Dear Fellow citizens

The country is passing through a difficult phase of corona. Our visionary Prime Minister Shri Narendra Modiji, and the Governor of MP Honble Shri Lalji Tandonji, has made this time safe and secure by providing relief and solutions which are being appreciated globally. This has brought faith and trust in the present governance. The chancellor and Governor of MP is also guiding the universities in giving them a digital governance which is transparent and student centric.

Jiwaji university, Gwalior has taken a humble initiative in coming up with an e-news letter which projects some scientific insight, theurapatic initiatives, and some other factors which go unnoticed by one and all. Inspite of all odds of corona era, Jiwaji University has taken some special initiatives mentioned in this news letter.

Besides this we are transforming into an era of virtual reality- virtual teaching and learning followed by virtual evaluation.

I am taking this opportunity to thank all my colleagues and the editorial board for supporting the cause.

I wish them all the best

Prof. Sangeeta Shukla
Vice Chancellor

About corona virus

The novel corona virus was first detected in a wet sea food market in the city of Wuhan, in Hubei province of China. Since then, the virus has infected over 200 countries and have wreaked havoc on humanity everywhere. The novel corona virus, namely severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) is the pathogen that leads to COVID-19 disease. The WHO has declared corona virus as a global Pandemic.

Symptoms of corona virus

The affected person has pneumonia like symptoms, affecting the respiratory tract and gastrointestinal tract of the patient. The virus has an incubation period of 4-14 days in which the virus replicates inside the host and symptoms of fever, cough, kidney failure etc emerges. Thus, those with weak immune systems and underlying respiratory illnesses are most affected.

Stages of corona virus spread

There are four stages;

Stage I: Cases are imported from affected countries.
Stage II: During this stage, there is a local transmission from infected persons.
Stage III: This stage involves community transmission.
Stage IV: This is the worst stage of the infection where it takes on the form of an epidemic.

What is corona virus / covid 19 ?

A class of RNA based viruses. The name is derived from Latin word 'corona' translating to crown like appearance. Some previous outbreaks such as SARS, MERS etc. were also a part of corona virus family. Currently 7 strains of this virus is identified that has an ability to affect humans. The latest being SARS-CoV-2 or novel corona virus.

Govt. Of India Initiatives

The government was prompt in acknowledging the hazard that the ongoing crisis posed in early days of its spread. Thus, series of steps including notifying COVID-19 as a notified disaster. This allows the states to spend their SDRF (State disaster response fund) to provide food, medicine, vaccines, temporary accommodation, build testing laboratories etc. Also, on 22 March, a Janta curfew was imposed throughout the country to prevent the spread of the virus. This was followed by a 21 day long complete lockdown, and strict social distancing measures were adopted. The second phase of lockdown started from 14th april to 3rd may. The orders of lockdown were issued under the Epidemic Disease act, 1897 and Disaster Management Act, 2005. A series of national, state and private laboratories have been designated for testing of patients. Second lockdown was executed by Govt. Of India from 15 April to 3rd May, 2020.

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Origin

Coronaviruses [CoVs] are large family of viruses that are genetically and phenotypically different. CoVs belong to the family Coronaviridae, the subfamily Orthocoronavirinae, which can cause illness in birds, mammals and humans. The novel coronavirus referred to as COVID-19 or 2019-nCoV is originated in bat and is transmitted to human through yet unknown intermediary animal in Wuhan, Hubei Province, China in December 2019. The virus genome is + sense RNA [+ssRNA] whose size ranges from 26 to 32 Kb including a variable number of open reading frames (ORF) ranging from 6-11. Both structural and non-structural proteins such as membrane (M), envelope (E), nucleocapsid (N) and spike (S) proteins play a major role in virus entry and replication in the host cell. The emergence of COVID-19, a highly pathogenic virus caused global pandemic where the number of deaths exceeded >55,000 whereas more than 10,00,000 are infected globally within a period of about four months. Several clinical, genetic and epidemiological features of COVID-19 resemble SARS-CoV infection. Despite extensive research neither an effective vaccine or antiviral therapeutic agent has been approved for the treatment of COVID-19 or any other CoV infection in humans till date. Few attempts may have promising results in near future:

i. Passive antibody therapy: Antibodies for passive immunotherapy can be isolated from the blood of COVID-19 infected person who has recovered from the disease or it can be manufactured in the laboratory.

