical procedure in a negative pressure room will also prevent viral contamination outside the operation theater. Use of HEPA filter in operation room also reduces viral contamination outside the operation room.



To Swab ALL patient Except who had been tested positive for SARS-COV-2 within 90-day-period

During operation appropriate **personal protective equipment (PPE);** such as N95 or FFP 2 mask, gown, cap, eye protection and double gloves, are worn by the surgical team. In the operating room, use of smoke evacuators to suction away the smoke plumes generated by electro cautery minimize the risk of exposure to healthcare personnel of aerosolized tissue. Special precautions should be taken for all surgical cases that involve the airway and digestive tract, and minimally invasive procedures that require the creation of pneumoperitoneum (laparoscopic surgery) must be safely managed or avoided if possible. The benefits of laparoscopic surgery i.e., reduce morbidity, mortality and hospital stay – needs to be balanced against the theoretical risk of aerosol transmission from surgical smoke. Given the newly devised ultra-filtration devices, laparoscopy could be valuable in improving outcome of patients with COVID-19.

To protect both patients and healthcare personnel the protocol used for patients for surgery is shown in **diagram**

TIMING OF ELECTIVE SURGERY AFTER RECOVERY FROM COVID-19

- Four weeks for an asymptomatic patient or recovery from only mild, non-respiratory symptoms.
- Six weeks for symptomatic patient (e.g. Cough, dyspnea) who did not require hospitalization.
- 8- 10 weeks for a symptomatic patient who is diabetic, immune-compromised or hospitalized
- 12 weeks for a patient who was admitted to ICU due to COVID-19

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REHABILITATION IN COVID-19

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Rehabilitation has been identified by the World Health Organization (WHO) as an essential health strategy. It focuses on the overall functioning of the whole person, including comorbidities. Rehabilitation of individuals who have experienced COVID-19 must consider not only the consequences of the disease but also the effects of treatments applied during the acute phase. Rehabilitation inherently serves to reduce disability, with broad health, social, and economic impacts.

At present the exact proportion of COVID-19 patients requiring rehabilitation are difficult to predict, but assuming that patients who received mechanical ventilation would be a minimum set of patients that require rehabilitation post discharge. Also, to be added, patients on high-flow oxygen therapy. Considering various hospital data from UK and US, it can be around 5 to 10% of total COVID patients referred to hospitals.

Who provides rehabilitation?

It's a multidisciplinary team lead by Physiatrist (PMR doctor / Rehab Physician), Physiotherapist, Occupational therapist, rehabilitation nurse, speech and language pathologist, psychologist and social worker.

Which all conditions need rehabilitation?

WHO COVID-19 rehabilitation program included the following conditions namely Acute respiratory distress syndrome (ARDS) and pulmonary restrictive syndrome, Post-intensive care syndrome (PICS) / Critical illness polyneuropathy or myopathy (CIP/CIM), Post-extubation swallowing disorders, Multiple organ failure and shock sequale, Post-traumatic stress disorder (PTSD)

Rehabilitation of different post COVID-19 complications

Respiratory Rehabilitation

In **acute infective stage,** aggressive respiratory rehabilitation should be avoided to prevent unnecessary dispersal of the virus and worsening of respiratory distress. The main goal in ICU patients will be prevention of complications like bed sores, contractures and deconditioning by providing ROM (Range of motion) exercises and regular position changes. Closed loop suctioning will be better than open suctioning. Recruitment maneuvers (transient elevations in airway pressure applied during mechanical ventilation) help to open ('recruit') collapsed lung units and increase the number of alveoli participating in tidal ventilation.

In the **post-acute phase**, inspiratory muscle training should be included if inspiratory muscles are weak. Deep, slow breathing, thoracic expansion (with shoulder elevation), diaphragmatic breathing,

mobilization of respiratory muscles, airway clearance techniques, and positive expiratory pressure devices can be added based on assessed needs. Postural drainage and gradual standing are suggested if comorbid conditions such as bronchiectasis, secondary pneumonia, or aspiration coexists. Cough augmentation techniques, such as lung volume recruitment or manually and mechanically assisted cough, are used to prevent and manage respiratory complications associated with chronic conditions.

Prone position helps to optimize oxygenation. Appropriate candidates for awake prone positioning are those who can adjust their position independently and tolerate lying prone. Patients suffering from ARDS showed benefitted from prolonged prone ventilation, up to 12 - 16 h/day.

If pulmonary fibrosis is present, perform training with oxygen supplementation as needed. The current target oxygen saturation range for patients with COVID-19 recommended by the NIH is 92–96%.

Severely affected cases may present with chronic cough, fibrotic lung disease, bronchiectasis, and pulmonary vascular disease and may require rehabilitation on long term basis with initial inpatient rehab and to follow up on OPD basis or tele rehabilitation.

Patients with interstitial Lung disease and pulmonary fibrosis may require portable oxygen concentrator / home oxygen treatment.

Tele Rehabilitation

Mobility and Functional Rehabilitation

Rehab of post-intensive care syndrome (PICS)

Critical illness polyneuropathy or myopathy (CIP/ CIM) is a frequent complication in the intensive care unit (ICU) and can be associated with prolonged mechanical ventilation and longer ICU stay. Consultation with a neurologist and/ or Physiatrist, and electromyography/nerve conduction study, muscle enzymes (e.g., creatine kinase), and/or muscle biopsy will help a proper diagnosis.

Early mobilization should include frequent posture changes (prevent bed sores), bed mobility, sit-to-stand, simple bed exercises, and ADLs, while respecting the patient's respiratory and hemodynamic states.

Active limb exercises should be accompanied by progressive muscle strengthening (suggested program: 8-12 repetitions, 1 to 3 sets with 2 minutes rest between sets, 3 sessions a week for 6 weeks).

Exercise with PPE

Neuromuscular electrical stimulation (induces passive contraction of muscles through low voltage electrical impulses delivered through skin electrodes placed over target muscle groups) can be used to assist with strengthening.

Aerobic reconditioning can be accomplished with overland walking, cycle or arm ergometry, or a NuStep cross trainer. Bedside cycle ergometry can provide muscle strength training and range of motion exercises for ICU patients who are either awake (active cycling) or sedated (passive cycling), and may also preserve muscle strength and function. Initially, aerobic activity should be kept to

less than three metabolic equivalents of task. Later, progressive aerobic exercise should be increased to 20-30 minutes, 3-5 times a week. Balance work should be incorporated.

Patients with persistent weakness and immobility will require long term support in the form of intensive inpatient rehabilitation and later follow up as OPD.

Occupational therapist focuses on activities of daily living (ADL) and instrumental ADL guidance as well as targeted interventions to facilitate functional independence and prepare patients for discharge. They should also address cognitive issues involving attention, visual-spatial abilities, memory, executive function, and working memory. They also help in training patients in transfer activities (bed –wheel chair –toilet) and fine motor functions.

Rehabilitation of Post-extubation swallowing disorders

A **Phoniatrist** (specialist physician of speech and voice disorders) assess dysphagia and voice impairments resulting from prolonged intubation and will refer them to **Speech-language pathologists /Speech therapists** who in turn help out with the oromotor exercises and swallowing techniques.

Education on the importance of a healthy lifestyle and participation in family and social activities should be included.

In addition to the Psychiatrist involvement, psychological interventions delivered by occupational therapists, social workers or rehabilitation psychologists will benefit the patients with persistent depression, anxiety, or PTSD.

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USEFUL TIPS

EXERCISE: WHY IS IT IMPORTANT ?

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COVID 19 AND GASTROINTESTINAL DISEASES

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THE pandemic caused by the novel SARS-CoV-2 virus has led to the disease now termed COVID-19 by the WHO. This has been followed by an explosion of information about this novel virus much of which is important and clinically relevant to gastroenterologists. COVID-19 was originally thought to affect only the respiratory system but there is increasing evidence about the potentially serious affections of major organs, including those of the **gastrointestinal (GI) system.**

GI Presentations of COVID-19

Abdominal pain, loss of appetite (anorexia), nausea and vomiting and diarrhea represent the GI symptoms of presentation. This group of patients frequently have abnormal liver function tests and a positive stool test for COVID-19. Some patients present with GI symptoms with or without the respiratory symptoms.

GI emergencies in COVID-19 patients

GI emergencies during COVID-19 pandemic represent a challenge in clinical practice

1. **Diarrhea** is one of the most common symptoms associated with COVID-19, though usually mild, some patients report severe diarrhea with electrolyte disturbances or bloody, inflammatory diarrhea during or before onset of pulmonary symptoms.
2. Patients with severe COVID-19 were more likely to have GI symptoms, especially **abdominal pain.** Among different causes, acute pancreatitis (inflammation of pancreas) and acute acalculous cholecystitis (inflammation of gall bladder without gall stones) both presenting before the overt appearance of COVID-19 have been seen.
3. **GI bleeding,** though not as common as the other GI symptoms, is one of the most frequent reasons for emergency consultation. The cause of bleeding is not often identified since endoscopic procedures are not always performed and most of the patients are treated with medications. GI mucosal herpetic-like erosions and ulcers with biopsies testing positive for the COVID-19 virus have been reported following an upper GI endoscopy. Other causes include esophagitis (inflammation of esophagus/food pipe), duodenal ulcer, gastritis (inflammation of stomach lining), gastric cancer and esophageal tears. The incidence of lower GI bleeding though much less common, endoscopy reveal higher proportion of lesions suggestive of COVID-19. Other causes of lower Gi bleeding include diverticulosis, hemorrhagic ulcerative colitis (inflammation of colon) and ischemic (lack of blood supply) colitis. Ischemic cause of GI bleeding in COVID-19 patients is attributed to the COVID-19 infection after other causes are excluded.

COVID-19 and Liver Diseases

1. It has been suggested that the frequent derangements of liver chemistry with jaundice are best explained by the effects of a cytokine storm rather than a direct effect of the virus on the liver.
2. The outcome data in chronic liver disease (CLD) appears to indicate a greatly increased risk of death due to COVID-19, and that this risk increases with the severity of liver disease.
3. Currently patients with decompensated liver cirrhosis and liver enzymes (> 5 times the upper limit of normal) are recommended not to receive Remdesivir.
4. Reactivation of chronic hepatitis B with dexamethasone therapy must be considered, especially where the virus is endemic.

COVID-19 and the Upper Gastrointestinal Tract

1. Upper GI tract symptoms may include loss of appetite, nausea, vomiting and/or abdominal pain.
2. Heartburn is frequent and as in general population requires a standard approach with proton pump inhibitors (PPIs) or H2 receptor antagonists (H2RAs).

Gut microbiome and COVID-19

The gut microbiome (microbes present normally in the gut) may play an important role in COVID-19. As the gut microbiota is known to affect pulmonary health, it may influence the pathogenesis of

SARS-CoV-2 infections. Furthermore, respiratory infections are known to cause a change in the composition of the gut microbiota. Increased mortality and morbidity from COVID-19 is associated with the elderly, those with comorbidities such as diabetes and obesity and immunocompromised individuals. These groups of individuals are known to have an impaired gut microbiome structure and function. SARS-CoV-2 infections may further disturb the commensal microbe composition in the gut and lead to gut dysbiosis (abnormal change in composition of normal gut microbe population). The dysbiosis may cause increased cytokine levels, systemic inflammation and exaggerated immune responses. Factors released during systemic inflammation, such as C-reactive protein, are related to the severity of COVID-19.

Inflammatory Bowel Disease (IBD) and COVID-19

Inflammatory bowel disease (IBD) is a term for two conditions (Crohn's disease and Ulcerative Colitis) that are characterized by chronic inflammation of the GI tract. Anxieties have been heightened by the widespread use of immune-modulator and biological agents in treatment of IBD.

1. A consensus emerges that mortality rates are not unduly increased in IBD compared with the general population, but advanced age, comorbid illness and active IBD, particularly colonic disease, are key concerns within this patient population.
2. Stopping immune-modulation and biological agents in this setting was considered necessary early in the pandemic and was associated with very low rates of COVID-19, but follow-up data confirm that stopping these agents has been associated with significant problems related to the management of disease relapse.
3. In the management of IBD cases, until more data are available, it seems appropriate to advocate early and careful strategies for detection and treatment of active disease. It is recommended to limit the use of steroids if possible and using monotherapy with biological agents rather than

combination therapy (with steroids). In most of the cases it is otherwise advisable to observe conventional guidelines for drug management.

4. During the height of the pandemic, elective and emergency surgeries for IBD were associated with high complication rates, highlighting the need for targeted and effective medical interventions.

Strategies for personalizing care and delivering stratified medicines to provide effective and safe medicines is identified as a key unmet need and represents the focus for ongoing work in this group of high-risk patients.

Endoscopy during COVID-19 pandemic

The large number of COVID-19 cases has led to radical changes in endoscopy services as clinicians have tried to continue offering patients what are often life-saving services during this pandemic. This has led to necessary reductions in endoscopy unit through out to maintain the safety of patients and staff. Despite the development of COVID-19-minimized facilities, patients have been reluctant to attend hospitals for medical emergencies or in cases where they are at high risk of a serious adverse medical outcome. Emergency endoscopy for GI bleeding, bolus obstruction and cholangitis has largely continued, but there is a need to risk stratify elective patients as endoscopy services resume so that those at highest risk receive endoscopy first.

