**Nosocomial Superinfection**

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**[Abstract]**

Most diseases in the past came as a pathogen and left behind antigens throughout the human body after it was treated with a vaccine. However, the adaptive immune system is very specific to certain antigens and will only target antigens have based on its genetic information. Bardi’s article is demonstrating how patients are developing new harmful variants from COVID-19 post vaccination. What comes off even more disturbing in this publication is that it shows that a handful of patients who are under intensive care unit (ICU) or who have been under admission for the duration of their illness developed a mutual infection from both harmful bacteria and fungi. How can a disease enhance and mutate itself inside an institution such as a hospital? Why are doctors and nurses getting infected as well, considering they are wearing anti-disease attire? Data and information have been limited to the public for safety concerns. These concerns regard public publicity and criticism for those who might be undergoing stressful circumstances relating the pandemic.

**[Introduction]**

COVID-19 has been a global issue since the start of 2019. Since then, it has developed and mutated into something far more deadly, contagious, and more asymptomatic prior to realizing infection has become present. The answer is clear to why even nurses, doctors, and patients under ICU are getting infected as well. Due to hospitals becoming overcrowded with patients that need critical care, COVID-19 has mutated due to swift and silent speed of its spread among organisms. Since the chemistry in every person’s body is different, having everybody in a tight space such as hospitals and clinics, that gives the disease a chance to share its antigens and develop a more resistible variant which further mutates into something more difficult to neutralize at an atomic level. One of the main actions taken against the pandemic is increasing the activity of antibodies such as immunoglobin, a glycoprotein that acts as a receptor binding to antigens. This publication addresses the relationship of the coinfection (bacteria/fungi) creating superinfection as well as patients with certain risk factors such as age, youth, gender, etc.

**[Recent Progress]**

According to the article, “We found a high incidence of CAPA among critically ill COVID-19 patients and that its occurrence seems to change the natural history of disease” (Bartoletti et al). Aspergillus is a fungal infection that comes from decaying soil, plants, and vegetation. As for bacterial infection, enterococcus has been a primary outcome of being exposed to a heavy handful of antibiotics. “Disruption of colonization resistance in humans by antibiotics allows enterococci to proliferate in the gut and cause disseminated infections” (Chakraborty et al). Enterococcus is gram-positive, anaerobic bacteria that does not require any oxygen to grow or mutate. In other words, cellular oxygen toxicity. As far as how age and gender can play a major role in this pandemic, Grasselli’s article states, “In this case series of critically ill patients with laboratory-confirmed COVID-19 admitted to ICUs in Lombardy, Italy, the majority were older men, a large proportion required mechanical ventilation and high levels of PEEP, and ICU mortality was 26%” (Grasselli). This does not steer from the fact that children, elderly people, and people with severe disorders are also at disadvantage for recovering from the virus. Other methods have included steroid therapy to reduce swelling, pain, and inflammation. Tocilizumab is one of the big uses for groups of people in the clinic. “Treatment with tocilizumab, whether administered intravenously or subcutaneously, might reduce the risk of invasive mechanical ventilation or death in patients with severe COVID-19 pneumonia” (Rheumatol). A good percentage of the patients treated with this drug has been beneficially effective but it is still unproven that tocilizumab is the best antibiotic for preventing fatality in COVID-19 patients.

[**Discussion]**

As for how the pandemic affects patients in the manner of a hospital setting, it seems to affect older patients, children, and most in common is particularly men. Steroid use has shown to be quite effective yet the hypothesis is having not been confirmed. The fungal infection from decaying plant life seems to be another cause of death; however, that is quite interesting and fascinating how aspergillus seems to be the common bacteria killer. The bacterial and fungal infections have been unidentified in respects to what they produced. However, only cultured samples were documented and there is still more data that has not been collected. Secondly, the data that was collected came from only a single institution which gives it limited information as well since institutions all carry their own kind practice. There is still more to find.

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