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THE ANATOMICAL IMPLICATIONS OF CORONA VIRUS ON THE HUMAN RESPIRATORY SYSTEM

The world is recently going through a great tribulation due to a pandemic which is caused by corona virus that is also referred to as covid-19. It has been stated to have started from a place called wuhan in china. Now this deadly virus is not an air borne disease because air borne viruses lingers for a longer period of time than those spread by droplets and can also be spread in air conditioning and ventilation system therefore this disease is spread between close contacts by spending more than 15min within 1metres of an infected person also like cold and flu bugs the virus is spread via droplets when an infected person coughs or sneezes. the droplets lands on surfaces and are picked up on the hands of others and spread further could be

through hand shaking. People catch the virus when they touch their infected hands to their mouth, nose or eyes. But not to be scared preventive measures like keeping your hands clean by washing them frequently with soap and water or a hand sanitizing gel, social distancing, putting on nose mask and hand gloves. Symptoms like cough, common cold, fever, difficulty in breathing.

Most confirmed cases which has been recorded round the globe, has shown a total of about 350,000 confirmed cases and death toll passing 15,000. Majorly in places like the Western Pacific region, European region, Eastern Mediterranean region, regions of the Americas and minor confirmed cases in places like the African region and as African am so grateful for this and the south-east Asia region. With all this under consideration it has been seen that the corona virus has a crucial negative impact on the anatomy of the human respiratory tract because it's a respiratory disease which attacks the lungs in three phases; viral replication, immune hyper-reactivity and pulmonary destruction but though not all patient went through the three phase. In the early days of an infection the novel coronavirus rapidly invades human lung cells. Those lung cells come in two classes ones with hair like batons called cilia. Mucus though gross when outside the body, helps protect lung tissue from pathogens and make sure your breathing organs doesn't dry out. The cilia cells beat around the mucus, clearing out debris like pollen or viruses. The corona virus loves to infect and kills cilia cells which then sloughed off and filled patients airways

with debris and fluids developing into pneumonia in both lungs accompanied by symptoms like shortness of breath, that's when phase two comes in and the immune system kicks in aroused by the presence of viral invaders, our bodies step up to fight the disease by flooding the lungs with immune cells to clear away the damage and repair the lung tissue. When working properly, this inflammatory process is tightly regulated and confined only to infected areas. But sometimes your immune system goes haywire and those cells kill everything in their way including your healthy tissue, therefore you get more damage instead of less from the immune responses. Even more debris clogs up the lungs and pneumonia worsens. During the third phase lung damage continues to build which can result in respiratory failure, even if death doesn't occur some patients survive with permanent lung damage. According to the WHO, SARS punched holes in the lungs, giving them a honeycomb-like appearance and these lesions are present in those afflicted by novel coronavirus too. These holes are likely created by the immune system's hyperactive response, which creates scars that both protect and stiffen the lungs. When that occurs, patients often have to put on ventilators to assist their breathing. Meanwhile, inflammation also makes the membrane between the air sacs and blood vessels more permeable which can fill the lungs with fluids and affect their ability to oxygenate blood. In severe cases, you basically flood your lungs and you can't breathe, that's how people are dying. The virus is spread through

droplets transmitted into the air from coughing or sneezing, which people nearby can take in through their nose, mouth or eyes. The viral particles in these droplets travel quickly to the back of your nasal passages and to the mucous membranes in the back of your throat, attaching to a particular receptor in cells, beginning there. Coronavirus particles have spiked proteins sticking out from their surfaces, and these spikes hook onto cell membranes, allowing the virus's genetic material to enter the human cell.

That genetic material proceeds to “hijack the metabolism of the cell and say, in effect, ‘Don’t do your usual job. Your job now is to help me multiply and make the virus’,” says Dr William Schaffner, an infectious disease specialist at Vanderbilt University Medical Centre in Nashville, Tennessee. As copies of the virus multiply, they burst and infect neighbouring cells. The symptoms often start in the back of the throat with a sore throat and a dry cough. The virus then “crawls progressively down the bronchial tubes”, Schaffner says. When the virus reaches the lungs, their mucous membranes become inflamed. That can damage the alveoli or lung sacs, and they have to work harder to carry out their function of supplying oxygen to the blood that circulates throughout our body and removing carbon dioxide from the blood so that it can be exhaled. “If you get swelling there, it makes it that much more difficult for oxygen to swim across the mucous membrane,” says Dr Amy Compton-Phillips, the chief clinical officer for the Providence Health System, which

included the hospital in Everett, Washington, that had the first reported case of the coronavirus in the US. The swelling and the impaired flow of oxygen can cause those areas in the lungs to fill with fluid, pus and dead cells. Pneumonia, an infection in the lung, can occur.