Summary

- The COVID-19 virus may lead to significant systemic disease and involve the GI tract, liver, biliary tract and pancreas.
- Upper GI tract symptoms are frequently reported in COVID-19 patients, most frequently loss of appetite and nausea.
- GI bleeding in patients with COVID-19 is not as frequent as might be expected, and the cause of the bleeding is often not found, because endoscopic procedures are not always performed and patients are managed conservatively.
- Endoscopy can be carried out safely in a COVID-19 environment with appropriate protective measures and establishment of new safe protocols.

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BTki = Bruton tyrosine kinase inhibitor; CI = confidence interval; CLL = chronic lymphocytic leukaemia; G = obinutuzumab; GClb = obinutuzumab + chlorambucil; HR = hazard ratio; PFS = progression-free survival.

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COVID-19 & HIV

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People with HIV (Human Immunodeficiency Virus) and COVD-19 is a rapidly evolving situation. Those with HIV have concerns and questions related to their risk of serious illness from COVID-19.

Some frequently asked questions are:

Are people with HIV at higher risk from COVID-19 than other people?

We are still learning about the risk of COVID-19 in people living with HIV. Current evidence suggests that people living with HIV are at higher risk of becoming seriously ill, and dying from, COVID-19, than people without HIV.

Older adults and people of any age who have serious underlying medical conditions might be at increased risk of serious illness. This includes people who have weakened immune system. The risk for people with HIV getting sick is greatest in those with

- a low CD4 count (<350 copies/cell),
- a high viral load,

The normal range of CD4 T-Lymphocyte (CD4) cell count in healthy adults is about 500 to 1,600 cell/mm^3. People with HIV and CD4 count ≥ 500 cells/mm^3, have their cellular immune function similar to people without HIV. For patients on antiretroviral therapy (ART), the hallmark of treatment success is an undetectable plasma HIV viral load.

- a recent opportunistic infection, for example, tuberculosis (TB)
- a current AIDS-defining illness.

People living with HIV are also more likely to get respiratory infections when their HIV is not well managed.

For this reason it's very important to take your antiretroviral treatment as prescribed – always, but especially during this time. Also your risk of infection is less if you are virally suppressed

What can people with HIV do to protect themselves from COVID-19?

- The best way to prevent getting sick is to avoid exposure to the virus.
- People with HIV should strictly follow preventive measures like wearing mask, hand hygiene and maintaining social distance to help prevent getting infection and spreading the virus to others.

If you have HIV and develop COVID-19 infection including those requiring hospitalisation, you should continue taking your treatment and opportunistic infection prophylaxis. This is the best way to keep your immune system healthy. An ART regimen should not be switched or adjusted for the purpose of treating COVID-19 infection.

People with HIV should also continue to maintain a healthy lifestyle by

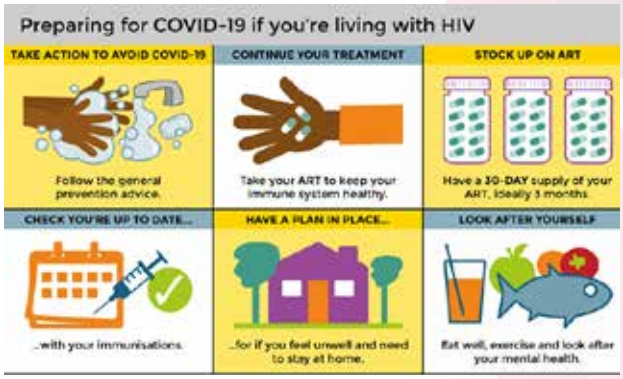
- Eating right and exercise
- Getting 8 hours of sleep
- Reducing stress as much as possible

Staying healthy helps your immune system fight off any infection

What should I do if I think I might have COVID-19?

Call your health care provider if you develop symptoms that could be consistent with COVID-19. You should get tested. If your symptoms are mild, you can recover at home, but if the symptoms are severe you will need hospitalisation, but it is important to continue taking your HIV medicines as prescribed so as to keep your immune system healthy.

What steps can people with HIV take in addition to what is recommended for others?



- Make sure you have adequate (30-90 days) supply of your HIV medications and any other medications or medical supplies you need for managing HIV.
- Make sure all vaccinations are up to date including vaccination against seasonal influenza (flu) and bacterial pneumonia.
- If possible, establish and maintain a plan for remote clinical care, telemedicine or else you can communicate with your healthcare provider by phone or text.
- If your HIV is undetectable (virally supressed) delaying your routine medical and lab visits can be considered.
- Stay connected with friends, family, neighbours, community care workers. This will keep you not only socially connected but also mentally strong.

Should people with HIV undergo the same diagnostic and laboratory testing for COVID-19?

Yes, they should undergo the same diagnostic and serological testing but serological testing as the sole basis for diagnosis is not recommended.

What should people with COVID-19 and a new diagnosis of HIV do?

HIV specialist will determine the optimal time to initiate ART. Once ART is initiated, maintaining treatment at all times is critical.

Are there any concerns about pregnancy and maternal outcome in women with HIV and COVID-19?

Currently the information about pregnancy and maternal outcomes in individuals with HIV and COVID-19 are limited. However, data are accumulating that the risk of severe illness, morbidity and mortality may be greater among pregnant individuals than among general population. Of most importance is, HIV treatment with proven efficacy and safety should not be interrupted to prevent mother to child transmission of HIV and maximize maternal health.

Are the vaccines for COVID-19 safe for people with HIV?

Yes, people with HIV can safely get the coronavirus vaccination. In fact, in some countries they are being prioritised.

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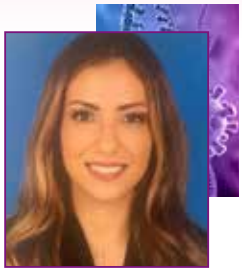
COVID-19 AND MENTAL HEALTH



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Wilson Centre Fellow, University of Toronto

IN December 2019 the city of Wuhan reported an increasing incidence of an illness,

initially referred to by local hospitals as a chest infection (pneumonia) of unknown cause. Later a novel virus was identified and named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (1), or COVID-19. The spread of this virus sent the world into panic, with many countries implementing full lockdowns or partial lockdowns of schools, shops, restaurants, gyms, and others to prevent the virus from spreading further. Although the lockdown measures were necessary to prevent spread of the virus, there are reasons to be concerned because prolonged school closure and home confinement during a disease outbreak was found to have negative effects on children's physical and mental health. (1, 2) Evidence suggests that when children are out of school in general, they are physically less active, have much longer screen time, irregular sleeping patterns, and poorer diets. (1, 3)

In addition to these, home quarantine coupled with fear of infection, uncertainty towards the future, and miscommunication regarding the virus has been found to have a significant impact on children's mental health. Studies showed that the mean posttraumatic stress scores were four times higher in children who had been quarantined than in those who were not quarantined. (4)

As of today, the pandemic has affected 216 different countries and more than 79.9 million confirmed cases, unfurling fear, uncertainty, and distress. In this article, we are going to focus on students and parents and how they can cope with the mental health impacts of COVID-19.

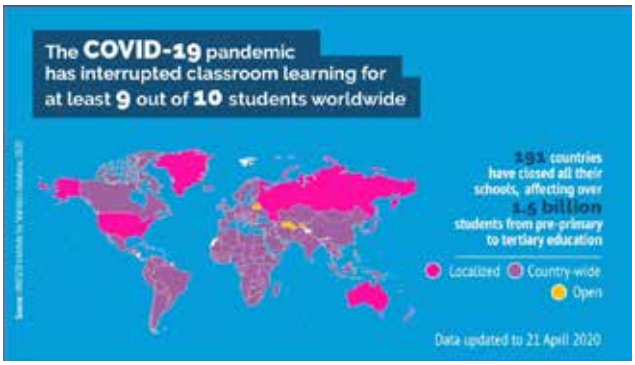
What can we do to decrease stress surrounding COVID-19?

Regular exercise has shown to significantly decrease stress during the lockdown period. (5) Those who exercised 3-4 times per week were found to have less anxiety and depression symptoms. (5) Also, people who were using social media more during the lockdown period were found to have increased stress. (5) Therefore, less use of social media could improve a person's mental health. In addition, people who lived alone were more likely to experience anxiety symptoms, so spending time with family and close friends may help a person get through this time. Psychiatrists and psychologists can offer free online services to help members of the community cope with fear of infection, tension with family, and domestic conflicts. Open communication is key to decreasing stress surrounding COVID-19. Close and open communication with children especially is key to identifying any physical and psychological issues and to comforting children in prolonged isolation. (6, 7)

For students: how to cope with remote learning and staying at home?

It is clear that remote learning has had a huge impact on both parents and students alike. Students have reported difficulty focusing and enjoying classes online compared to in person

(8), and parents have found it hard to help their children stay on track with e-learning. However, there are some things that can be done to cope. Firstly, students should try and establish a routine that includes sufficient sleep, regular meals, and dedicated study time. Establishing this routine will help them normalize remote learning in their lives. It is recommended that they don't attend online classes from their beds or couches, but instead in a dedicated spot such as a desk or table. They can set up virtual study sessions with friends to keep themselves accountable and bring back the social aspect of learning. Additionally, students should be encouraged to set regular goals related to learning to continuously give them something to work towards. There have also been some positive findings to celebrate with remote learning. Students have felt safer and more financially stable at home (8), and freshmen university students have actually reported less depressive and anxiety symptoms with remote learning (9), possibly due to there being no need for them to adjust to a new learning environment with the move to university.



Going back to school: how to prepare students for the gradual return of schools?

After months of remote learning, it may be difficult for some students to go back to school with ease. Fears of COVID-19 and the unfamiliarity of classes will catch many students off guard, which is why we recommend helping students return with a positive mindset. Something as simple as a new uniform or schoolbag can help excite them to return to school. Parents should remind their children that going to school will be a chance to see friends, participate in school sports and clubs, and socialize more than with remote learning.

Schools also offer students the opportunity to obtain psychological counseling, which might not be available at home. In addition, schools can actively promote a health-conscious schedule, good hygiene, physical activity, an appropriate diet, and good sleep habits, and integrate these health promotion parameters into the school curriculum. (1) By following the proper safety guidelines implemented by the Ministry of Health and Education, students should be able to return to school with little fear.

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USEFUL TIPS


If I am 60 or older, or have an underlying health condition, should I travel during COVID-19?
1
Because you are at higher risk of serious illness and even death from COVID-19, you should try to avoid/delay travel.
2
If you must travel, wear a medical mask.
If you must remove your mask, clean your hands before & after and put the mask in a sealed plastic bag.
3
Try to stay at least 1 metre away from others, wherever possible
4
Frequently clean your hands throughout your travel.
5
Bring disinfectant wipes to clean any surfaces before touching them, and then discard the wipe in a sealed plastic bag.
#COVID19
World Health Organization
3 AUGUST 2020


What kind of mask should I wear while flying during COVID-19?
People 60 years or over, or who have serious chronic illnesses or underlying health conditions, should wear a medical mask while traveling. This provides greater protection from others who may have the virus.
People who feel healthy and have no symptoms can wear a fabric mask to prevent the virus from spreading to others.
#COVID19
World Health Organization
3 AUGUST 2020


What should I do to prepare for a flight during COVID-19?
Follow instructions from your airline company.
Clean your hands frequently.
Bring disinfectant wipes to clean any surfaces before touching them, and then discard the wipe in a sealed plastic bag.
Try to stay at least 1 metre away from others, wherever possible.
Follow the floor markers that show you how far apart you should stand from others.
Use a mask as recommended by the government or travel company.
#COVID19
World Health Organization
3 AUGUST 2020

USEFUL TIPS


If you are organizing a small gathering or event, take precautions to prevent the spread of COVID-19 among guests
PROVIDE ALL NECESSARY SUPPLIES...
TISSUES
HAND SANITIZER OR SOAP AND WATER
MASKS
DISTANCE MARKERS
CLOSED BINS
(IN ACCORDANCE WITH LOCAL RECOMMENDATIONS)
World Health Organization


Older people may find it difficult to stay connected during a #COVID19 quarantine. Loved ones should connect with them regularly through telephone, messaging apps, and social media to help them feel safe and secure.
GOOD MORNING!
#mentalhealth #coronavirus
World Health Organization
Western Pacific Region


Be KIND to support loved ones during #coronavirus
Check in regularly especially with those affected
Encourage them to keep doing what they enjoy
Share WHO information to manage anxieties
Provide calm and correct advice for your children
Learn more to Be READY for #COVID19:
www.who.int/COVID-19
UNITED NATIONS
World Health Organization


Novel Coronavirus COVID-19
FOR HEALTHCARE FACILITY STAFF
Coping with stress
It is normal to feel sad, stressed, or overwhelmed during a crisis
Talk to people you trust or a counsellor
Maintain a healthy lifestyle: proper diet, sleep, exercise and social contacts with friends and family
Don't use alcohol, smoking or other drugs to deal with your emotions
If you have concerns, talk with your supervisor, and if you start feeling unwell tell your doctor immediately

THE MYTH BUSTERS COVID-19

Dr Aarti Chadha
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Mubarak Al Kabeer Hospital, Kuwait

WE are all being exposed to a huge amount of COVID-19 information on a daily basis, and all of it is reliable. Don't believe the rumors. Don't pass them along, especially on social media.

Here are some tips for telling the difference and stopping the spread of misinformation

1. Can I get COVID-19 infection from ticks, mosquitoes and flies: NO

To date there is no evidence which suggests that COVID-19 can be transmitted through these insects.

