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Chinese research team: Early spread of new crown disease sisco is more like influenza than SARS

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February 20, 2020

On February 19, local time, the New England Journal of Medicine (NEJM), a leading international academic journal, published a newsletter from the Guangdong Provincial Center for Disease Control, Zhuhai CDC, Zhongshan University Fifth Affiliated Hospital, and the University of Hong Kong's research team, showing that patients with new coronary pneumonia had higher viral loads on their

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upper respiratory tract swabs in the early stages of the disease. Virus load begins to decrease over time. The findings are of great significance to the disease control of new coronavirus pneumonia.

The authors argue that the performance of the new coronavirus load is very different from the SARS outbreak in China in 2003. In the early stages of onset, the viral load of SARS patients' respiratory tracts was moderate. The patient's SARS virus load peaked about 10 days after the onset of symptoms. This means that the SARS virus only begins to spread a few days after the onset of the disease.

In 2003, the global outbreak of SARS-CoV was successfully contained through public health interventions, including case detection and isolation. The team's new research suggests that different means are needed to curb the spread of the more "sophisticated" new coronavirus.

So what are the characteristics of the spread of the new coronavirus?

The researchers monitored new coronavirus loads in upper respiratory samples in 18 patients (9 men and 9 females aged 59; range 26 to 76) in Zhuhai, Guangdong Province, including four cases of secondary infection in two families (one of whom never developed symptoms, "Patient Z" below). The asymptomatic patient was found to be monitored because of his close contact with known cases.

The researchers analyzed a total of 72 nasal swabs (samples from the nasal cavity and nasopharynx)

and 72 pharynx swabs (Figure 1B), with one to nine consecutive samples per patient.

From 7 January to 26 January 2020, a total of 14 patients who had just returned from Wuhan to Zhuhai with fever (≥ 37.3 degrees C) were diagnosed with neo-coronavirus pneumonia. The diagnostic method is reverse transcriptase-polymerase chain reaction (RT-PCR), which was developed by the China Center for Disease Control and Prevention and tested by the Guangdong Provincial Center for Disease Control and Prevention.

Of the 14 imported cases, 13 cases showed pneumonia. In the 14 days before the onset of symptoms, none of these people had been to Wuhan's South China Seafood Wholesale Market. Patients E, I and P need to be admitted to intensive care (ICU) wards, while other patients have mild to moderate symptoms.

Patient I and Patient P are in close contact with patient E after being detected with secondary infection. Patient E, who works in Wuhan, returned to Zhuhai on January 17 to visit his wife (patient L), mother (patient D) and friends (patient Z). Patients L and D were detected in their noses and pharynx swabs on 20 January and 23 January, respectively, and both were diagnosed shortly after the onset of symptoms.

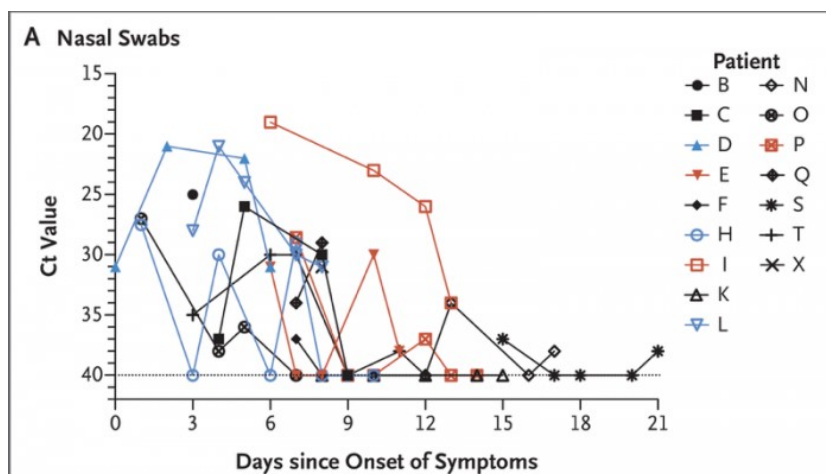
Patient Z, no clinical symptoms were reported, but on the 7th, 10th and 11th days after exposure to E, his nasal swabs (cycle thresholds (Ct) were 22 to 28) and throat swabs (Ct values 30 to 32) tested

positive. The CT of the patient Z obtained on February 6th was also not obvious.

In addition, patient I and patient P live in Wuhan, January 11 to visit their daughter (patient H) in Zhuhai, and the first symptoms on the same day. On 17 January, the patient had a fever, and the virus RNA was detected in the nose and pharynx swabs on the first day after the onset of symptoms.

The team analyzed the relationship between viral loads in nasal swabs and pharynx obtained from 17 patients with symptoms and the onset of symptoms (Figure 1C). A higher viral load (inversely proportional to the Ct value) was detected shortly after the onset of symptoms, and the viral load in the nose was higher than the throat.

The team believes that the analysis shows that patients infected with the new coronavirus have a similar virus nucleic acid detoxification pattern to those with influenza, but different from SARS patients. In addition, the viral load detected in asymptomatic patients is similar to that of asymptomatic patients, indicating that asymptomatic or mild patients have the potential to spread.



