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Similarities and Differences between the New Coronavirus Infectious 2019 (COVID-19) and Seasonal Influenza

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ABSTRACT

From late fall to winter of 2020, the further challenge of medical care for thetwindemic of coronavirus infectious disease-2019 (COVID-19) and seasonal influenza is imminent. The key to that is the ability of family doctors to protect the front lines of community medicine. It is difficult not only for patients but also for doctors to distinguish COVID-19 from seasonal flu only based on initial symptoms such as fever and malaise. Every year, patients with suspected seasonal flu are tested and, if positive, are treated with influenza drugs. However, due to the expansion of COVID-19, tests using a nasopharyngeal swab have a high risk of droplet infection. In this review, we would like to discuss the clinical similarities and differences between COVID-19 and seasonal influenza, including new findings.

The coronavirus infectious disease 2019(COVID 19) pandemic, also known as the coronavirus pandemic, is an ongoing global pandemic of COVID 19, caused by severe acute respiratory syndrome coronavirus 2(SARS CoV 2) (1).The outbreak was first identified in December 2019 in Wuhan, China (2,3).The World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern on 30January 2020 and a pandemic on 11March 2020 (4,5).As of 30 August 2020,more than 25million cases of COVID 19 have been reported in more than 188 countries and territories, resulting in more than 843,000 deaths; more than 16.4million people have recovered (6).The WHO has published a report summarizing the differences between the COVID-19 and influenza (7).

KEYWORDS: *Vaccine, COVID-19, SARS-CoV-2*

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Similarities between COVID-19 and seasonal influenza

The infection route is contact infection: Both types of viral infectious diseases are infected by touching one's face with the hands that touch the person or object to which the virus is attached.COVID-19 may also cause droplet infections due to coughing and sneezing in infected individuals.

In both viral infections, there are many similarities in symptoms: Both COVID-19 and seasonal influenza affect the respiratory organs. Fever, malaise, and cough are present in both infections. Severe respiratory illness can lead to pneumonia, which can lead to death.

Differences between COVID-19 and seasonal influenza

COVID-19 transmission rate is lower than seasonal influenza transmission rate: Perhaps this is the biggest difference between COVID-19 and seasonal influenza. Compared with COVID-19, seasonal flu has a shorter asymptomatic period and shorter onset interval. According to WHO, COVID-19 has an onset interval of about 5 to 6 days, but seasonal influenza has an onset interval of about 3 days. Therefore, compared to COVID-19, seasonal influenza spreads faster.

Virus shedding: Excretion of the virus means that the virus infects the host and proliferates, and a new virus is germinated from the infected cells. Therefore, by shedding the virus, a virus-infected person infects others with the virus. In some severe acute respiratory syndrome coronavirus type 2(SARS-CoV-2) infected individuals, SARS-CoV-2 was excreted within 2 days of virus infection and before the characteristic symptoms of COVID-19. The WHO believes that such individuals are probably not the main cause of the spread of COVID-19.In recently published paper, in patients with COVID-19, it has been reported that large amounts of virus are shed in the early stages of showing asymptomatic or mild symptoms (8).

With seasonal influenza viruses, viral shedding usually occurs within the first two days after symptoms are observed, followed by up to one week of viral shedding (9) (Figure 1). However, according to a study on Chinese patients published in The Lancet, about 20 days after a person with COVID-19 becomes infected with the virus or until they die, it was confirmed that SARS-CoV-2 was being continuously emitted (10).The shortest period of time of the detected virus shedding has been reported to 8 days (10,11)

(Figure 2).However, there were cases where the virus was shed for 37 days. From these results, the patient's COVID-19 is considered to maintain the infection force much longer than seasonal flu patient (10).

Secondary infection: COVID-19 is a bad infection. COVID-19 has been reported to cause about two more secondary infections. Although Seasonal influenza can also cause secondary bacterial infections, such as common pneumonia, it is rare that patient with seasonal influenza is applied to the secondary infection (12). The WHO warns that these characteristics of COVID-19 are important in the course of treatment.

Adults are spreading COVID-19: In seasonal influenza, children are often the cause of seasonal influenza epidemics. However, in COVID-19, infection seems to be spreading among adults. Therefore, the most severely affected persons are mainly elderly people and people with underlying diseases. According to the article in Washington Post, experts can't explain why children are avoiding the severity of COVID-19 (13,14).Some experts speculate that children may be vulnerable to a cold caused by a coronavirus closely related to SARS-CoV-2 and may be immune to the novel coronavirus. It is also believed that the child's immune system is constantly alert and fights the new coronavirus more quickly than adults.