2. Can 5G mobile networks spread COVID-19: NO

Viruses cannot travel through radiowaves ,so this is a complete myth.

3. Can using cleaning products such as bleach OR mouthwashes kills Corona virus: NO

Some brands of mouthwash can eliminate certain microbes in your mouth but not CORONA. On the contrary bleaches could have harmful effect on our body if swallowed.

4. Can I get corona virus from packaging and food containers: UNLIKELY: Although the virus can survive for a short period on some surfaces, it is unlikely to be spread from domestic or international mail, products or packaging.

5. Can children be infected with the virus that causes COVID-19 and get sick: YES: Most children with COVID-19 have mild symptoms or they may have no symptoms at all ("asymptomatic"). Fewer children have been sick with COVID-19 compared to adults. However, children with certain underlying medical conditions and infants (less than 1 year old) might be at increased risk for severe illness from COVID-19.

6. Are hand-dryers effective in killing corona virus: NO: To protect yourself, clean your hand frequently with alcohol-based hand-rub or wash with soap and water.

7. Regularly rinsing your nose with saline can prevent infection: NO: This might be applicable to common cold but not for COVID-19.

8. Thermal scanners can detect people with corona infection: NO: They can only detect people with fever, which is one of the symptoms of COVID-19.

9. Corona virus cannot survive in very hot and very cold climates: NO: It is seen in countries with both hot andhumid as well as cold and dry weathers.

10. Drinking hot water prevents corona infection: NO: Hot water might alleviate sore throat but it does not protect against COVID-19

11. COVID-19 can spread through feces: MIGHT BE: Like other corona viruses, it might be found in feces. So, to protect yourself wash your hands after using the toilets or changing diapers and before preparing food or eating.

12. Can Supplements like Vitamins and Minerals cure COVID-19? NO: Micronutrients are critical for a well-functioning immune system and promote overall wellbeing but currently there is no guidance on their use for treatment of COVID-19.

13. Holding breath for more than 10 seconds mean you don't have corona: NO: Being able to hold your breath for 10 seconds or more without discomfort

DOES NOT mean you are free from COVID-19 or any other lung diseases.

14. Can Prolonged use of medical masks cause oxygen deficiency: NO: Use of medical masks when properly worn does not cause any carbondioxide intoxication or oxygen deficiency.

15. Can Corona infection be transmitted through water like swimming: NO: Wear a mask when you are not in water and you can't stay distant. Clean your hands frequently.

16. Can eating garlic prevent COVID-19 infection: NO: Garlic is a healthy food that might have some antimicrobial properties but it does not prevent COVID-19 infection.

17. Am I at risk if I go to the funeral for someone who died of COVID -19: NO: There is currently no known risk associated with being in the same room at a funeral or visitation service with the body of someone who died of COVID-19. However, you may be at risk of getting COVID-19 if you attend a funeral where there are multiple people congregating.

18. Can I get infected with the belongings of someone who died of COVID-19: UNLIKELY: This type of spread is not a concern after death. It may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes, but this is not thought to be the main way the virus spreads.

19. Is it safe to vacuum schools, business or community facility after someone with COVID-19 was there: UNKNOWN: The risk of spreading SARS-CoV-2, the virus that causes COVID-19, during vacuuming is unknown. At this time, there are no reported cases of COVID-19 associated with vacuuming. Use vacuums with HEPA filters if possible.

20. Can Animals carry COVID -19 virus: UNLIKELY: There is no evidence till date that viruses, including the virus that causes COVID-19, can spread to people from the skin, fur, or hair of pets. It's always a good idea to practice healthy habits around pets and other animals.

21. Is it possible to have Flu and COVID at the same time: YES: It is possible to test positive for flu (as well as other respiratory infections) and COVID-19 at the same time. Because some of the symptoms of flu and COVID-19 are similar, it may be hard to tell the difference between them based on symptoms alone. Testing may be needed to help confirm a diagnosis.

22. Do I still need to quarantine for 14 days after my last exposure if my test came as negative: YES. You should still self-quarantine for 14 days since your last exposure. It can take up to 14 days after exposure to the virus for a person to develop COVID-19 symptoms. A negative result before end of the 14-day quarantine period does not rule out possible infection.

Stay safe and well informed!

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MASKS IN COVID-19 PANDEMIC

Dr. Roy Thampy Cherian
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1. Why should people wear masks?

Masks are one of the measures to reduce transmission of SARS-CoV-2 virus and help save lives. It is part of the strategy to contain the virus in addition to physical distancing, washing hands, good personal habits like coughing or sneezing in tissue paper and avoiding crowded places. Masks not only protect those who wear them but also protect others from getting the virus.

2. Who should wear and which type?

Medical masks are advised for health care workers in hospitals, anyone who has cough, sore throat, generalized weakness or muscle pain. It can be used for people waiting for COVID-19 test results or those who have tested positive for the virus. It is also mandatory for family members who are looking after positive cases at home. Medical masks are also indicated for high risk people like age above 65 years, longstanding lung diseases, heart ailments, diabetes, low immune status, cancer and obesity. Non-medical / fabric masks can be used by general public and those with good immunity.

3. In which situations are masks to be worn?

Masks should be worn in crowded areas, where 6 feet distance between people cannot be maintained and rooms with poor ventilation. Always wash your hands before wearing and removing your masks and try to avoid touching your mask as much as possible. Wearing masks does not mean you should not keep physical distancing. It should be worn in closed indoor areas where physical distancing cannot be maintained like religious places, shopping malls, restaurants, public transport and schools. If somebody who is not part of the household visits your home, masks should be worn especially if physical distancing or ventilation is poor. Outdoor settings like bus stops, markets and crowded roads is another indication to wear masks.

4. How to decide what fabric mask to buy?

While choosing a fabric mask 3 criteria must be satisfied namely filtration, breathability and fitting. The mask should be held in place comfortably using elastic bands. The various types like flat fold and duckbill must fit closely over nose, cheeks and chin otherwise air penetrates under the edges of the mask instead of being filtered through the fabric. Masks with vents or exhalation valves are not recommended because they allow unfiltered breath to escape the mask. Fabric mask should be made of three layers: A) Inner layer of absorbent material like cotton. B) Middle layer of non-woven nonabsorbent material like polypropylene and C) Outer layer of nonabsorbent material like polyester or polyester blend.

5. How to wear a fabric mask and clean it?

Before touching the mask wash your hands with alcohol-based hand rub or soap and water; inspect the mask for tears or scratches; put on the mask covering your mouth, nose and chin leaving no air gaps on the sides. Put the ear loops behind ears or

head and do not cross the straps as gaps may appear on the side of face. Avoid touching the mask while wearing and wash your hands if you do so. Change your mask if it gets dirty or wet. Before taking off the mask wash hands, remove it out from ear loop, do not touch the front side of mask. To store a fabric mask if not wet or dirty put it in a plastic sealable bag. Wash your hands after removing the mask. To clean the mask wash with soap and water, preferably hot water and then boil the mask for 1 minute.

Resist the temptation of lowering the mask while speaking. Do not keep your mask around your neck, wrist or elbows but put it in a clean plastic bag.

6. How to wear & remove a medical mask?

The same practices as above with some differences like the metal strip of mask is up, pinch the metal strip to the nose to keep it tight around nose. The inside of mask is usually white; medical masks are to be worn for single use. Lean forward and pull it away from face and discard in a closed bin.

7. What is the difference between medical masks (surgical masks) and respirators?

Medical masks are made of 3 layers of synthetic nonwoven materials with filtration layer in the middle. It is available in different thickness with various levels of fluid resistance and filtration. Respirator masks like N95, N99 are used by health care workers in settings where there is high aerosol generation like taking care of COVID-19 patients. Both offer similar level of protection.

8. Do masks with exhalation valves offer extra protection?

No, in fact it is not recommended as it is harmful to others around you. In this type of mask, the valves close while breathing in thereby preventing any dust or other particles from going in but on breathing out the valves open and unfiltered air and viruses if present are released into the atmosphere.

9. When should health workers wear masks?

Health workers like doctors, nurses, midwives, medical attendants, cleaners, community health workers are more likely to be exposed to SARS-CoV-2 virus as they take care of suspected or confirmed cases of COVID-19 patients in hospitals. Hence it is mandatory that they wear the masks throughout the shift along with frequent hand washing except during eating, drinking and changing masks. They must try to keep physical distancing especially with their colleagues.

10. What is Double Masking?

Double masking is simply when you wear two face masks instead of one. It has been validated by CDC and leading infectious diseases experts recently.

What are the advantages of Double Masking?

1. Better fit – most masks do not fit perfectly on the face which not only allows respiratory droplets containing virus to escape your mask, but also allow them in. When you wear double masks, the outer mask can apply gentle pressure to edges of inner mask .
2. Increases filtration. – More layers of mask help to increase filtration.

11. How to double mask?

The Centre for Disease Control and prevention {CDC} recommends layering a cloth mask over a surgical mask. Avoid other mask combinations like a) Two surgical mask b) N95 and any other mask .c) KN95 and any other mask.

Loosely fitted mask *Double mask* *Knotting*

12. What are other ways to increase mask effectiveness?

1) When using cloth masks, it should be made of 2-3 layers.
2) Masks with strip of wire located at top reduces any leakage.
3) Try Knot and Tuck method – It involves knotting the ear loops close to where they join to the mask and carefully tucking away extra material.

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HOME CARE FOR PEOPLE WITH SUSPECTED OR CONFIRMED COVID-19

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Home care for people with suspected / confirmed COVID-19 is appropriate in the following circumstances

- People with suspected/ confirmed mild or moderate COVID-19 disease and no risk factors.
- The home in question should be suitable for adequate isolation and provision of care.
- At home, they have family members/ caregivers with no risk factors.
- The above suspected/ confirmed cases whose health can easily be reviewed by the public health personnel or health care provider.

Figure 1: Home care for suspected/confirmed COVID-19 patient

Recommendations for suspected or confirmed COVID-19 patient

1. Stay alone in a different room which is well-ventilated, and has attached bathroom and toilet.
2. Stay away from vulnerable people like children, pregnant women, elderly, people with co-morbidities and weakened immune systems as well as pets.
3. Avoid sharing common spaces and household items.
4. Do not attend any social gathering and restrict visitors until you completely recover.
5. Wear a surgical face mask (three-ply) to hold back respiratory secretions and you should change it whenever it is wet, dispose them properly in trash can and wash hands immediately with soap and water.
6. If you do not tolerate a surgical mask then cover your coughs and sneezes with a disposable tissue, then discard them properly in trash can and wash your hands. If you use handkerchiefs, wash them with soap and water.
7. Keep your hands clean by washing them frequently (before eating, after using the bathroom and whenever your hands look dirty) and thoroughly with soap and water for at least 20 seconds. If your hands are not visibly dirty you can rub them with 70% alcohol hand sanitizer.
8. Use disposable paper towels to dry your hands after washing them. If they are not available, use clean cloth towels and replace them frequently.

9. Surfaces that are frequently touched such as furniture, door knobs, taps, bathroom areas etc. in the room should be cleaned and disinfected frequently. Regular household detergent or soap should be used for cleaning followed by wiping the surfaces with common disinfectant containing 0.1% sodium hypochlorite.
10. Keep a covered trash bin lined with a plastic bag in the room.
11. Place contaminated clothing in a laundry bag, wash them separately using household detergent and dry thoroughly.
12. Take medicines as advised by the healthcare provider.
13. Eat healthy meals, drink plenty of fluids and have enough rest.
14. Look after your mental health. Stay in touch with family and friends via phone.
15. Monitor your symptoms and if you feel worse, consult your health care personnel immediately or contact your local public health unit for further instructions

Note: If the patient is unable to perform the above-mentioned tasks, assistance from a family caregiver is necessary. One family member/person who is in good health and has no risk factors can be engaged as caregiver for the patient.

Recommendations for caregivers

1. Limit your time with the patient.
2. Household members and pets should not enter the patient room.
3. No visitors should be allowed in the house until instructed by health care personnel.
4. Wear a surgical face mask (three-ply) and avoid touching your face.
5. Avoid sharing common spaces and household items.
6. Use dedicated items for the patient like plate, bowl, spoon, towels, napkin, bedding etc. After use wash them separately with dish soap and water, and dry them thoroughly.
7. Keep your hands clean by washing them with soap and water for at least 20 seconds after any type of contact with the patient or his/her immediate environment. Use disposable paper towels to dry your hands after washing them. If they are not available, use clean cloth towels and replace them frequently.
8. Use disposable paper towels to dry your hands after washing them. If they are not available, use clean cloth towels and replace them frequently.
9. Use disposable gloves when cleaning the surfaces or handling the items used by the patient. Surfaces that are often touched such as door knobs, phone, kitchen and bathroom areas should be cleaned and disinfected frequently. Regular household detergent or soap should be used for cleaning followed by wiping the surfaces with common disinfectant containing 0.1% sodium hypochlorite.
10. Place contaminated clothing in a laundry bag, wash them separately using household detergent and dry thoroughly.
11. Call the health care personnel immediately if the ill person feels worse or finds difficulty in breathing.
12. Monitor your own health and if you develop any COVID-19 symptoms such as fever, cough, sore throat, contact local public health unit for further instructions.

QUARANTINE Vs ISOLATION

Quarantine and Isolation are the terms used in public health practices, to protect the public by preventing exposure to people who have or may have an infectious disease.