ii. Immunotherapy: The use of monoclonal antibodies in prevention of infectious diseases is very common due to several features in its favor like high specificity, purity, low risk of blood borne pathogen contamination and safety. Many abs against viruses have been developed in recent years and successfully used by many pharmaceutical industries for or humans. CoV infection starts with the interaction of receptor domain located on S-protein and target receptor on the host cell surface such as angiotensin converting enzyme 2 (ACE2) for SARS-CoV and dipeptidyl peptidase-4 (DDP4) for MERS-CoV. Treatment of SARS-CoV2 has been attempted by using specific antibodies which can directly interrupt any stages of the viral life cycle or the receptor protein located at the cell surface of the host to restrain the viral binding thereby blocking attachment and entry in the host cell. The main molecules involved in this process are peptide fusion inhibitors, antiSARS-CoV2 neutralizing monoclonal antibodies, antiACE monocolonal antibodies, protease inhibitors and spike protein on viral membrane playing important role in entry of the virus and are the principle antigenic component responsible host immune response. The monoclonal abs against spike protein in SARS-CoV and MERS-CoV have shown promising results that could be potentially effective against SARS-CoV2. or effective therapy and disease prevention, the combination of different monoclonal abs that recognize different epitopes on the viral surface could be tested for neutralization of wide range of mutated viral strains including escape strains and best candidates could be used against passive immunotherapy. The same strategy could be tested against COVID-19 therapeutic design. Further, detailed research and understanding of pathogenesis of COVID-19 might increase the opportunities for the realistic design of specific therapeutic strategies.

iii. Drugs: Treatment is generally supportive and symptomatic as of now, no approved treatment of COVID-19 is available. Antiviral drugs such as ribavirin, lopinavir-ritonavir have been used as these were effective against SARS and MERS. A combination of lopinavir-ritonavir with ribavirin showed better outcomes than when these compounds given alone. Other drugs proposed for therapy are remadavin, arbidol, chloroquin and hydrochloroquin.

Evolutionary origin and past out breaks

All coronaviruses has been estimated to have existed as recently as 8000 BCE. Studies revealed that bats and birds as warm blooded flying vertebrates are the ideal hosts of corona virus gene source. Coronaviruses have been co-evolved with bats for a long time and infected various animal species and finally to human. At the beginning of 21st century Severe acute respiratory syndrome corona virus (SARS-CoV) and middle east respiratory syndrome coronavirus (MERS-CoV) are highly transmissible cruel pathogenic viruses. In 2003, outbreak of SARS-CoV has begun in Asia and then secondary cases in elsewhere in the world. Due to this, more than 8000 people were infected and 10% of whom died. In 2012, MERS-CoV was identified by WHO. The said virus seem to pass infection from person to person. By 30th October 2013, there were 124 cases and 52 deaths in Saudi Arabia. In May 2015, an outbreak of MERS-CoV occurred in republic of Korea and caused one of the largest outbreaks outside the Middle East.

On 22nd March 2020, The prime minister of India Shri Narendra Modi called of JANTA CURFEW. On 25th March onwards he declared 21 days lockdown for human safety as a 1st lockdown. Further, 2nd lockdown was announced during 15 April to 3 May.
The immune system is impaired in critical ill covid-19 patients

The human immune system which is compartmentalized anatomically and functionally in to innate and acquired wings, is suitably equipped to deal with both extracellular and intracellular pathogens. The Natural killer cells of innate immune system and Cytotoxic T cells of acquired immune system supported by cytokines secreted by T helper cells are mainly responsible for elimination of viral pathogens. During a viral infection, the most prominent cytokines produced are IFNs, which interfere with viral replication.

COVID-19 caused by SARS-CoV-2 is an ongoing global health emergency. The critical ill COVID-19 patients (3-4%) are reported with sudden deterioration of disease around one to two weeks after onset. Such patients are characterized by much lower level of lymphocytes (lymphocytopenia), especially natural killer (NK) cells in peripheral blood and extremely high inflammatory markers such as C reactive protein (CRP) and pro-inflammatory cytokines.

The percentage of CD8 + T cell reduction were 28.43% and 61.9% in mild and severe group respectively, and the NK cell reduction were 34.31% and 47.62% respectively, in mild and severe groups. Also, serum IL-6 levels in severe group were significantly higher than that in mild group [Wan et al, 2020]. Thus lymphocytopenia is one of the most prominent markers of COVID-19, and appear to serve as a prognostic marker.

The critically ill patients exhibited atrophy of spleen and lymph nodes. Infiltration of monocytes and macrophages in lung lesions along with endothelial damage, vessel wall thickening, lumen stenosis, occlusion and focal hemorrhage were recorded which in turn is followed by multiple organs damage. Such patients were tested positive with high titer antiphospholipid antibodies, including anticardiolipin antibodies and 2 glycoprotein antibodies.

