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# PREVENTIVE AND THERAPEUTIC ASPECTS OF COVID-19

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**ABSTRACT**
Detailed clinical picture and investigation have been described in this paper and the role BCG has been described. Recently many kind of vaccines have been come and have already win described.

## PREVENTION

BCG vaccine has been used for over a century to protect the masses from tuberculosis, caused by mycobacterium tuberculosis, Diseases that affects are mainly the lung, but infect any organ of the body from bones to brain and skin & internal organ.

BCG is an abbreviation for Bacillus Calmette–Guérin as it was created by leon Charles albert calmette and Jean marie calmette in early 1900's. Myco bacterium bovis is a bovine a bacterium in the cows milk was used, A micro bacterium closely related to micro bacterium tuberculosis. They grew it on a nutrient rich jelly in the lab for 13 years and the bacterium adapted to this by losing element of its DNA no longer required including the element that cause the disease.

BCG is offered to infant in some parts of the world in dose of 0.05 ml under 1 year and 0.1 ml over 1 year usually in intradermal skin deltoid muscle skin, especially in the developing world. It provides immunity life long but after 40 to 60 year of age the immunity start declining.

Of late BCG vaccine has been used for prevention of COVID pandemic $1^2(0=1)$ which started in wuhan city of china and later spread to the whole world affecting over 102,650,713cases and 2,216,748 death as on 30/01/2021.

It protects 86 % of patients against even some rarer form of tuberculosis common in children. But it protects only against 50 % of times in adults. Scientist are still in search of newer BCG vaccine and different BCG vaccine are used in different countries. In developed world it is not a normal practice for BCG to be given to infants at birth. It has been found BCG vaccine kids have better health and, lesser upper respiratory infections and fewer deaths. Immunologists suspect this is caused by a type of immune response called "trained immunity". Trained immunity is distinct from what we think of immunity or "immune memory" because different types of immune cells work in this.

### Immune memory v/s trained immunity

We have two main types of cells with in our immune system: innate cells which respond rapidly to microbes that cause the disease and the adaptive cells which initially respond quite slowly.

Adaptive cells includes B cells which make antibodies to block infections and T cells which can kill the infected cells. Adaptive cells can remember the particular microbe for years or even decades after the first encounter. This phenomenon is called "immune memory": When adaptive immune cells encounter the same microbes a second time the immune system can clear the infection before it causes a major disease. Immune memory is why often we don't get infected by Chickenpox or herpes zoster a second time or just as alastramized attack if at all.

### BCG for corona virus

For decades, scientist believes innate cells did not have the ability to remember previous encounter with microbes. But of late we have learnt that some innate cell such as monocytes can be "trained". during an encounter with a microbes. Training can program me innate cell to be acting more quickly then when the encounter the same or any other microbes a second time.

Live attenuated vaccines such as BCG can trigger trained immunity. BCG vaccine could train innate cells to improve early control of SARS _ COV 2 virus to reduce Covid 19 disease or even prevent infection.

Whether BCG can prevent Covid 19 infection or not is an enigma. However BCG is a potent stimulate of immune system. Currently it used with other therapy to

treat bladder cancer and melanoma and papiloma warts. Also it seems to benefit the lung immunity 3 to 8.

Researchers in Australia and Netherlands are preparing to give BCG to frontline health care workers, the result of which are awaited and if it found to be effective then we have to see that we may fall short of the vaccine which is primarily used to prevent the tuberculosis.

**HCQS**

The other drug used for the prevention of getting infection is HCQS. An antimalarial group drugs in dosage or 400 milligram twice a week but it must be given after $G_6PD$ testing especially in males.[4] Other drugs used in different countries are Doxycycline, Azithromycin and in china some ayuarvedic medicine.

The WHO sources say we have to learn to live with the virus and use preventive measures like using a mask, social distancing, frequent washing of hands after touching the fomites or use tissue paper or throw it and quarantine for positive patients for at least two weeks. If 55% of patients across the world may be infected it could cause hard immunity. My kinds of vaccine are in the process of being developed for example ICMR vaccine, oxford vaccine and the France are trying to modify measles vaccine but we have to weigh the side effect of vaccine before it is finally given to masses.

**Investigation**

For mild or asymptomatic patient ESR, CBC, X ray chest and nasal swab and Covid antibodies are enough.

Thoracic imagining is of immense value in covid 19 patient and high resolution CT is much preferred in early stages focal patchy shadows or ground glass opacticies are seen in lung periphery and both lower lobes. The long axis of the lesion is usually parallel to the pleura. Inter stitial thickening is also seen. A crazy patchy pattern is observed and some ground glass opestives.

Disease progression is seen in seven to ten days with increased density of the lesions and consolidated lesion with bronco gram sign. Critical cases may show expanded consolidation what is called white lung. After the consolidation is relieved, the ground glass opasties1 are completely absorbed and fibrotic strips or sub pleurals reticulation is left.

Brocoscopic is usually is avoidable.

**Clinical manifestation: the authors of Chinese CDC report divided the clinical manifestation as follows:**

1. **Mild case:** The symptoms are mild and no pneumonia
2. **Moderate cases:** May have fever with some respiratory tract symptoms.
3. **Severe cases:** respiratory rate $\geq$ 30 breaths per minutes. Oxygen secretion $\leq$ 93 % at resting stage. $Pao_2 \leq 300$ mm of mercury patient having more than 50% lung involvement in 24 to 48 hours.
4. **Critical cases:** occurrence of respiratory failure requiring mechanical ventilation, presence of shock and other organ failure which should be treated in ICU.2
5. **Theraputics:** Many drugs have been used for the treatment of Covid 19 with varying results. Tipanavir/ Retinavir(2 capsules every 12 hours)3 RB dol/Umiftnob (200 mg 12 hours). Antiviral drug should be stopped if nucleic acid test result from sputum specimens remain negative for 3 times.
   HCQS and chloroguim have been used[4] and decreases viral load[5]
6. Interferon nebulization is recommended
7. Appropriate and short term use of corticosteroids can be used to inhibit Cytokine cascade.