We have heard these terms been used interchangeably during the COVID outbreak, and so it is important that we understand the difference between them.

What is QUARANTINE? - Quarantine is when someone who has been in close contact with COVID-19 patient stays at home or shelters in place for 10 -14 days from their last contact with the virus to prevent spreading the virus.

What is ISOLATION? - Isolation is used to keep someone who has tested positive or has COVID-19 symptoms separate from all others, even in their own home.

QUARANTINE	ISOLATION
When a person had close contact with COVID-19 patient	When a person has COVID-19 symptoms or have tested positive for COVID-19
Person should be quarantined for · A minimum of 10 days (after 10 days, the risk of spreading the virus to others goes down) if they have no symptoms. · After tenth day, the person should still continue to monitor herself/himself for symptoms of COVID -19 daily for the full 14 days, wash hands often, maintain physical distancing and always wear a mask when outside their homes. . NOTE: A 14-day quarantine is the safest way to prevent the spread of COVID-19 to others.	The person should be isolated until after · 10 days since symptoms first appeared and · 24 hours with no fever without fever-reducing medication and · All other symptoms of COVID-19 improve.
If the person develops symptoms, he/she should isolate away from others and call their doctor or clinic right away.	A person with positive COVID -19 test but no symptoms (called asymptomatic) should isolate themselves for 10 days after they test positive.
	The person should be in a specific "sick room" or an area in his/her home away from all others and pets, animals and if possible use a separate bathroom.
People who have completed their quarantine/ isolation may return to work and their regular routines. As long as they have completed the required quarantine or isolation, there is no need to have a negative test result to return to work.	

INDIVIDUALS WHO DO NOT REQUIRE MEDICAL ATTENTION MAY BE EFFECTIVELY ISOLATED OR QUARANTINED IN THEIR HOMES, RATHER THAN BEING CONFINED IN A HOSPITAL OR OTHER FACILITY.

***Source: Centres for Disease Control (CDC) and Prevention**

References:

https://apps.who.int/iris/handle/10665/333782

https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/index.html

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THE IMPORTANCE OF HAND HYGIENE

Dr Saroj Bala Grover
Physician
Infectious Diseases Hospital, Kuwait

Hand Hygiene is vital in the fight against COVID-19. Frequent and thorough hand washing is one of the most effective way to reduce the spread of germs. This easy and essential act will reduce the potential transmission of these organisms directly to others or to surfaces where they can be picked up by others. Washing one's hands will also decrease the transmissions of infectious agents to oneself. It may save lives. I urge you to follow these crucial steps diligently and precisely to protect yourself and your community.

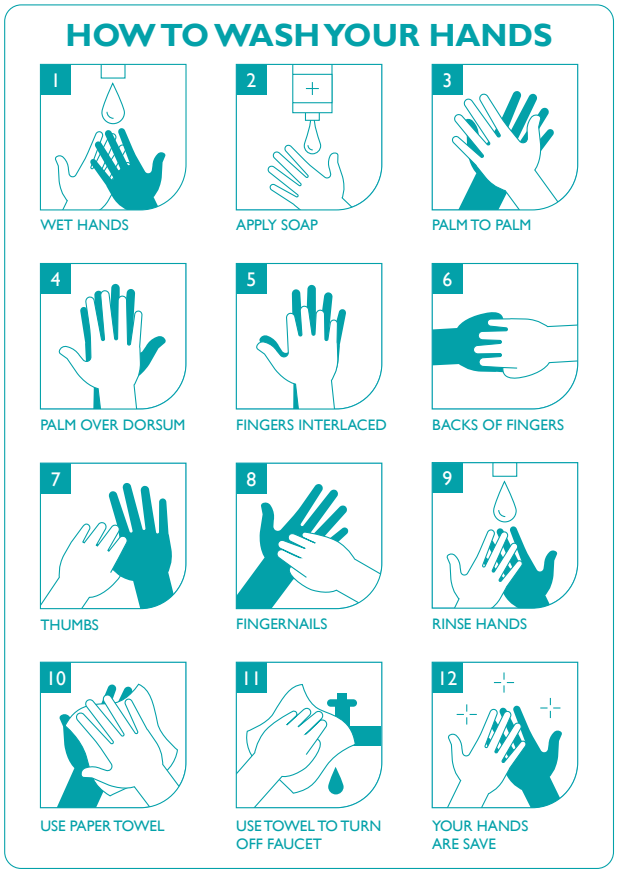

Illustration Source: World Health Organizationhttps://www.who.int/docs/default-source/patient-safety/how-to-handwash-poster.pdf?sfvrsn=7004a09d_2

HAND HYGIENE

1. Handwashing Steps

Do I really need to wash my hands for 20 seconds?
It takes 20 seconds to successfully remove harmful germs and chemicals from your hands. Make sure to scrub all areas of your hands, including your palms, backs of your hands, between your fingers, and under your fingernails.

How does handwashing with soap and water remove germs and chemicals?
Soap and water, worked into a lather, trap and remove germs and chemicals from hands. Wetting your hands with clean water before applying soap helps you get a better lather than applying soap to dry hands. A good lather forms pockets called micelles that trap and remove germs, harmful chemicals, and dirt from your hands. When you rinse your hands, you wash the germs and chemicals down the drain.

Should I use a paper towel to turn off the faucet after washing my hands?
CDC recommends turning off the faucet after wetting your hands to reduce water use. Then, turn it on again after you have washed them for 20 seconds, to rinse off the soap. If you are concerned about getting germs on your hands after you wash them, you can use a paper towel, your elbow, or another hands-free way to turn off the faucet.

2. Plain or antibacterial Soap

Plain or antibacterial soap?
Use plain soap (either liquid or bar) and water to wash your hands. Studies have not found any added

health benefit from using antibacterial soap

3. Water and Handwashing

What if I have water but no soap to wash my hands?

If you don't have soap and water, use a hand sanitizer with at least 60% alcohol. If you don't have hand sanitizer or soap, but do have water, rub your hands together under the water and dry them with a clean towel or air dry. Rubbing your hands under water will rinse some germs from your hands, even though it's not as effective as washing with soap.

Is it better to use warm water or cold water?

Use your preferred water temperature – cold or warm – to wash your hands. Warm and cold water remove the same number of germs from your hands. The water helps create soap lather that removes germs from your skin when you wash your hands. Water itself does not usually kill germs; to kill germs, water would need to be hot enough to scald your hands.

What if the water is dirty or contaminated?

Your hands can get germs on them if you place them in dirty water. That's why CDC recommends using clean, running water to wash your hands. If you don't have access to clean, running water, use hand sanitizer containing at least 60% alcohol to get rid of germs.

If you don't have clean, running water or hand sanitizer, you can still remove germs from your hands by washing with clear water. You can also make water safe to use by boiling, adding the proper amount of disinfectant such as a mild bleach solution, or filtering it. Use the cleanest water possible to wash your hands. Avoid using cloudy water or water that may be contaminated with harmful chemicals or toxins, such as toxins made by harmful algal blooms.

4. Drying Hands

Should I dry my hands using a paper towel or an air dryer?

There is currently not enough scientific evidence to determine if using a clean towel or an air hand dryer to dry your hands is more effective at reducing germs on your hands. Both are effective ways to dry your hands. Germs spread more easily when hands are wet, so make sure to dry your hands completely, whatever method you use.

Should I reuse a towel to dry my hands at home?

CDC recommends using a clean towel if you are using a towel to dry your hands. Reusable towels are a practical option at home. They should be changed when visibly dirty and before they develop mildew from remaining damp.

5. Germs and Bathrooms

Will touching bathroom door handles make my hands dirty again after I wash them?

Scientists don't know if you would get a significant number of germs on your hands from touching a bathroom door handle. That's because it has not been specifically studied. If you're concerned about getting germs on your hands after you wash them, you can use a paper towel, your elbow, shirt, or another hands-free way to open the door.

Should I wash my hands after using the bathroom at home?

CDC recommends always washing your hands after you use the toilet, whether it is in your home or somewhere else. Germs in faeces (poop) can make you sick. These germs can get on your hands after you use the toilet or change a diaper. If you don't wash them off, you can pass them from person to person and make people sick. Make a habit of washing your hands after you use the toilet every time to reduce your chance of getting sick and spreading germs.

6. Key Times to Wash

What are the key times to wash hands?
CDC recommends washing hands:

- Before, during, and after preparing food
- Before eating
- Before and after caring for someone at home who is sick with vomiting or diarrhea
- Before and after treating a cut or wound
- After using the toilet

- After changing diapers or cleaning up a child who has used the toilet
- After touching an animal, animal feed, or animal waste
- After handling pet food or pet treats
- After touching garbage

  If your hands are visibly dirty or greasy
- After blowing your nose, coughing, or sneezing, you should immediately clean your hands by either washing them with soap and water or using hand sanitizer with at least 60% alcohol.

7. Hand Sanitizer and Wipes

Which is better, hand sanitizer or handwashing?

Washing hands with soap and water is the best way to remove all types of germs and chemicals. If soap and water are not avvailable, use an alcohol-based hand sanitizer with at least 60% alcohol.

How do hand sanitizers work differently than handwashing?

Alcohol based sanitizers work by killing germs on your hands, while washing your hands with soap and water removes germs from your hands. **Handwashing will remove all types of germs from your hands, but hand sanitizers are not able to kill all types of germs or remove harmful chemicals like pesticides and heavy metals.**

Do wipes remove germs?

Hand sanitizing wipes with at least 60% alcohol kill germs on your hands. **Baby wipes** are not designed to remove germs from your hands, and CDC does not recommend using them to clean your hands. They may make your hands look clean, but baby wipes and similar products that do not have at least 60% alcohol do not reliably remove germs from your hands.

Disinfecting wipes are designed to kill germs on surfaces. Do not use disinfecting wipes to clean your skin because they may cause irritation. Always read and follow the directions on the label to use these products safely.

What if I have a hand sanitizer that has no alcohol?

Hand sanitizers without at least 60% alcohol don't consistently kill germs.

Should I make my own hand sanitizer?

CDC does not regulate hand sanitizer production. However, CDC does not recommend producing, using, or selling homemade hand sanitizer products because of concerns over the correct use of the ingredients, and the need to work under sterile conditions to make the product. Handwashing with soap and water is the best way to get rid of germs in most situations. If hand sanitizer is made incorrectly, it can be ineffective or even harmful. Do not rely on "do-it-yourself" (or "DIY") hand sanitizer recipes based solely on essential oils or formulated without correct compounding practices.

8. Hand Hygiene and Healthcare Settings

What method of hand hygiene is recommended for healthcare workers?

CDC recommends the use of alcohol-based hand sanitizers as the primary method for hand hygiene in most healthcare situations. Alcohol-based hand sanitizers effectively reduce the number of germs that may be on the hands of healthcare workers after interacting with patients. Using hand sanitizers is also a quick and easy way for healthcare workers to clean their hands, so it improves hand hygiene compliance in healthcare settings. Healthcare workers should wash their hands for at least 20 seconds with soap and water when hands are visibly dirty, before eating, after using the restroom, and after caring for people with infectious diarrhea.

9. Encouraging Handwashing in Community Settings

What supplies do I need for handwashing?

Ensure you have easily accessible sinks; clean, running water; soap; and a way to dry hands, such as paper towels or a hand dryer.

How can I encourage handwashing among my employees?

Remind employees to wash their hands often with soap and water and provide accessible sinks, soap, water, and a way to dry their hands (e.g., paper towels, hand dryer). Put visual reminders, like signs or posters, in bathrooms or kitchen areas to remind employees to wash their hands. Provide other hygiene supplies such as tissues, no-touch/foot pedal trash cans, and hand sanitizer with at least 60% alcohol to keep your employees healthy.

