



Support of hospitalized patients with severe COVID-19

Since the pandemic started at the end of 2019, it has infected more than 100 million people and claimed the lives of more than 2.5 million lives.

To look at the half full glass of such disastrous pandemic, the overall deaths rate of infection is relatively low at 2-3 percent. Some other diseases like severe infections (sepsis) or severe lung infection (pneumonia) have much higher deaths rate.

So how the Corona virus induced pneumonia and failure of the lungs (respiratory failure) different from the other pneumonias from other bacteria.

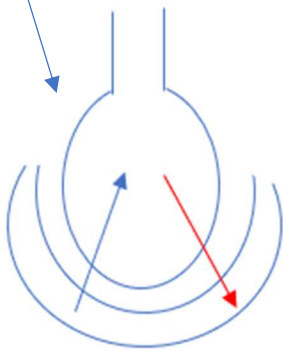
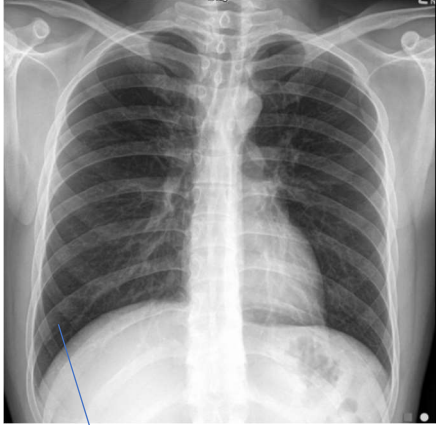
To start, we still do not have effective treatment for the disease.

Additionally, despite our understanding of the disease itself and how it affects our bodies is growing fast, our knowledge is still lacking.

The usual bacterial pneumonia infects a part called a lobe of the lungs, even if it infects multiple lobes, even then there is sufficient healthy lung tissue to be supported and keep the patient alive till the disease improve. On the other hand, the Corona virus causing Covid-19 has high affinity to receptors widely distributed in our lungs and affects the lungs diffusely.

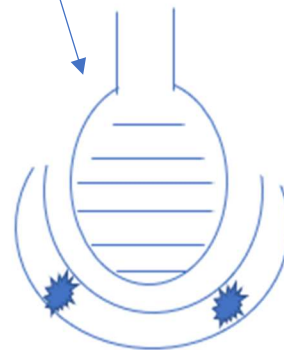
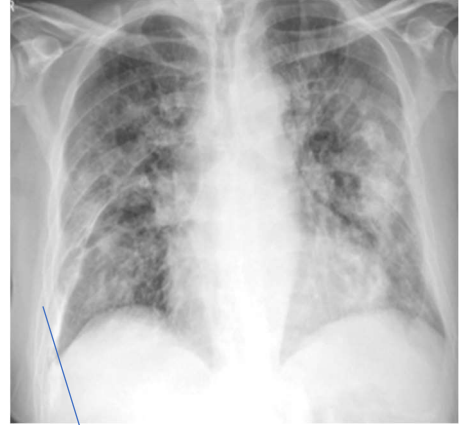
Not only it destroys the air sacks (alveoli) that have the oxygen to be delivered to our blood (Ventilation), it also destroys and causes blood clots in the small blood vessels around those alveoli (perfusion) adding more insult to the injury even to the spared good alveoli. Figure 1

To make matters even worse, blood clots happen even in the big blood vessels to the lungs further reducing the amount of blood going to the lungs. Not to mention the negative effects on the heart that complicates matter even worse.



Normal lung X-ray and lung unit

Blood with low oxygen from the body passes to the alveolar sacs, get saturated with oxygen and unloads the carbon dioxide and gets delivered back to the body organs



Infected lung X-ray and lung unit

The air sac gets filled with inflamed fluid and debris
The blood vessels get blocked, so air transport becomes very difficult

Support of the patient with Covid-19 with severely and dangerously low oxygen (hypoxia) follows the same treatment and support for other causes of hypoxia.

The usual oxygen devices described in the previous detailed in the previous series (oxygen support devices). The worse the oxygen level, the higher oxygen support is required till the point of mechanical ventilation or heart-lung machine also known as ECMO.

Though mechanical ventilation forces the air under pressure into the lungs and try to open the closed airspace for better air transport. It can have adverse effects on the heart and blood circulation which can contribute to worsen the problem. This issue was observed early in the pandemic when there was a rush to place patients on the ventilators but currently the pendulum has swung to the opposite side which is to prevent placing the patients on mechanical ventilation unless of course we exhausted all the other techniques of improving the oxygen.

The implementation of the prone position (placing the patients on their stomach) is not a new concept but has been used for more than 50 years, yet its benefits in reducing the fatality of severe respiratory failure has just been proved over the last decade. The benefits of such position are numerous, from better homogeneous air distribution to the lung units to improve blood circulation through the blood vessels.

The prone position has been implemented in patients on and off mechanical ventilation during the pandemic worldwide. Though it is unclear if this technique has helped reduce the deaths rate of this disease.

Blood thinners and even medications to break blood clots in the vessels have been tried also but the evidence of using them is still not very clear.

To summarize, we still struggle how to support the patients with severe Covid-19. Our knowledge is growing yet slowly in a hope that we will understand more for the good of humanity.