New coronavirus is far more deadly than influenza: The lethality of new coronaviruses, which is the number of deaths divided by the number of case reports, has so far been about 3% to 4%. However, since there are many cases that have not yet been reported, in fact is likely to fall below this value. On the other hand, the case fatality rate of seasonal influenza is 0.1%.

Treatments and a vaccine against COVID-19 has not been established: The development of treatments and vaccines of COVID-19 is progressing but has not yet been established (15). On the other hand, the influenza vaccine is widely used as a general medical treatment in many countries. Influenza vaccination may reduce the burden on healthcare providers significantly due to co-infection with seasonal influenza and COVID-19, which is feared to occur in the coming months.

Conclusion

Studies inferred from the COVID-19 transmission model predict a major outbreak of COVID-19 in the winter of 2020. In each country, there are concerns about COVID-19 and the seasonal influenza Twindemic. Actually, the number of people with seasonal influenza seems to be higher compared with the number of people with COVID-19.COVID-19 may be missed if treated as influenza by clinical diagnosis alone. Therefore, as a general rule, if the epidemic of COVID-19 is observed, it is recommended to carry out the inspection of COVID-19 and the seasonal influenza as much as possible. Previous studies have also reported patients co-infected with COVID-19 and seasonal influenza. Such co-infectious disease makes differential diagnosis difficult. According to the medical guidelines of each country, it is recommended to collect a sample for testing COVID-19 and a sample for testing seasonal influenza at the same time.

It has been reported that immune cells responsible for the immune response to the common cold-causing coronavirus may also respond to SARS-CoV-2, which causes the pandemic of COVID-19 (16).The research results support the hypothesis that pre-existing immunity to the common cold coronavirus have contributed to the difference in the severity of COVID-19.Further research is needed to support this conclusion.

Disclosure

The authors declare no potential conflicts of interest. The funders had no role in study design, data collection, or analysis; decision to publish; or preparation of the manuscript. The materials (manuscript and figures) presented here reflect original research, have not been published previously, and have not been submitted for publication elsewhere while under consideration.

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Author Contributions

T. H. and M. M. performed most of the experiments and coordinated the project; T.H. and M.M. conceived the study and wrote the manuscript. N.Y. carefully reviewed this manuscript and commented on the medical science. I.K. gave information on clinical medicine and oversaw the entire study.

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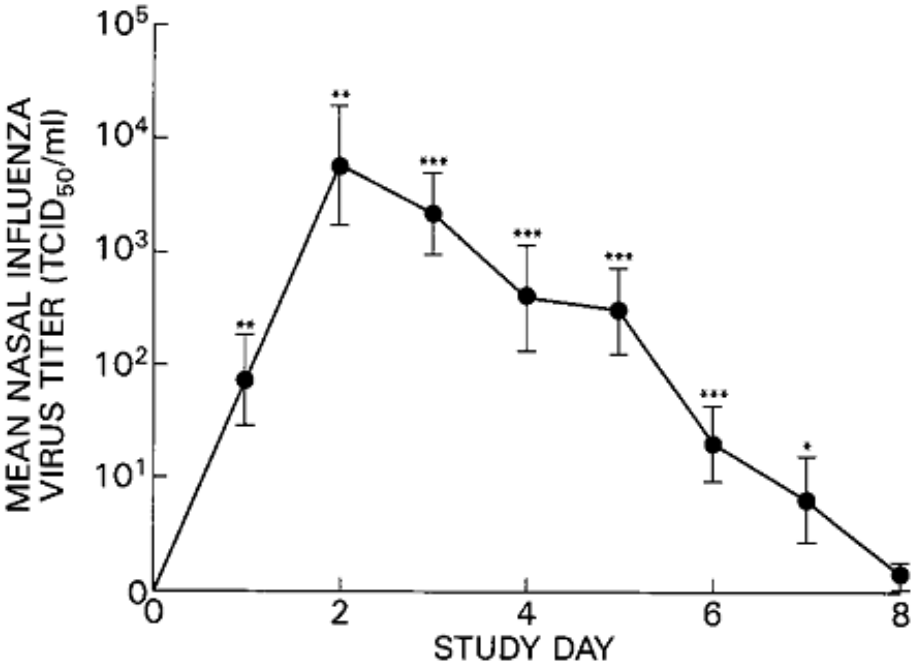

Figure1. Mean nasal lavage fluid influenza virus titers.