Source: **Center for Disease Control and Prevention (CDC)**

https://www.cdc.gov/handwashing/when-how-handwashing.html

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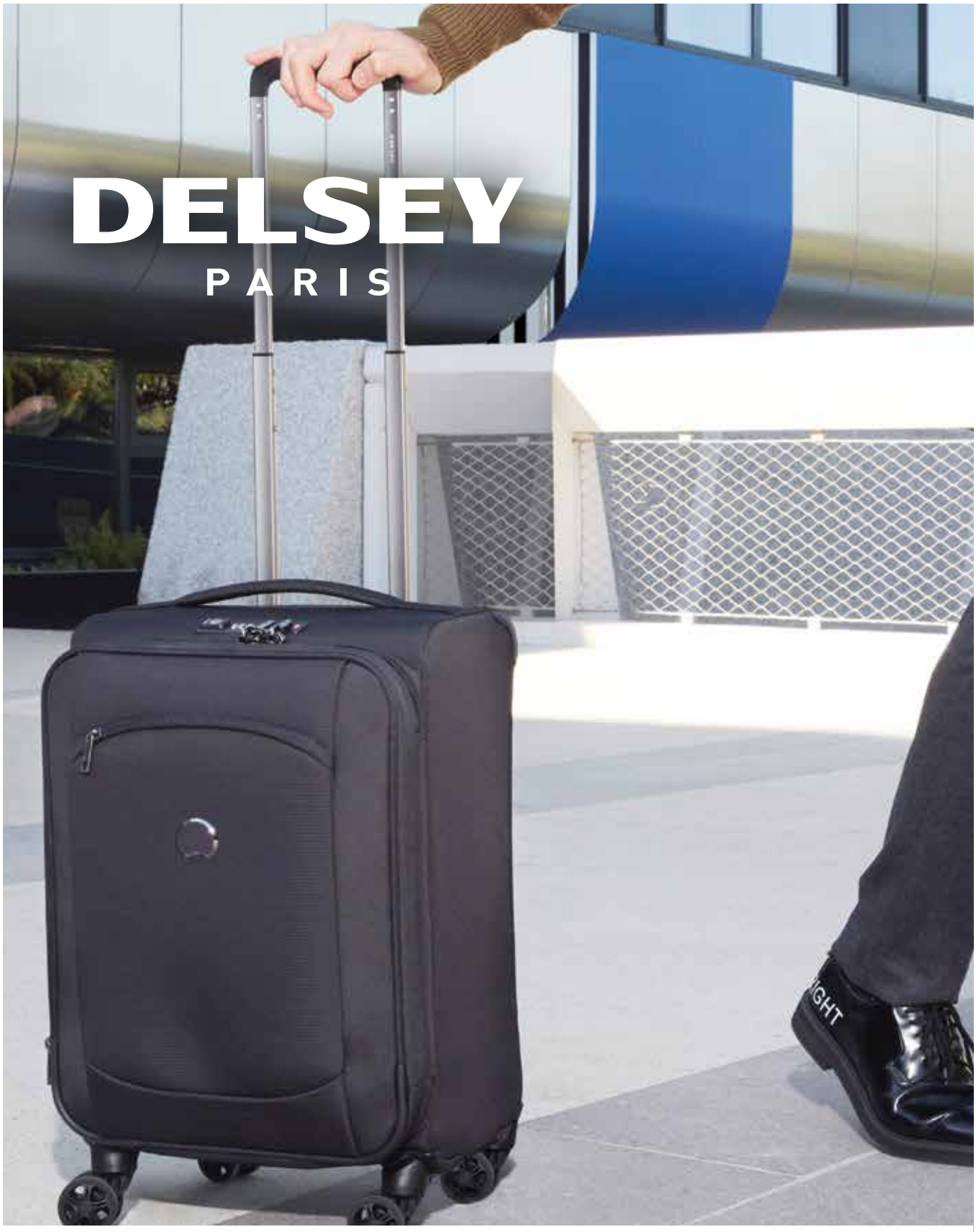

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Overview of COVID-19 Vaccines

Vaccine Platforms

Vaccines

- **What we know**
- **What we are still learning**
- **What you need to know**

COVID-19 Vaccines - Questions and Answers

Guidance how to protect yourselves and others

- **Guidance for Vaccinated People**
- **Guidance for Non-vaccinated People**

In the end of 2019 a Novel Coronavirus, (SARS – CoV-2) was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in Hubei province of China. In February 2020, the World Health Organization named the disease COVID-19 which stands for Coronavirus disease 2019. It rapidly spread resulting in pandemic. Vaccines to prevent SARS–CoV-2 infection are considered the most promising approach for cutting the pandemic.

OVERVIEW OF VACCINE DEVELOPMENT

As with the development of pharmaceuticals, vaccine development progress through preclinical evaluation and three distinct clinical stages, phase I, II and III. Traditionally these steps occur sequentially, and each usually takes several years for completion. For SARS-CoV-2, these stages have accelerated in an unprecedented pace, with each step occurring over several months. Nevertheless, safety criteria remain stringent. In the United States, the Food and Drug Administration (FDA), European Medicinces Agency (EMA) and Central Drugs and Standard Committee (CDSCO) in India must approve progression to each step-in human trial, from initiation of phase I trials through progression to phase III based on data generated in the prior step.

Currently there are 122 candidate vaccines. Today there are 34 candidate vaccines in stage III clinical trials. So far 19 candidate vaccines have been authorized across several countries.

CLINICAL TRIALS

Preclinical Studies

Initially, early vaccine candidates are administered to small animals, often mice and the resulting immune responses are measured. The vaccine must generate an immune response to undergo further testing. Toxicity studies are also conducted in animals to detect any safety concerns.

With SARS-CoV-2, non- human primate models of infection have been employed. In these preclinical studies, primates are vaccinated and challenged with wild type SARS-CoV-2 to observe if vaccine might enhance subsequent disease.

Phase I Clinical Trials

Vaccines that stimulates an immune response without toxicity concerns in animal studies progress to phase I human trials. These trials enroll healthy subjects, usually fewer than 100 individuals, generally between the ages of 18 to 55 years. The primary object is to test the safety of the experimental vaccines, although immunogenicity is also measured. Phase I studies also often involve dose ranging studies so that the first controlled subjects are administered the lowest doses of vaccine and if tolerated the doses are increased in subsequent subjects.

Subjects enrolled in Phase I trials undergo rigorous safety assessments. These assessments include daily monitoring of local and systemic adverse events with measurement of temperature as well as swelling and size of redness at the injection site. There are also detailed assessments of systematic reactions that result in limitation of normal activities. Most of this phase I studies have data safety and monitoring committees (DSMC) composed of independent vaccine experts and study sponsors to assess adverse events that follow vaccination and approve dose adjustments. All phase I studies have halting rules, so that if severe reactions are seen, the study is stopped.

Phase II Clinical Trials

These trials are planned to expand the safety profile and immune response in large number of subjects, generally several hundred. As with phase I trials, there is meticulous attention to safety assessments and input by an independent DSMC to access the reaction profile. In the COVID-19 vaccine initiative phase I and II, and phase II and III studies have been frequently combined with a seamless transition from one phase into the next.

Phase III Clinical Trials

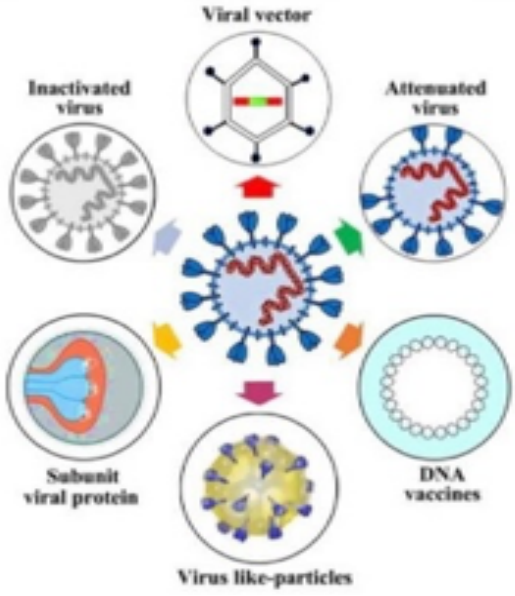
These trials are designed to determine whether the vaccine prevents a predefined endpoint related to infection, usually laboratory confirmed disease. Subjects enrolled in phase III studies are randomly assigned and blinded to receipt of either vaccine or a

control preparation typically a placebo. When study participants develop symptoms or signs of disease, they are tested for the pathogen. Vaccine efficacy in percent is the reduction in specific disease incident among those who received vaccine versus those who received the placebo.

National regulatory authorities have granted emergency use authorizations for nineteen COVID-19 vaccines. Six of these have been approved for emergency or full use by at least one WHO recognized stringent regulatory authority: (Oxford-AstraZeneca,/ Covishield, Pfizer- BioNTech, Sinopharm – BBIBP, Moderna, Sinovac, Johnson and Johnson. Covaxin is in the process of getting WHO approval.

VACCINE PLATFORMS

SARS-CoV-2: Vaccines are being developed using several different platforms. Some of these are traditional approaches such as inactivated virus or live attenuated virus which have been used for inactivated influenza vaccine and measles vaccine respectively. Other approaches employ newer platforms, such as recombinant proteins and vectors. Some platforms such as RNA and DNA vaccines have never been employed before in a licensed vaccine.



Inactivated Vaccines

Inactivated vaccines are produced by growing SARS-CoV-2 in cell culture then chemically inactivating the virus. The inactivated virus is often combined with alum or another adjuvant in the vaccine to stimulate an immune response. Inactivated vaccines are typically administrated intramuscularly. Immune responses in a SARS-CoV-2 inactivated vaccine would target not only the spike protein but also the other components of virus. Sinopharm, Sinovac and Covaxin are all example of this vaccine

Live Attenuated Vaccines

Live attenuated vaccines are produced by developing genetically weakened version of the wild type virus. This weakened viruses replicate in the recipient to generate an immune response but do not cause disease. MMR vaccine (measles, mumps and rubella), chickenpox and shingles vaccines are example of this type of virus.

A live attenuated SARS-CoV-2 vaccine would hopefully stimulate both humoral and cellular immunity to multiple components of the whole attenuated virus. Another advantage of live vaccine is that they can be administrated intranasally (as with live attenuated influenza vaccine) which might induce mucosal immune response at the site of viral entry in the upper respiratory tract. However, safety concerns with live attenuated vaccine include reversion to or recombination with the wild type virus. However, vaccine like this may not be suitable for people with compromised immune system. But once produced and approved, intra nasal vaccines will be the game changer because of easy administration, single dose, needle free, not requiring elaborate storage and administration set ups. It will be especially helpful when large number of populations needs to be immunized in short time. Bharat BioTech (India) and Codagenix (N.Y) have their nasal vaccines in clinical trials.

Viral Vector Vaccines

Viral vector vaccines use a modified version of a different virus (The vector) to deliver important instructions to our cells. First the vector not the virus that causes COVID-19 but a different harmless virus (e.g adeno virus) will enter a cell in our body and then use the cell machinary to produce a harmless piece that causes COVID-19. This piece is known as spike protein and is only found on the surface of the virus that causes COVID-19. Next the cell displays the spike protein on its surface and our immune system recognizes that it does not belong there. This triggers our immune system to begin producing antibodies and activating other immune cells to fight off what it thinks is an infection. At the end of the process, our bodies have learned how to protect us against future infection with the virus causing COVID-19. The benefit is that we get this protection from a vaccine without ever having to risk the serious consequences of getting sick with COVID-19. The Oxford- Astra Zeneca/Covshield, Sputnik V, and Johnson and Johnson are all vector vaccines. In all these vaccines, the vector used is an adeno virus.

RNA Vaccines

RNA Vaccines were the first vaccines for SARS-CoV-2 to be produced and represent an entirely new vaccine approach. Once administered, the instructions (mRNA) are inside the immune cells. The cells use them to make the protein piece (Spike protein). After the protein is made, the cells break down the instructions and gets rid of mRNA. Next the cell displays the protein piece on the surface. Our immune systems recognize that the protein does not belong there and begin building an immune response and making antibodies like what happens in natural infection against COVID-19. This immune response which produces antibodies is what protects us from getting infected if the real virus enters our bodies, example of these vaccine are Pfizer - BioNTech and Moderna.

RNA Vaccines

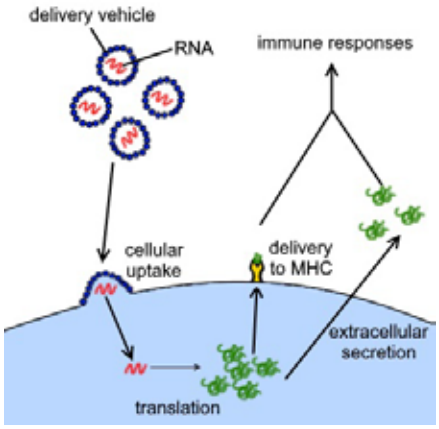


Diagram of the operation of an RNA vaccine. Messenger RNA contained in the vaccine enters cells and is translated into foreign proteins, which trigger an immune response.

DNA Vaccines

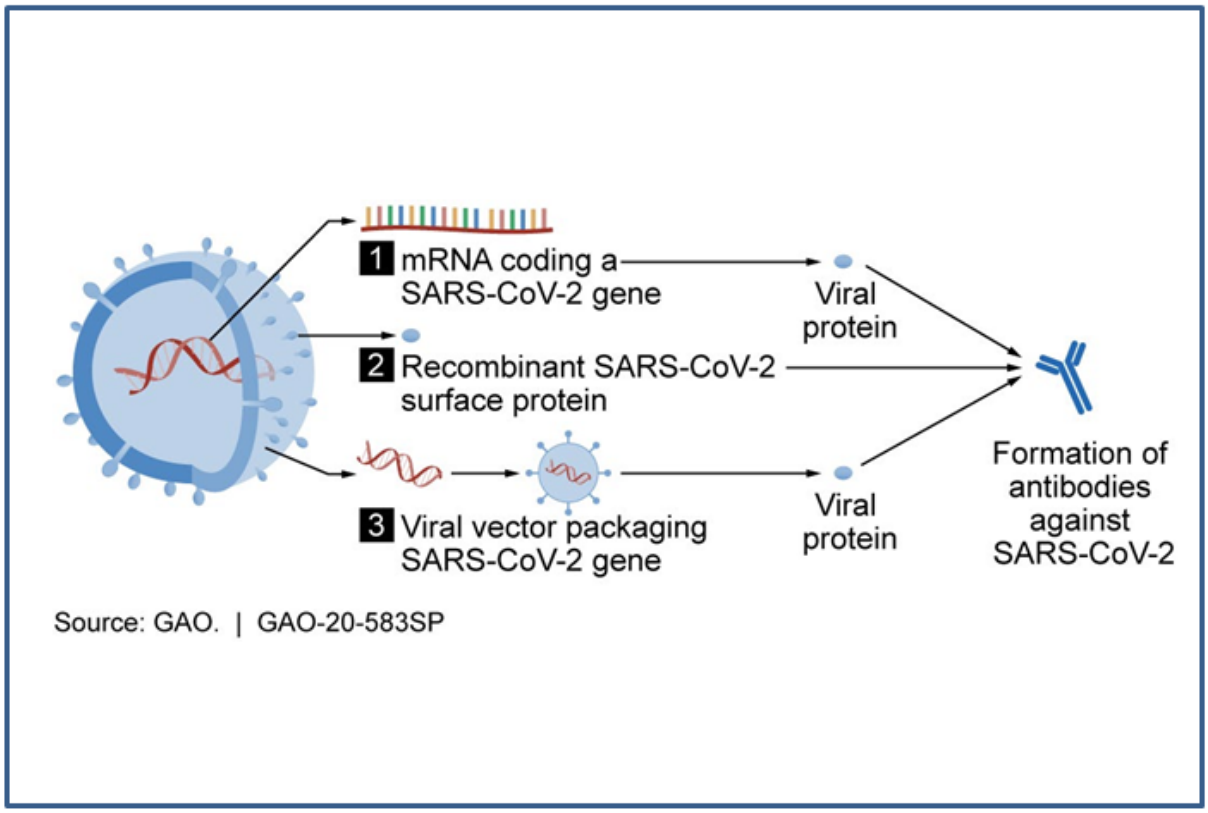
DNA vaccines are made up of small strands of DNA. The gene encoding the antigen of interest in this case is the Spike Protein or S-Protein of the COVID-19 coronavirus. The gene is attached to a plasmid for delivery into the body. The plasmid is used so that the body does not degrade the foreign gene before it can provide an immune response. Once administrated the DNA is taken by host cells which produce the S Protein and then reflect the S Protein antigen on its cell surface, thus stimulating an antibody and T cell response (immune response).