Some people have so much trouble breathing, they need to be put on a

ventilator . In the worst cases, known as Acute Respiratory Distress Syndrome (ARDS), the lungs fill with so much fluid that no amount of breathing support can help, and the patient dies.

What trajectory does the virus take in the lungs?

Dr Shu-Yuan Xiao, a professor of pathology at the University of Chicago School of Medicine, has examined pathology reports on coronavirus patients in China. He says the virus appears to start in peripheral areas on both sides of the lung and can take a while to reach the upper respiratory tract, the trachea and other central airways.

Xiao, who also serves as the director of the Centre For Pathology and Molecular Diagnostics at Wuhan University, says that pattern helps explain why in Wuhan , where the outbreak began, many of the earliest cases were not identified immediately.

The infection can spread through the mucous membranes, from the nose down to the rectum-

The initial testing regimen in many Chinese hospitals did not always detect infection in the peripheral lungs, so some people with symptoms were sent home without treatment.

“They’d either go to other hospitals to seek treatment or stay home and infect their family,” he says. “That’s one of the reasons there was such a wide spread.”

A recent study from a team led by researchers at the Icahn School of Medicine at Mount Sinai in New York found that more than half of 121 patients in China had normal CT scans early in their disease. That study and work by Xiao show that as the disease progresses, CT scans show “ground-glass opacities”, a kind of hazy veil in parts of the lung that are evident in many types of viral respiratory infections. Those opaque areas can scatter and thicken in places as the illness worsens, creating what radiologists call a “crazy paving” pattern on the scan.

Are the lungs the only part of the body affected?

Not necessarily. Compton-Phillips says the infection can spread through the mucous membranes, from the nose down to the rectum.

So while the virus appears to zero in on the lungs, it may also be able to infect cells in the gastrointestinal system, experts say. This may be why some patients have symptoms like diarrhea or indigestion. The virus can also get into the bloodstream, Schaffner says.

The Centres for Disease Control and Prevention says that RNA from the new coronavirus has been detected in blood and stool specimens, but that it's unclear whether the infectious virus can persist in blood or stool.

Bone marrow and organs like the liver can become inflamed too, says Dr George Diaz, section leader for infectious diseases at Providence Regional Medical Centre in Everett, Washington, whose team treated the first US coronavirus patient. There may also be some inflammation in small blood vessels, as happened with Sars , the viral outbreak in 2002 and 2003.

Why do some people get very ill but most don't?

About 80 per cent of people infected with the new coronavirus have relatively mild symptoms. But about 20 per cent of people become more seriously ill; and in about two per cent of patients in China, which has had the most cases, the disease has been fatal.

Experts say the effects appear to depend on how robust or weakened a person's immune system is. Older people or those with underlying health issues, like diabetes or another chronic illness, are more likely to develop severe symptoms.

What do scientists still not know about coronavirus patients?

A lot. Although the illness resembles

Sars in many respects and has elements in common with influenza and pneumonia, the course a patient's coronavirus will take is not yet fully understood.

Some patients can remain stable for over a week and then suddenly develop pneumonia, Diaz says. Some patients seem to recover but then develop symptoms again.

Xiao says that some patients in China recovered but got sick again, apparently because they had damaged and vulnerable lung tissue that was subsequently attacked by bacteria in their body. Some of those patients ended up dying from a bacterial infection, not the virus. But that didn't appear to cause the majority of deaths, he says.

Other cases have been tragic mysteries. Xiao says he personally knows a man and woman who got infected but seemed to be improving. Then the man deteriorated and was hospitalised.

"He was in ICU, getting oxygen, and he texted his wife that he was getting better, he had good appetite and so on," Xiao says. "But then in the late afternoon, she stopped receiving texts from him. She didn't know what was going on. And by 10pm, she got a notice from the hospital that he had passed.

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