And to prevent the progression of severity of Covid 19 usually methyl prednisolone in the dose of .75 to 1.5 mg/ kilogram body weight intravenously once or twice in a day.

Plasma therapy from convalescent patient is being used for critically ill patient, but their should not be Severe bleeding disorder or disseminated intravascular co-angulations and those who are highly allergic to blood component, uncontrolled hypertension or shock and severe arrhythmias. The passive immune antibodies can effectively neutralize the pathogens which minimize the damage to target organ.

Oxygen therapy is used in critical cases, but in critical disease oxygen saturation SPO2 is measured and oxygen saturation should be over 93% in critical specially older patient accompanied by another disease. Oxygen therapy is mostly required especially when SPO2 is less than in 93 % PAO2 is less than 300mg of Hg, respiratory rate more than 25 per mint at bed or increased progression on xray imaging Non invasive or invasive is recommended as per the patient conditions. Fluid management is equally important so is timely clearing of the secretion from the mouth and nose. Nutrition support should not be over looked. Energy supply of 25 to 30 k cal per kg body weight and a target protein content be 1.2to 2 gram/ kg body weight daily. Avoiding iatrogenic side effect in special population like pregnant women, patient with hepatic and renal deficiency should be kept in mind. In pregnant women liponavir/ ritonavir tablet could be used. Favipiravir and cloroquin phosphate should not be used. Last of all psychological intervention is suggested in specially in elderly patient with other co- morbidities and drugs like citalopram, estelopram etc to improve anxiety and depression symptoms can be used to improve sleep quality. It may be noted Covid 19 is not the last pandemic, they will help on accuring, what we have to see is how they are tackled.

Of late tocilizumab is being used in very critical patient with good effect. It produces interleukin and sitokines which kill the virus and help prevent co- qgulation and hence prevent myocardial infarction and help other major

organs. It is basically used for psoriasis a skin diseases rheumatoid arthritis giant cell arteritis and castleman's syndrome and has been found to treating Covid-19[6]

**CONCLUSION**

once covid is diagnosed get a baseline CBC, LFT, RFT, CRP, d-Dimer, IL6, LDH, Ferritin, Trop- T, ECG, E Ray chest, CT chest. Ask for replication score in RT PCR test. It indicates how infective the patient is for other people. Any score above 25 is generally non infectious the specially if you have crossed 10 days and asymptomatic for 3- 4 days.

Viral replications usually stops by the 9th day , so if you wish to benefit from antivirus they should be administered within this period, after that there is doubt if antivirus will work.

The pathology of Covid diseases is that is causes inflammation which causes damage, not the virus. CRP and LDH are the first to be raised Fever, Myalgia or exhaustion and fatigue indicate high inflammation. Steroids and anticoagulants work well in this face even in absence of hypoxia and steroids prevent long term fibrosis and clexene 0.5mg s/c BD if d- Dimer is normal, otherwise double the dose. After 5-7 days one can switch to oral anticoagulants for four weeks and injection methyl predinoslone 40 mg i/v BD or TDS It is a must to monitor CRP and d- Dimer every alternate day till the patient is in hospital and i/l6 on day 5-8 because i/l6 is a marker of cytokine storm for which Tocilizumab should be handy if symptoms worsen. I/LE can return to normal with steroid and anticoagulants. Most dangerous period is day 8-12 when most people die.

Prone ventilation for 18 hours a day will make a big difference if patient if hypoxic.

Chest Xray every three days is sufficient to monitor progress.

10 -15 % patient may not develop antibodies post Covid. For very poor patient C reactive proteins, complete blood count gives an indication especially leucopoenia, lymphopaenia and mono-cystosis.

It may be noted that initially people keep on waiting after they get fever and some time Covid antibodies develop, but nasal swab come negative, in that case people start doubting the doctor (suppose antibodies tested from one lab are positive and nasal swab from other lab is negative) so the physician must know that the virus from the nose may disappear from 7-28 day, this is very important to remove patient doubt.

It may be preferable to use two masks, one surgical so that your infection does not go to patient and the other N95 mask so that outside virus does not enter your mouth or nose. It may also be noted that the eye blindness may occur and to be treated by anticoagulants

For post Covid care it may be noted that long haulers keep on throughing virus in the saliva. To avoid clots specially in lung, internal clotting and myocardial infarction keep taking blood thinners. Lungs may get fibrosis and may remain for life for that blow conch and baloon.

The good effect of BCG for prevention of Covid have already been described in another article.

**Vaccines:** The year 2020 shall be remembered as year of covid 19 which flaberghasted the whole world is less than 3 months and travel restrictions could not be taken in time and covid 19 spread to be whole world. Though most patient are mild but 15-20% are moderately to severly ill, and lakhs of mortalities.

Thanks to the tireless efforts of medical fraternity for vaccines against covid 19. Two vaccines- from Pfizer and Moderna – based on the mRNA platform have been approved in UK, US and other parts of Europe.

The Oxford-Astra-Zeneca vaccines has developed covishield and serum institute of India is manufacturing it In India and also have been approved in UK and USA. In India Oxford And Bharat Biotech of have been approved. Also Russian and Chiness vaccines have been approved in their respective countries. All vaccines have two doses, 14-28 days apart. Let us wait and see which ones are the best. Various anti viral drugs like umifemivir and sefobuvir are being evaluated for cytokines strom.

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