Inovio Pharma U.S.A is developing the DNA vaccine INO-4800. Zydus Cadila-India is soon going to seek emergency use approval for its COVID vaccine ZyCov-D. This will be the first DNA COVID vaccine in the world once approved.

Subunit Vaccines

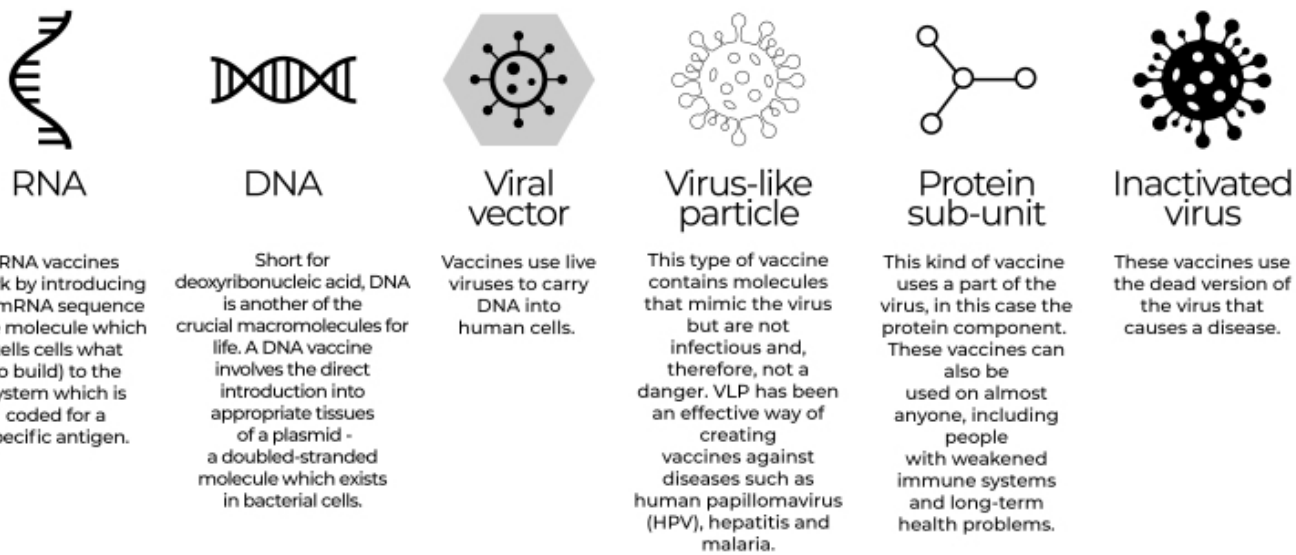
Subunit Vaccines take very specific part of the virus (instead of the whole virus) that best stimulates an immune response in defense, in this case it is the S. Proteins.

Two of the COVID-19 vaccine candidates of Sub unit vaccines are NVX– CoV 2373 developed by Novovax and SCB - 2019 developed by Clover Biopharmaceuticals. Both vaccines contain the spike Protein of the SARS-CoV2 virus combined with an adjuvant a chemical that enhances the immune response to the vaccine.



Conceptual diagram showing three vaccine types for forming SARS-CoV-2 proteins to prompt an immune response: (1) RNA vaccine, (2) subunit vaccine, (3) viral vector vaccine

VACCINE PLATFORMS



ABOUT VACCINES

WHAT WE KNOW

- COVID-19 vaccines are effective at preventing COVID-19, especially severe illness and death.
- Other preventive steps to stop the spread of COVID-19 and these steps are still important even as vaccines are being distributed.

What are we still learning

- We are still learning how well vaccine prevents you from spreading the virus that causes COVID-19 to others, even if you do not have symptoms
- We are still learning how long COVID-19 vaccine protects people.
- We are still learning how many people have to be vaccinated against COVID-19 before the population can be considered protected (Population or herd immunity).
- We are still learning how effective the vaccines are against new variants of the virus that causes COVID-19.
- We are still learning, how well the vaccine protects those with weakened immune systems, including people who take immunosuppressive drugs

What You Need to Know

- All approved vaccines – Pfizer, Moderna, Covishield, Covaxin, Oxford-AstraZeneca, Sputnik V and J&J have 100% efficacy in preventing death due to COVID-19.
- Have moderate to high efficacy 60% - 95% against symptomatic COVID-19 but poor efficacy only against asymptomatic COVID-19. So stop running after efficacy data while choosing a vaccine.
- You may have side effects after vaccination. These are normal and should go away in a few days.
- It typically takes two weeks after vaccination for the body to build protection (Immunity) against the virus that causes COVID-19. You are not fully vaccinated until 2 weeks after the second dose of a two-dose vaccine or two weeks after a one dose vaccine. That means it is possible for a person to get COVID-19 before or just after vaccination and to get sick because the vaccine did not have enough time to provide protection.
- COVID-19 vaccination is important to help stop the pandemic.
- People who have been fully vaccinated can start to do some things that they had stopped doing because of the pandemic.

COVID-19 VACCINES - QUESTIONS & ANSWERS

What is COVID-19 Vaccine?

A COVID-19 vaccine is a vaccine intended to provide acquired immunity against severe acute respiratory syndrome coronavirus 2 (SAR-CoV-2), the virus that causes corona virus diseases (COVID-19). They are widely celebrated for their role in reducing the spread, severity and death caused by COVID-19.

What are the benefits of getting vaccinated?

All COVID-19 vaccines currently available have shown to be safe and effective at preventing COVID-19. Experts believe that getting a COVID-19 vaccine also helps you from getting seriously ill even if you do get COVID-19. Getting vaccinated yourself may also protect people around you particularly people at increased risk for severe illness from COVID-19. Because all vaccines prevent severe COVID and death, vaccination of large cohort of population is important if we want to save the humanity from the ill effects of current pandemic.

Will the vaccine be safe as it is being tested and introduced in a short span of time?

Various phases of trials are undertaken to ensure safety measures for the vaccine. Vaccine will be introduced only after regulatory bodies clear it for its safety and efficiency.

Will a COVID-19 mRNA vaccine or any other vaccine alter my DNA?

NO. COVID–19 mRNA vaccine do not change your DNA in any way. The term mRNA means messenger RNA. These vaccines teach your cells how to make a specific protein that triggers the immune system to fight back against the COVID-19 virus and protect against future COVID-19 infection. The mRNA never enters the nucleus of the virus where your DNA is located. The other COVID-19 vaccines Oxford-AstraZeneca, Covishield, Covaxin and SputnikV also do not alter your DNA.

What are the most common side effects after getting a COVID-19 vaccine?

Most of the side effects occur within the first three days of vaccination and usually last a day or two.

After getting vaccinated, you might have some side effects, which are normal signs that your body is building protection. Common side effects are pain, redness and swelling in the arm where you received the shot, as well as tiredness, headache, muscle pain, chills, fever, nausea and in few cases vomiting and diarrhea.

Side effects after your second shot may be more intense than the one you experienced after your first shot. These side effects are normal signs that your body is building protection and will go away within a few days. In order to get the most protection in a two dose vaccine you should take the second shot even if you had side effects after the first dose, unless a vaccination provider or your doctor tells you not to get it.

People should be aware that a risk of rare side effect a condition called thrombosis with thrombocytopenia (TTS) has been reported with some COVID-19 vaccines J&J / Janssen, Oxford - AstraZeneca. TTS is a serious condition that involves blood clots with low platelets count. This problem is rare, and most reports were in women between 18 and 49 years old. For women 50 years and older and men of any age, this problem is even more rare. There are other COVID-19 vaccine options available for which this risk has not been seen: Pfizer-BioNTech and Moderna vaccine.

COVID Arm

Some people have experienced a red, itchy swollen or painful rash at the site of the vaccine. These rashes can start a few days to more than a week after the first shot and sometimes quite large. These rashes are also known as COVID arm. It is harmless but an annoying response If you experience “COVID arm” after getting the first shot you should still get the second shot. You may take the second shot in the opposite arm. If the rash is itchy take an antihistamine, if it is painful take

a pain reliever like paracetamol or a nonsteroidal anti-inflammatory drug.

Lymphadenopathy

If you have received a COVID-19 vaccine, you may develop some lymph node enlargement under the arms two to four days after vaccination on an average. The swelling is almost always on the same side of the vaccination and typically returns to normal about four weeks later, without any therapy.

Myocarditis and Pericarditis

Reported cases of myocarditis and pericarditis in mRNA COVID-19 vaccine (Pfizer-BioNTech and Moderna) recipient have occurred predominantly in males aged 12-29 years, with symptoms typically developing within a few days after receipt of the second dose of vaccine.. Based on the benefit-risk assessment, COVID-19 vaccination continues to be recommended for everyone aged 12 years and older under the FDA's EUAs. (July 2, 2021) Recently (July 9, 2021) WHO experts recommended the same

Useful Hints For Relief 0f Symptoms

To reduce pain and discomfort where you have got the shot:

- Apply a clean, cool wet washcloth over the area.
- Use or exercise your arm.

To reduce the discomfort from fever:

- Drink plenty of fluids
- Dress lightly

To relieve fever, body ache, arthralgia, muscle pain one can take symptomatic treatment e.g. ibuprofen, acetaminophen, aspirin and antihistamines for complaints of itching provided you have no other medical reasons that prevent you from taking these medicines normally. It is not recommended you take these medicines before vaccination for the purpose of trying to prevent side effects.

Is it OK to take an over the counter pain medication before or after getting a COVID-19 vaccine?

It is not recommended that you take a pain medication before getting COVID-19 vaccine to prevent possible discomfort. It is not clear how this medicine will impact the effectiveness of vaccine. However, it is OK to take this medication after getting COVID-19 vaccine if there is no contraindication to take these medicines.

What are the signs of severe allergic reaction to a COVID-19 vaccine?

The signs of severe allergic reaction to a COVID-19 Vaccine occur within four hours of the first vaccine dose. These signs are:

- Continuous shortness of breath or wheezing.
- Swelling of the lips, eyes or tongue.
- Redness, swelling or itchiness in areas of the body other than the limb in which the vaccine was given. Inform your doctor. You might not be able to get a second dose of the same vaccine.

Who should not get the COVID-19 vaccine?

You should not get the vaccine if you have:

- Serious allergies to any of the ingredients of the vaccine. An ingredient in mRNA vaccines that has been associated with a rare but serious allergy anaphylaxis is polyethylene glycol (PEG). PEG can be found in many cosmetics, skincare products, laxatives, some processed food and drinks. Note PEG is not in AstraZeneca vaccine and Johnson and Johnson vaccine.
- An ingredient in the Astra Zeneca and Johnson and Johnson vaccine that has been associated with a rare but serious allergy is polysorbate 80.
  It is also found in medical preparations (e.g. vitamin oils, tablets and anticancer agents) and cosmetics.

- Have had a life threating reaction to a previous dose of COVID-19 vaccine or to any part of the vaccine.
- People with severe anaphylaxis to non COVID-19 vaccine should avoid COVID-19 vaccine.
- Experts urge that the fear of anaphylaxis should not deter people from getting vaccinated. The risk of developing severe outcomes from COVID-19 is much higher than the risk of an allergic reaction to the vaccines which is extremely rare.

Can I get a COVID-19 vaccine if I have a history of allergic reactions?

If you have a history of severe allergic reactions not related to vaccines or injectable medications, you may still get COVID-19 vaccine

What are the long-term side effects of COVID-19 vaccines?

Because the COVID-19 vaccines clinical trials only started in the summer 2020, it is not yet clear if these vaccines will have long term side effects. However, vaccines rarely cause long term side effects.

How many doses of COVID-19 vaccine will I need to get?

