RISK OF REACTIVATION OR REINFECTION OF NOVEL CORONAVIRUS: A STUDY BASED ON CASE REPORTS

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SUMMARY

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people who fall sick with COVID-19 will experience mild to moderate symptoms and recover without special treatment. The virus that causes COVID-19 is mainly transmitted through droplets generated when an infected person coughs, sneezes, or exhales. These droplets are too heavy to hang in the air, and quickly fall on floors or surfaces. Someone can be infected by breathing in the virus if you are within close proximity of someone who has COVID-19, or by touching a contaminated surface and then your eyes, nose or mouth. In December 2019, a pneumonia outbreak was reported in Wuhan, China. On 31 December 2019, the outbreak was traced to a novel strain of coronavirus, which was given the interim name 2019-nCoV by the World Health Organization (WHO), later renamed SARS-CoV-2 by the International Committee on Taxonomy of Viruses. As of 26 July 2020, there have been at least confirmed deaths and more than 16,055,909 confirmed cases in the COVID-19 pandemic. The Wuhan strain has been identified as a new strain of Beta-coronavirus from group 2B with approximately 70% genetic similarity to the SARS-CoV. The virus has a 96% similarity to a bat coronavirus, so it is widely suspected to originate from bats as well. The pandemic has resulted in travel restrictions and nationwide lockdowns in many countries.

Key words: Reactivation, Reinfection, Novel Coronavirus
1.0 Introduction

In early December, 2019 and outbreak of respiratory illness took place in Wuhan, Hubei Province, China and named as the coronavirus disease or simply COVID-19. The World Health Organization (WHO) has declared it as a public health emergency due to its rapid spread over 19 countries with 11791 confirmed cases including 231 deaths\(^1\). On 29 December 2019, the first four cases of an acute respiratory syndrome of unknown etiology were reported in Wuhan City, Hubei Province, China among people linked to a local seafood market (“wet market”)\(^1\). This corona virus belongs to large family of enveloped RNA virus and is highly contagious, and it spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes\(^2\). Person-to-person transmission is mostly driven by who interacts with whom, which can vary by age and location of the contact (i.e., school, work, home, and community)\(^3\). Respiratory droplets and contact are considered the main routes of transmission. Currently, COVID-19 patients remain the primary source of infection\(^4,5\). We report a case of COVID-19 with recurrently positive SARS-CoV-2 ribonucleic acid (RNA) from an oropharyngeal swab test.

2.0 Medical history

Here, we tried to discuss two case series study related to recurrence of Novel CoV-2 positive RNA result.

First case was a 38 years old male patient, professionally who is a banker, had developed fever with cough and sore throat on 4 June, 2020. On 6 June he gave his first sample, oral and nasal swab for rtRT-PCR in a hospital and report was positive for SARS-CoV-2. This gentleman was treated conservatively at his house with consultation of a graduate registered doctor through telemedicine service. He was treated with Azithromycin 500mg once daily for 5 days along with some symptomatic treatment. He had no diagnosed co-morbidity. There was no history of administration of low molecular heparin for treatment purpose. 14 days after giving first sample, he gave his second sample for rtRT-PCR again in a hospital on 20 June, 2020. He was tested negative for SARS-CoV-2. On 28 June, he gave his 3rd sample again in a hospital it was positive for SARS-CoV-2. He had no symptoms since 20 June and no medications were taken. After 3 days, on 2 July, he tested his 4th sample in and again positive for SARS-CoV-2. He had no symptoms for last 12 days and didn’t take any medications. In the meantime, he kept him isolated in a room in his house since 1st appearing of the symptoms. On 17 July, He gave his 5th sample in and again tested positive for SARS-CoV-2 on 18th July. He was remaining positive for about one and half month.

In our second case, participant was a 43 years old male businessman, had developed sore throat, cough with productive sputum and anosmia on 20 June, 2020. He became isolated in a room from rest of his family members and conservative treatment was started over telemedicine service as a suspected case of COVID-19. He was fear about social stigma and that’s why rtRT-PCR test didn’t done. In the meantime, he had developed severe body ache and upper abdominal pain. Treatment was given accordingly over telemedicine. He had hypertension for about 6 years and taking anti-hypertensive medicines accordingly. After 12 days of first appearing of COVID-19 symptoms, he gave his first sample in a hospital in Dhaka and tested positive for SARS-CoV-2. On 16 July, he gave oral and nasal swab again for rtRT-PCR in a hospital and
report was positive for SARS-CoV-2. But he had no symptoms since 1 July, 2020 and didn’t take any medications. He was remaining positive for about one month. In the meantime, he kept him isolated in a room in his house since 1st appearing of the symptoms.

3.0 Discussion

Around the world, there have been several cases of people recovering from COVID-19 only to later test positive again and appear to have another infection. Such cases have had doctors and researchers puzzling over whether recovered people continue to be contagious, and if they could get a second infection. New research published by the Korea Centres for Disease Control and Prevention has found that recovered COVID-19 patients who test positive again aren’t infectious. The study also found that most patients who recover have neutralizing antibodies, the type of antibody that confers immunity and protects people from getting sick again. The patient we report in this article presented an inconsistent situation. The oropharyngeal swab test for SARS-CoV-2 RNA on 28 June and 2 July, 2020 became two times positive again after a negative result on 20 June, 2020, while his respiratory symptoms had already improved, and he had no fever. In other words, he was still capable of transmitting the virus to other people if he had been discharged right after the first negative test. We speculate on the reasons why the results of the SARS-CoV-2 RNA tests, in this case, were fluctuant. Still now, no research has yet accurately established the contagious period of COVID-19 and also about the chance of reinfection. Besides patients and asymptomatic carriers, those in convalescence may also be infectious. SARS-CoV-2 RNA from respiratory tract specimens may be persistent or recurrently positive during the course of this disease. Furthermore, Angiotensin-converting enzyme-2 (ACE-2), identified as the cell entry receptor of SARS-CoV-2, was highly expressed in the lungs rather than in the upper respiratory tract. The result of the SARS-CoV-2 RNA test likely depends on the viral load of the specimen. Therefore, there could be false negatives on occasion for oropharyngeal or nasopharyngeal swabs tests, affected by the site from which the sample was taken (Table 01), the experience of the operator, and the actual quantity of virus. The Broncho-alveolar lavage fluid (BALF) specimen test is considered more accurate but with a higher exposure risk. In addition to the above specimens, SARS-CoV-2 RNA can be detected in a patient’s sputum, blood, or stool swab by RT-PCR assay. Running multiple tests and collecting different specimens would be more effective approaches to maximize sensitivity.

Table 01: Types of swabs that can be tested and the time period of getting positive results, highest peak reached, and time of fall

<table>
<thead>
<tr>
<th>Type of swab used for RT-PCR</th>
<th>Starts to peak from (day)</th>
<th>Highest levels detected</th>
<th>Starts to fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-turbinate swab</td>
<td>Day 1</td>
<td>First week</td>
<td>Third week onwards</td>
</tr>
<tr>
<td>Anterior nares swab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oropharyngeal swab</td>
<td>Day 1</td>
<td>First week</td>
<td>Third week onwards</td>
</tr>
<tr>
<td>Rectal</td>
<td>End of first week</td>
<td>Second week</td>
<td>End of third week onwards</td>
</tr>
</tbody>
</table>
4.0 Acknowledgement

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5.0 Funding

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6.0 Ethical approval

Informed written consent was obtained from the patients for publication of this case report.

7.0 Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References


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