There are two possible reasons for the destruction of the immune system in patients with COVID-19, lymphocytes directly invaded by virus or indirectly damaged by CS. As we know that 2019-nCoV infects target cells through ACE2 (Angiotensin converting enzyme-2), while there was no ACE2 expression on lymphocytes, the cause of lymphopenia remains to be proved.

There are a variety of anti-inflammatory medications, including non steroidal anti-inflammatory drugs, glucocorticoids, chloroquine/hydroxychloroquine, immunosuppressants, inflammatory cytokines antagonists (such as IL-6R monoclonal antibodies, TNF inhibitors, IL-1 antagonists, janus kinase inhibitor (JAK) inhibitors, et al. The time window of anti-inflammatory treatment is very important as severe patients usually undergo abrupt deterioration in 1-2 weeks after onset, and prompt initiation of the anti-inflammatory therapy at this extremely short time window is likely to achieve a favorable treatment response.

In conclusion, a timely anti-inflammatory treatment initiated at the right window time is of pivotal importance and should be tailored in individual patient to achieve the most favorable effects.

References


Possible therapeutic approaches

Currently no drugs and vaccines are approved to treat COVID-19 disease, but there are several possible approaches that can be worked upon to treat this disease.

1. Plasma Therapy- It can be a possible treatment for COVID-19 patients as it has been recently used in the treatment of other coronavirus diseases like SARS in 2003 and MERS in 2012 where it gave promising results. In this therapy, Plasma of a person who have recovered from COVID-19, and thus has sufficient antibodies to fight against the disease, is drawn and transferred to people who have freshly contracted the disease. Blood is drawn from the recovered person (tested negative for SARS-CoV2) after at least two weeks, then plasma is separated and tested for sufficient antibody and their effectiveness against the virus. If the plasma is rich in antibody then it is administered to COVID-19 patients. Though this therapy provides only passive immunization and is not effective as vaccine which could provide lifelong immunity. Still it is a hope in this situation where no other treatments are available for COVID-19 treatment.

2. Antiviral therapy - Antiviral drugs like RNASe inhibitors and protease inhibitors could be possible therapeutic approach against this novel coronavirus SARS-CoV2. RNASe inhibitors like Remdesivir, were found to be highly effective in inhibiting the viral replication of broad RNA viruses. Protease inhibitors like Lopinavir/ Ritonavir, disulfiram has been reported to be effective against SARS and MERS. Clinical trials with these drugs have shown promising results to use Chloroquine or their derivatives as potential drug for COVID-19 treatment.

3. Chloroquine/ hydroxychloroquine - Chloroquine/ hydroxychloroquine drugs have been successfully used in the treatment for malaria infection and diabetes patients. Though antiviral efficacy of these drugs has not been evaluated, but some of the recent findings suggest that it interferes with the viral attachment to host cell surface molecules. Clinical trials with these drugs have shown promising results to use Chloroquine or their derivatives as potential drug for COVID-19 treatment.

4. Vaccines – Another approach is to develop effective vaccine against this virus but it will take time for the approval and commercialization. Ethical Committee clearance, Clinical trial, standardization, Quality Control is the main reason. Work has been initiated for number of vaccines.

5. Other Treatments: Other treatments that are currently being used for treating COVID-19 infection
   A) To boost up patient’s immunity to fight against this disease
   B) Sign/symptomatic symptoms that patients shows.
   C) Use of citrus fruits like oranges, lemon which is a rich source of Vitamin C has been used as immune-boosters to increase person’s immunity
   D) Ayurvedic and Homeopathic immunity boosters
   E) Having hot water and food and avoiding cool drinks like ice-cream, cold drinks, dahi etc will be helpful in fighting against this disease.
CORONA Task force created Money donated to CM relief fund: Rs. 9.19 lakhs, by donating one day salary of teachers, officers and employees.

Social Outreach Initiatives
- Sanitizers / disinfectants were prepared in the university and distributed to police department, outside community, university staff, media person and hostels.
- Distribution of Mask and Gloves.
- Sanitization of University campus, residence area and all hostels.
- Distribution of 100 packets of food to needy people by teachers, officers of university on every day since 25 March to till date.
- Availability of University ambulance service for 24 hrs for university and community.
- Four Isolation wards are ready for use, in case of emergency
- Campus is sealed for morning walkers.
- Videos' generated for awareness.

Academic Initiatives
- 1286 lectures uploaded and more added on daily basis.
- Students linked through WhatsApp groups for regular study.
- E-news letter on Corona.
- Online classes, prerecorded video/ audio lectures, virtual assignments, seminars and Internals-transforming to a virtual reality for teaching, learning and evaluation.
- 290 audio/ video lectures are available at university website and more added on daily basis.
- Health Centre is open for emergency and distribution of medicine.

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