- Pfizer- BioNTech vaccine-2 doses given 21 days apart.
- Moderna vaccine-2 doses given 1 month apart.
- Johnson & Johnson vaccine requires only 1 dose.
- Oxford-AstraZeneca/Covishield–2 doses, at interval of 12 to 16 weeks (84 days)
- Covaxine – 2 doses, 2nd dose after 28 days
- Sputnik V – 2 doses, 2nd dose after 28 days

KNOW YOUR VACCINE

Covaxin

- Inactivated Virus
- 2 Shot vaccine
- 2nd Dose after 28 Days
- Efficacy of 70-80%
- Approved by 9 Countries
- Storage 2-8 °C
- Developed by India

Sputnik V

- Viral Vector (Modified Adenovirus)
- 2 Shot vaccine
- 2nd Dose after 28 Days
- Efficacy of 85 - 95%
- Storage regular fridge temperature
- Developed by Russia

Johnson & Johnson

- Viral Vector (Human Adeno)
- 1Shot vaccine
- Efficacy of 70-85%
- Storage 2-8 °C
- Developed by USA

Pfizer-BioNTech

- MRNA Based
- 2 Shot vaccine
- 2nd Dose after 21 Days
- Efficacy of 90-94%
- Approved by Majority Countries
- Storage: -70 °C
- Developed by USA

Oxford-Astra-Zeneca

- Viral Vector
- (Modern Chimpanzee Adeno)
- 2 Shot vaccine
- 2nd Dose after 84 Days
- Efficacy of 70 - 90% (After 1st dose 70% - and after 2 nd Dose 90%)
- Storage regular fridge temperature
- Developed by India and UK

Moderna

- MRNA Based
- 2 Shot vaccine
- 2nd Dose after 28 Days
- Efficacy of 90-94%
- Approved by Majority Countries
- Storage -20 °C up to 6 months
- Developed by USA

Is it important to follow the authorized dosing schedule?

If you receive a vaccine that requires two doses, you should get your second shot as close to the recommended interval as possible. You should not get the second dose earlier than the recommended interval.

Should Children Receive COVID-19 vaccine?

CDC recommends everyone 12 years and older should get COVID-19 vaccine to protect against COVID-19. At present the answer varies from county to county. Pfizer's vaccine has been authorised for children as young as 12 in Europe, United States and Canada.

Can I choose which COVID-19 vaccine to get?

All currently authorized and recommended COVID-19 vaccine are safe and effective and CDC does not recommend one vaccine over another. The most important decision is to get a COVID-19 vaccination as soon as possible. Widespread vaccination is a critical tool to help stop the pandemic.

Do I have to get the same COVID-19 vaccine? Can I Mix and Match the vaccine?

UN health agency recommends that the same product should be used for both doses as the complete data on safety and effectiveness of mixed vaccine is not available yet. However there are promising news. Initial results from a study from the University of Oxford (June 28, 2021) has shown that a mixed schedule of Pfizer shot followed by the Astra Zeneca vaccine and vice verse resulted in high concentration of antibodies against COVID-19 when given 4 weeks apart, a finding that could enable greater flexibility in the use of scarce supplies

Can I take COVID-19 vaccine with other vaccines?

COVID-19 vaccines were previously recommended to be administered alone, with a minimum interval of 14 days before or after administration of any other vaccines. COVID-19 vaccines and other vaccines may now be administered without regard to timing. This includes simultaneous administration of COVID-19 vaccine and other vaccines on the same day, as well as coadministration within 14 days. If multiple vaccines are administered at a single visit, administer each injection in a different injection site. For adolescents and adults, the deltoid muscle can be used for more than one intramuscular injection. Separate injection sites by 1 inch or more, if possible. Administer the COVID-19 vaccines and vaccines that may be more likely to cause a local reaction (e.g., tetanus-toxoid-containing and adjuvanted vaccines) in different limbs, if possible.

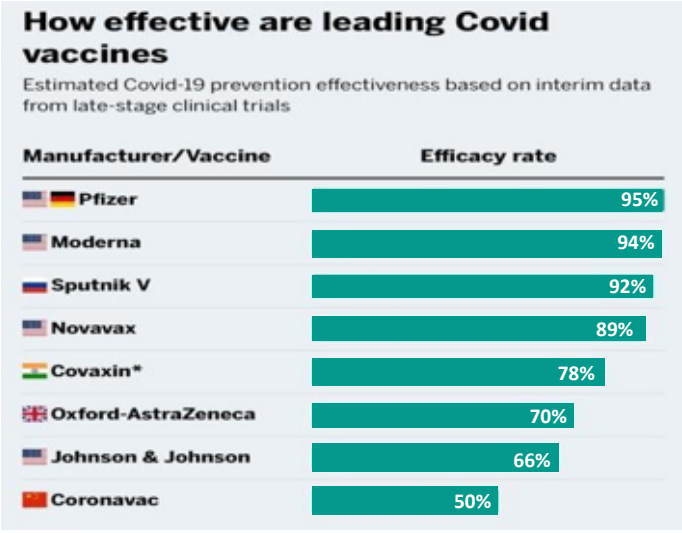
(CDC recommendation 2nd July 20221)

Do I still need to take flu vaccine if I have taken COVID-19 vaccine ?

YES, you still need to take the flu vaccine as the COVID-19 vaccine does not give you protection against flu

How does different vaccines compare in efficacy?

Here is apple to apple comparison



Authorized and approved vaccines have shown the following efficacies:

Vaccine	Efficacy by severity of COVID-19			Trial location
	Mild or moderate-symptoms	Severe symptoms without hospitalization or death	Severe with hospital-ization or death	
Oxford–AstraZeneca	≈81% (60–91%)	≈100% (97.5%; CI, 72–100%)	≈100%	Multinational
	≈76% (68–82%)	≈100%	≈100%	United States
Pfizer–BioNTech	≈95% (90–98%)	Not reported	Not reported	Multinational
Sputnik V	≈92% (86–95%)	≈100% (94–100%)	≈100%	Russia
Sinopharm	≈78% (65–86%)	≈100%	≈100%	Multinational
Moderna	≈94% (89–97%)	≈100%	≈100%	United States
Johnson & Johnson	≈66% (55–75%)	≈85% (54–97%)	≈100%	Multinational
	≈72% (58–82%)	≈86% (−9 to 100%)	≈100%	United States
	≈68% (49–81%)	≈88% (8–100%)	≈100%	Brazil
	≈64% (41–79%)	≈82% (46–95%)	≈100%	South Africa
CoronaVac	≈51% (36–62%)	≈84% (58–94%)	≈100% (56–100%)	Brazil
	≈84% (65–92%)	≈100%	≈100% (20–100%)	Turkey
Covaxin	≈78% (61–88%)	≈100%	≈100%	India
Sputnik Light	≈79%	Not reported	Not reported	Russia
Novavax	≈89% (75–95%)	≈100%	≈100%	United Kingdom
	≈60% (20–80%)	≈100%	≈100%	South Africa
	≈90%	Not reported	Not reported	United States
		Not reported	Not reported	Mexico

- **Mild symptoms:** fever, dry cough, fatigue, myalgia, arthralgia, sore throat, diarrhea, nausea, vomiting, headache, anosmia, ageusia, nasal congestion, rhinorrhea, conjunctivitis, skin rash, chills, dizziness. Moderate symptoms: mild pneumonia.
- **Severe symptoms without hospitalization** or **death** for an individual, are any one of the following severe respiratory symptoms measured at rest on any time during the course of observation (on top of having either pneumonia, deep vein thrombosis, dyspnea, hypoxia, persistent chest pain, anorexia, confusion, fever above 38 °C (100 °F)), that however were not persistent/severe enough to cause hospitalization or death: Any respiratory rate ≥30 breaths/minute, heart rate ≥125 beats/minute, oxygen saturation (SpO2) ≤93% on room air at sea level, or partial pressure of oxygen/fraction of inspired oxygen (PaO2/FiO2) <300 mmHg.
- **Severe symptoms causing hospitalization** or **death**, are those requiring treatment at hospitals or results in deaths: dyspnea, hypoxia, persistent chest pain, anorexia, confusion, fever above 38 °C (100 °F), respiratory failure, kidney failure, multiorgan dysfunction, sepsis, shock.

PLEASE DO NOT GO ON EFFICACY DATA AS ALL VACCINES ARE EFFECTIVE

Should you stop taking routine medications before your vaccination?

- Medications for blood pressure, diabetes, asthma and other common health conditions can be continued being taken.
- People taking aspirin and clopidogrel need not stop these drugs before vaccination.
- People on warfarin can take the vaccine provided they are up to date with their scheduled INR testing and the latest INR is below the upper level of therapeutic range. A fine needle (equal to 23 gauge or a fine caliber such as 25 gauge) should be used for vaccination, followed by firm pressure applied to the injection site without rubbing for at least two minutes. The patient should be informed of the risk of haematoma from the injection at the injection site.
- People with bleeding disorders can take the vaccine. If they are receiving regular treatment to reduce bleeding (e.g., person with Hemophilia) vaccine administration can be scheduled to be taken after the treatment is given.

Should old people take vaccine?

Older people should be encouraged to take vaccine as the risk of mortality is high among them.

People with dementia, paralysis and other neurological disorders should take vaccine, as their COVID appropriate behavior is likely to be compromised.

Can people with underlying medical conditions take vaccine?

People with certain underlying medical conditions are more at risk for severe illness from the virus that causes COVID-19. Hence, COVID-19 vaccines are recommended for and can be administered to most people with underlying conditions - diabetes, hypertension and bronchial asthma.

In addition:

People with stable chronic kidney diseases, cardiac failure can take vaccine but their immune response may be poor.

- People who have autoimmune conditions like SLE, Sjogren's syndrome may receive a COVID-19 vaccine. However, they should be aware that no data are currently available on the safety of COVID-19 vaccines for such people.
- People who have previously had Bell's Palsy may receive a COVID-19 vaccine. Cases of Bell's Palsy were reported following vaccination in the participants in the COVID-19 vaccine clinical trials. However, FDA has not concluded these cases were caused by vaccination.
- People with HIV and those with weakened immune systems due to other illnesses or medication may receive a COVID-19 vaccine. However, they should be made aware of the limited safety data and their potential for reduced immune response, and the need to continue the current guidance to protect themselves against COVID-19.

Can I get COVID-19 vaccine if I have CANCER?

- Most adults with cancer or history of cancer, vaccination against COVID-19 is recommended. In fact, they are in priority group as cancer is a high-risk condition for COVID-19.
- The mRNA vaccine, AstraZeneca, Covisheild, Sputnik V do not contain live or weakened version of virus. Hence, there is no risk of contracting the virus from the vaccine.
- If you have cancer or are receiving cancer treatment, it is important to speak with your health care provider before you get your first dose of vaccine. Your type of cancer and the type of treatment will be a factor to consider. If a vaccine is available to you, it may be appropriate to delay the start of some non-urgent cancer treatment until vaccination is completed. Most cancer treatments cannot be delayed for vaccination.
- For patient receiving chemotherapy or other immune-suppressive treatment, in general

receiving these vaccines during chemotherapy is recommended. But because the vaccine can cause fever within the first 24 to 28 hrs. it is preferable to receive the vaccine at a time when your blood counts are not expected to be low. This is because if a fever occurs and your blood count is low it may require hospitalization. In some circumstances it may be appropriate to delay vaccination until after completion of very intensive chemotherapy treatment such as those given as induction therapy for acute leukemia.

- For patient receiving immune therapy:

  For most patient, it is fine to proceed with vaccination and immune therapy need not be interrupted. Drugs like rituximab, blinatumomab, thymocyte globulin, alemtuzumab etc. can affect the lymphocytes, which are an important part of the immune response to COVID-19 vaccine. Vaccine may be more effective if delayed for at least 3 months after completing these therapies.

- For patients receiving hormonal treatments: Endocrine or hormonal treatment for cancer including tamoxifen, are not expected to alter the safety and effectiveness of vaccine.

- For patients receiving IVIG: It is fine to proceed for vaccination and IVIG therapy need not be interrupted.

- For patient receiving radiation therapy: For most patient it is recommended to proceed with vaccination and radiation treatment need not be interrupted.

- Those being treated for blood cancer and who have been given Bone marrow transplant should wait at least 3 months.

- Those being given monoclonal antibodies can be given vaccine safely as the present vaccine are not a live vaccine.

- Those without bone marrow transplant/cell therapy should wait for the vaccine till absolute neutrophils count returns to normal.

Is the vaccine safe in transplant patients?

YES. They should receive the vaccine. Transplant patients may be more likely to have severe disease and require hospitalization and care in I.C.U. with COVID-19. In fact, they have been prioritized for the receipt of the vaccine. The vaccine is safe. None of the vaccines approved by the FDA, Covishield and Covaxin of India contain live Coronavirus to pass to you.

Importantly there have been no reported cases of organ rejections or severe allergic reactions after vaccination.

Should patient waiting for transplant be vaccinated?

YES, you should get COVID-19 vaccine before your transplant if possible; ideally, this would be done at least two weeks before transplant to give your immune system to respond effectively. However, we will not delay your transplant because of a more recent vaccine.

When should a new transplant recipient take the COVID-19 vaccine?

New transplant recipients should delay receiving a COVID-19 vaccine.

- Kidney transplant patients should wait three months after transplant.

- All other organ recipients should wait one month after their transplant surgery.