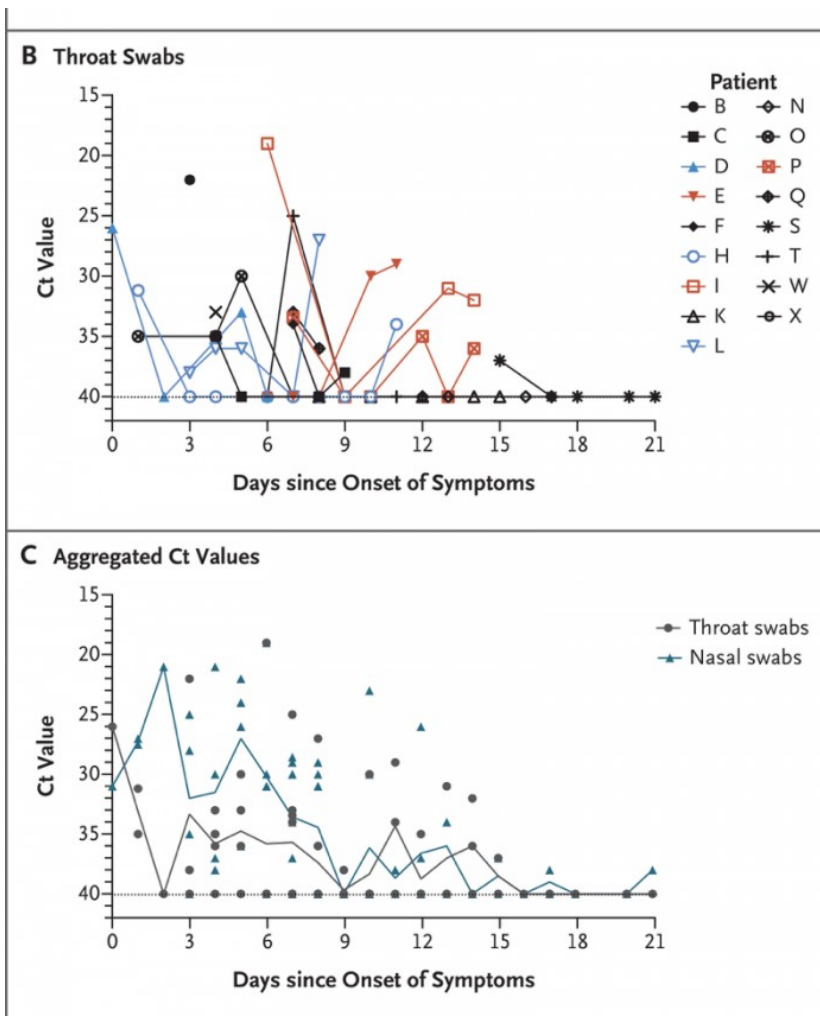


Chart Description: Viral load detected in nasal swabs and pharynx swabs obtained from patients infected with the new coronavirus.

Group A showed the cycle threshold (Ct) values of Orf1b detected in reverse transcriptase-polymerase chain reaction (RT-PCR) analysis in nasal swabs from 14 imported cases and 3 secondary cases.

Group B shows the Ct value of the swallow swab.

Patient Z has no clinical symptoms and is not included in the figure. Patients with severe illnesses (E, I and P) were marked red in imported cases, patients with mild to moderate diseases marked black, and secondary cases (D, H, and L) were marked in blue.

Compared to mild to moderate input cases, the Ct values of nasal and pharynx swabs in patients with severe patients were tested using a linear mixed effect model, which allowed for temporary trends in inpatient correlation and CT changes. The average Ct values of nasal swabs and pharynx swabs obtained from patients with severe illness were 2.8 (95% confidence intervals (CI), -2.4 to 8.0) and 2.5 (95% CI, -0.8 to 5.7) respectively.

Group C showed the total Ct value of Orf1b in 14 imported cases and 3 secondary cases in the RT-PCR assay the day after the onset of symptoms. The Ct values are inversely proportional to the number of copies of viral RNA, with Ct values 30.76, 27.67, 24.56 and 21.48 corresponding to 1.5×10^4 , 1.5×10^5 , 1.5×10^6 and 1.5×10^7 copies per milliliter. The Ct for a negative sample is 40, which is the detection limit.

The team concluded by stressing that their findings were consistent with previous reports that transmission could occur early in infection and suggesting that case detection and isolation strategies may need to be different from those required to control SARS. The relationship between the new coronavirus load and the cultureable virus also needs to be determined, and the identification of patients with little or no symptoms in the pharynx but moderate lysable viral RNA levels for at least 5 days indicates that we need better data to determine transmission dynamics and inform our screening practices.

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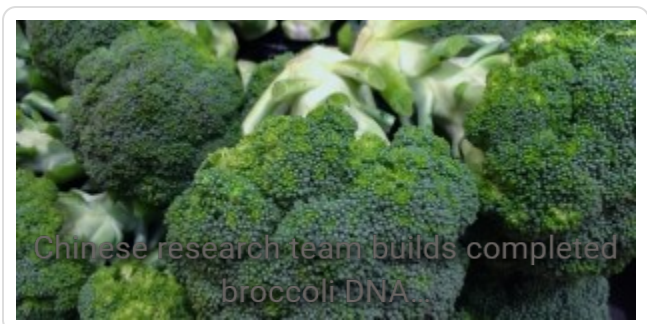
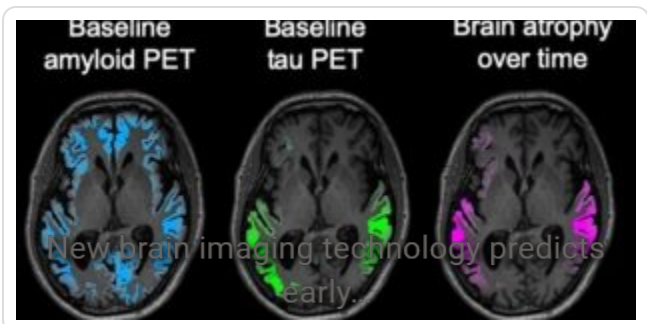


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