Mean nasal lavage fluid virus titers after experimental influenza A/Texas/36/91 (H1N1) infection. The mean TCID50/ml*6*SEM is shown for each day of the study. *P # 0.05, **P # 0.01, ***P # 0.001, Wilcoxon signed rank test. Figure is adapted from Ref.9.

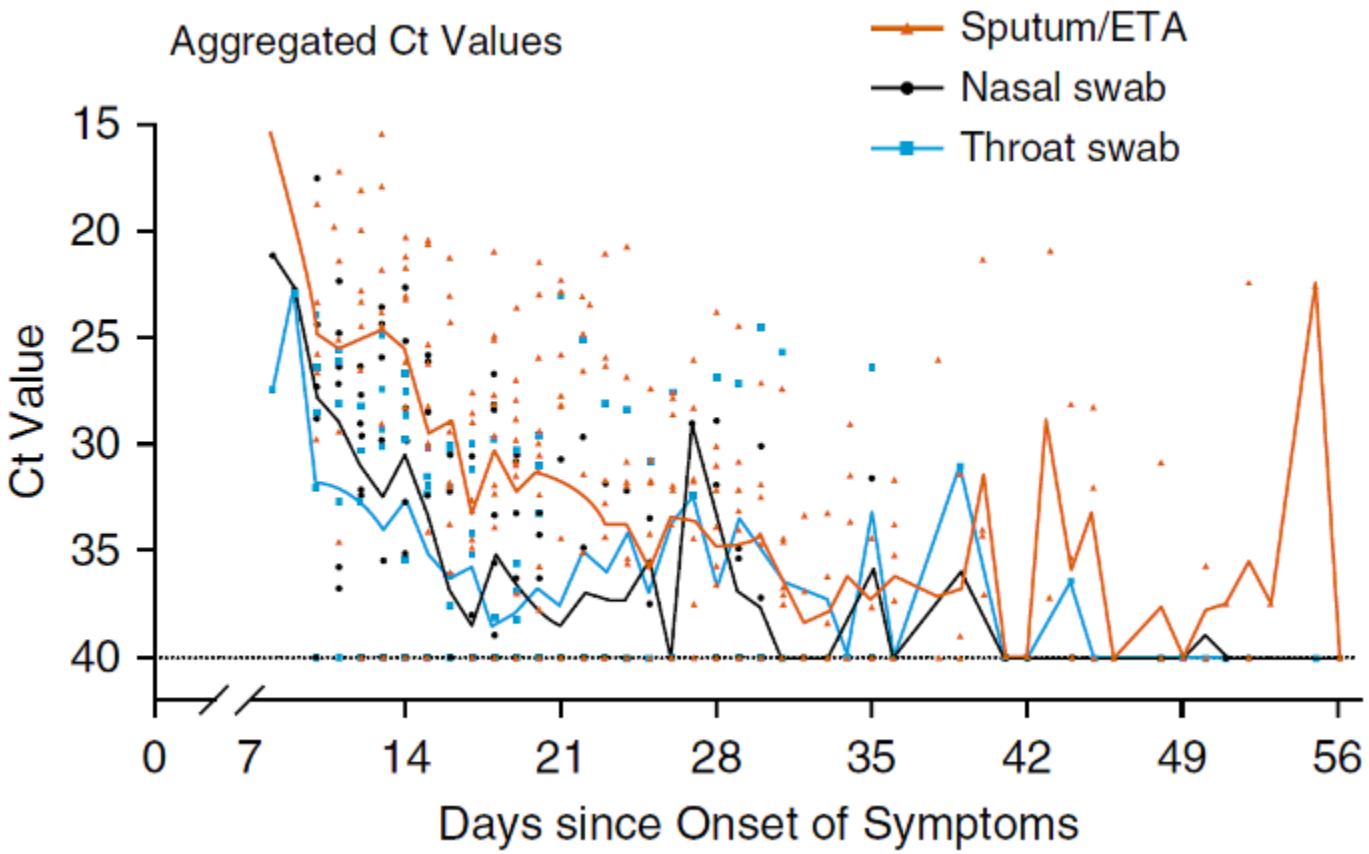

Figure 2.Viral load detected in respiratory specimens obtained from critically ill patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Aggregated cycle threshold (Ct) values of the nucleocapsid protein gene of SARS-CoV-2 in serial throat swabs, nasal swabs, and sputum/endotracheal aspirate (ETA) samples from 16 patients, according to days after symptom onset. If the Ct value is 40 or less, it is judged as SARS-CoV-2 positive. Figure is adapted from Ref.10.