- It has been recommended that anyone who has an autologous transplant (Auto) receives the vaccine at least 2 months after the transplant. Anyone who has an allogenic transplant (Allo) is recommended to receive vaccine 3-6 months after transplant. The delay in vaccination is necessary to give your immune system enough time after transplant to recover to a level where the vaccine is more likely to be effective.

Can people on Immunosuppressive agents take the vaccine?

YES. The immunocompromised people are at more risk for severe COVID-19 and hence are prioritized for COVID-19 vaccine. They can take the vaccine but people on immunosuppressive agents like methotrexate should stop drug 2 weeks before and 2 weeks after the vaccine.

Patients with cancer and those on immunosuppressive agents and transplant recipients should be counselled that at present we are not sure of the immune response. It may be less than the non-immunocompromised people, hence they need to continue with the three pillars of preventions. Wearing a mask, hand hygiene and social distancing.

To be clear any degree of protection from the deadly disease is better than no protection. Benefits of vaccination outweighs the risk which are often mild side effects.

Revaccination is not recommended in the person who received the vaccine during chemotherapy or treatment with immunosuppressive drugs.

Can I take the vaccine if I am planned for a plastic surgery?

- An Elective Cosmetic Surgery procedure is not a contraindication to routine COVID-19 vaccination.
- It is recommended that the date of Surgery is separated from the date of vaccination by at least one week
- This separation is helpful to attribute symptoms such as fever or systemic symptoms to either the surgical procedure or vaccination.
- If an individual is acutely unwell following elective Plastic Surgery, the COVID-19 vaccination should be delayed till the patient recovers fully.
- If an individual is acutely unwell following the COVID-19 vaccination, elective Plastic Surgery should be delayed till the patient recovers fully.

Can I take the vaccine if I am taking steroids?

- People taking corticosteroids e.g., Prednisolone at doses of 10 mg or higher have an increased risk of being hospitalized with any infection including COVID-19 infection, and thus are in need vaccine.
- If you are on chronic steroids, continue to take them as needed. But if you have a choice of starting a steroid right before your COVID-19 vaccination you can wait.
- People who are on corticosteroids should decrease dose to less than 7.5 mg/day, if possible, for 6 weeks when taking the vaccine because higher doses act as immunosuppressive and decrease immunity development but do not stop corticosteroids suddenly. Talk to your doctor about the risk and benefits of taking these medications. If the decision is to stop, work with your doctor to taper safety.
- Inhaled steroid may not be stopped.

If I have allergy to food, drugs, latex, venom can I take COVID vaccine?

YES. You can but you are advised to be monitored for at least 30 minutes after vaccination.

If I am pregnant, can I get a COVID-19 vaccine?

YES, If you are pregnant, you can receive a COVID -19 vaccine. Pregnant people are more likely to get severe illness with COVID-19 compared with non-pregnant people. Getting a COVID-19 vaccine during pregnancy can protect you from severe illness of COVID-19.

Dose COVID-19 vaccine cause fertility problem?

There is currently no evidence that COVID -19 vaccines cause female or male fertility problems - problems getting pregnant. CDC does not recommend routine pregnancy testing before COVID -19 vaccine

If I am lactating, can I take the COVID-19 vaccine?

YES, you can. Recent reports have shown that breast feeding people who have received COVID-19 vaccines have antibodies in their breast milk, which could help protect their babies. More data is needed to determine what protection these antibodies would provide to the baby.

How long does protection from COVID-19 vaccine last?

We do not know how long protection lasts for those who are vaccinated. Experts are working to learn more about natural (disease induced) and vaccine induced immunity.

Do I need a booster shot for my COVID-19 vaccine? When should I get a booster shot?

YES. The Joint Committee for Vaccination and Immunization (JCVI) has recently (June 30, 2021) recommended a third dose, to be given six months after the second dose and the campaign to begin in September 2021. The categories of people to be prioritised for a third dose are classified into Stages 1 and 2.

Stage 1. The following persons should be offered a third dose COVID-19 booster vaccine and the annual influenza vaccine, as soon as possible from September 2021:

- adults aged 16 years and over who are immunosuppressed;
- those living in residential care homes for older adults;
- all adults aged 70 years or over;
- adults aged 16 years and over who are considered clinically extremely vulnerable;
- frontline health and social care workers.

Stage 2. The following persons should be offered a third dose COVID-19 booster vaccine as soon as practicable after Stage 1, with equal emphasis on deployment of the influenza vaccine where eligible:

- all adults aged 50 years and over
- adults aged 16 – 49 years who are in an influenza or COVID-19 at-risk group. (please refer to the Green Book for details of at-risk groups)
- adult household contacts of immunosuppressed individuals

As most younger adults will only receive their second COVID-19 vaccine dose in late summer, the benefits of booster vaccination in this group will be considered at a later time, by the JCVI.

How long does it take to develop immunity after receiving a COVID-19 vaccine?

The COVID-19 vaccine teaches your immune system to recognize and fight the virus to protect you but a vaccine needs time to provide protection after it is given. COVID-19 vaccine that require 2 shots will protect you 2 weeks after your second shot and two weeks after a one dose vaccine.

Do the current vaccines on the market protect against the new COVID-19 variants?

At this time there is no evidence to suggest the variants of the COVID-19 virus are resistant. According to WHO the current vaccines Pfizer, Moderna, Oxford-AstraZeneca, Covaxin offer protection against the four main corona variants known to exist – Alpha-B.1.1.7UK; Beta-B.1.351 SouthAfrica; Gamma-P.1 Brazil/Japan; Delta- B.1.617 India

Can I get vaccinated against COVID-19 while I am currently sick with COVID-19?

NO. People with COVID-19 who have symptoms should wait to be vaccinated until they have recovered from their illness and have met the criteria for discontinuing isolation. The guidance also applies to people who get COVID-19 before getting their second dose of vaccine. People with severe disease who are admitted should wait at least 4-10 weeks after recovery before taking the vaccine.

If I already had COVID-19 and recovered, do I still need to get vaccinated with COVID-19 vaccine?

YES. You should be vaccinated regardless of whether you already had COVID-19. That is because experts do not yet know how long you are protected from getting sick again after recovering from COVID-19. It is possible although rare that you could be infected with the virus that causes COVID-19 again. You can receive your COVID-19 vaccination four to six weeks after recovery. If you were treated with monoclonol antibodies or convalescent plasma, you should wait 90 days before getting a COVID-19 vaccine.

Can the vaccine give me COVID-19?

NO. The vaccine cannot give you the virus. The current vaccines on the market Oxford-Astrazeneca, Covishield, Covaxin, Sputnik V, Pfizer- BioNTech, J&J and Moderna do not contain the entire virus. So, it is impossible for these vaccines to give you COVID-19.

Can I get infected with COVID-19 after I get vaccinated?

YES, but all these COVID-19 vaccines on the market provide exceptional protection against severe illness and hospitalization. You will usually experience mild to moderate symptoms. Although vaccine do not always prevent infection, they prime your immune system to quickly fight the virus and protect you from the worst outcome of disease.

After getting a COVID-19 vaccine will I test positive for COVID-19 on a viral test?

NO. the recently authorized and recommended vaccines cannot cause you to be positive on viral tests which are used to see if you have a current infection. If your body develops an immune response, the goal of vaccination there is a possibility you may test positive on some antibody tests. Presence of antibodies indicate that you have a previous infection/ vaccination and that you may have some level of protection against the virus.

Should I do an antibody test to evaluate my immunity after vaccination?

NO. FDA recommends that results from currently authorised SARS-CoV-2 antibody tests should not be used to evaluate a person's level of immunity or protection from COVID-19 anytime after the person received COVID - 19 Vaccination. A positive anybody test results can be used to identify people who may had prior SARS -CoV-2 infection. Currently authorised SARS-CoV-2 antibody tests have not been evaluated to assess the level of protection provided by an immune response to COVID-19 Vaccination. If antibody test results are interpreted incorrectly there is a potential risk that people may take fewer precautions against SARS-CoV-2 exposure and hence increasing their risk to SARS-CoV-2 infections

Do fully vaccinated people need quarantine if they are exposed to someone infected with COVID-19?

NO. Fully vaccinated people who are within 3 months following receipt of last dose of vaccination do not need quarantine but other recommendations, like wearing masks, maintaining social distancing and avoiding crowds and poor ventilated places stay in place.

Can I still spread COVID-19 after getting vaccinated?

YES, but getting vaccinated likely reduces your ability to spread the virus. As such CDC advises to continue to do social distancing and wear masks even after you are vaccinated to protect others.

Can I roam free once I am vaccinated?

NO, No vaccine protects 100%. There is still a possibility that you can get infection and transmit disease. We will have to continue wearing masks, observing social distancing and practicing hand washing. Once we have achieved herd immunity, we may think of being more liberal.

(SEE GUIDANCE FOR VACCINATED PEOPLE)

GUIDANCE HOW TO PROTECT YOURSELF AND OTHERS

A. GUIDANCE FOR VACCINATED PEOPLE

What you can start to do after you are fully vaccinated?

If you are fully vaccinated

- You can gather indoors with fully vaccinated people without wearing a mask or staying 6 feet apart.



- **Choosing safer activities:**

o You can gather or conduct activities outdoors without wearing a mask except in certain crowded settings and venues. Outdoor visits and activities are safer than indoor activities.

o If you have been around someone who has COVID-19 you do not need to stay away from others or get tested unless you have symptoms. However, if you live in a group setting like a correctional home or detention facility or group home and are around someone who has COVID-19 you should still get tested, even if you do not have any symptoms.

What You Should Keep Doing



- For now, if you have been fully vaccinated:
- You should still protect yourself and others in many situations by wearing a mask. Take these precautions when you are gathering indoor with unvaccinated people including children from more than one household.
- Visiting indoors with an unvaccinated person who is at increased risk of severe illness or death from COVID-19 or who lives with a person at increased risk.
- You should still avoid large indoor gatherings or public settings.
- If you travel, you should still take steps to protect yourself and others.
- You should still watch out for symptoms of COVID-19 especially if you have been around someone who is sick. If you have symptoms of COVID-19, you should get tested and stay home and away from others.
- You will still need to follow guidance at your work place and local business.
- People who have a condition or taking medicine that weaken the immune system, should talk to their healthcare provider to discuss their activities. They may need to keep taking all precautions to prevent COVID-19.

B. GUIDANCE FOR UNVACCINATED PEOPLE

Protect Yourself

- Get a COVID-19 vaccine as soon as you can.
- Wear a mask that covers your nose and mouth to help protect yourself and others.
- Stay 6 feet away from others.
- When inside your home: Avoid close contact with people who are sick. If possible, maintain 6 feet between the person who is sick and other household members.
- When outside your home, put 6 feet of distance between yourself and people who do not live in your household. Remember that some people without symptoms may be able to spread virus.
- Avoid crowds and poorly ventilated spaces
- Being in crowds like in restaurants bars, fitness centers or movie theaters puts you at a higher risk of COVID-19.
- Avoid indoor spaces that do not offer fresh air from the outdoors as much as possible.
- If indoor bring in fresh air by opening windows and doors if possible.
- Wash your hands often.

Cover Caughs and Sneezes

- If you are wearing a mask: you can cough or sneeze into your mask. Put on a new-clean mask as soon as possible and wash your hands.
- If you are not wearing a mask always cover your mouth and nose with a tissue when you cough or sneeze, or use the inside of your elbow and do not spit.
- Throw used tissues in the trash.
- Immediately wash your hands with soap and water for at least 20 seconds. If soap and water are not readily available, clean your hands with a hand sanitizer that contains at least 60% alcohol.

Clean and disinfect

- Clean high touch surfaces daily. This includes tables, doorknobs, light switches, desks, phones, keyboard, toilet faucets and sinks.
- If someone is sick or has tested positive for COVID-19 disinfect frequently touched surfaces. Use a household disinfectant product, according to manufacturers labelled directions.

Monitor your Health daily

- Be alert for symptoms, watch for fever, cough, shortness of breath, or other symptoms of COVID-19.

- Take your temperature if symptoms develop. Do not take your temperature within 30 minutes of exercising or after taking temperature-lowering medications like paracetamol.

- Contact Health care professional is symptoms develop.

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Together we shall breakthrough;
together we shall overcome;
together, mankind will win.
Once again.

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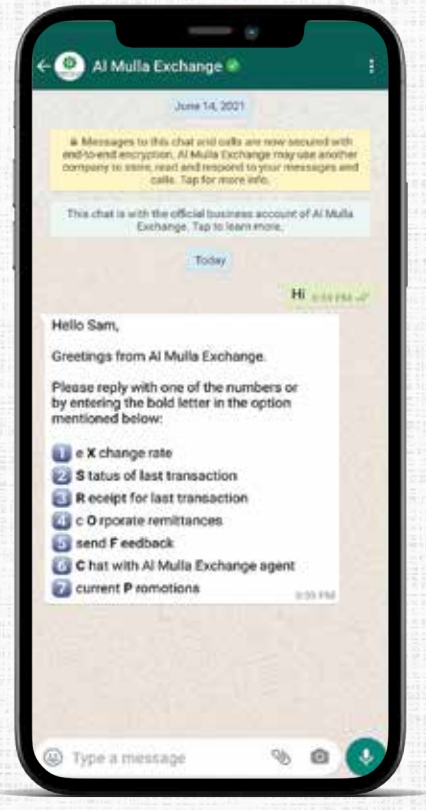

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