Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Need for a high-specificity test for confirming weakly positive result in an immunochromatographic SARS-CoV-2-specific antigen test: A case report

KEYWORDS
Antigen test;
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Immunochromatography;
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Dear Editor,

Besides diagnostic tests for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) using reverse transcription-polymerase chain reaction (RT-PCR), some simple kits use immunochromatography to detect SARS-CoV-2-specific antigens. The immunochromatographic antigen test is less sensitive than RT-PCR but with equivalent specificity.[1—4] Therefore, in Japan, for a positive antigen test result within 9 days of onset, the coronavirus disease 2019 (COVID-19) can be diagnosed without performing RT-PCR. However, any test can produce false-positive. Herein, we report a case of false-positive SARS-CoV-2-specific antigen test.

A 40-year-old man was hospitalized with a diagnosis of COVID-19 because of a positive SARS-CoV-2-specific antigen test (ESPLINE SARS-CoV-2®; Fujirebio Inc. Tokyo, Japan). The patient had some symptoms consistent with COVID-19, but he had no history of close contact with known COVID-19 patients. On day 4 of admission, as part of the study to determine whether saliva samples could be used for SARS-CoV-2 RT-PCR tests, we performed SARS-CoV-2 RT-PCR tests (using a Cobas® z480 analyzer; Roche Diagnostics, Indianapolis, IN, USA) on saliva samples (saved after RNA extraction) collected from the patient on days 1 and 2 since admission, but the results for the patient's samples were negative. Consequently, we suspected that the original antigen-detecting rapid test result may have been a false-positive.

Two weeks after onset, an antibody test (Elecsys® Anti-SARS-CoV-2) was performed on a serum sample from the patient at LSI Medience (Tokyo, Japan), but the result was negative. Upon receiving these results, a second SARS-CoV-2-specific antigen test (ESPLINE SARS-CoV-2®) was conducted on a new nasopharyngeal swab sample collected from the patient 1.5 months after onset, which was weakly positive (Fig. 1) despite the patient experiencing no symptoms. Furthermore, the SARS-CoV-2 RT-PCR (using a Cobas® z480 analyzer) result for a nasopharyngeal swab sample collected at the same time was negative. Thus, we concluded that antigen test results were false positive.

After that, 7 patients were admitted to our hospital because the same antigen test (ESPLINE SARS-CoV-2®) was positive. But 5 of them seemed to be false positives because the 5 patients had negative for RT-PCR performed thereafter. Other hospitals in Japan have been also encountering many false-positive cases in antigen tests. Thus, false-positive SARS-CoV-2-specific antigen test results may be more common than that currently thought.

Serious problems arise if a patient is diagnosed with COVID-19 based on a false-positive because not only is the patient forced into unnecessary hospitalization, but they also face the risk of becoming infected with SARS-CoV-2 from other COVID-19 patients. Therefore, if SARS-CoV-2-specific antigen test results are weakly positive, the infection route is unknown, or the symptoms are atypical, confirming the antigen test result using other test methods is necessary.

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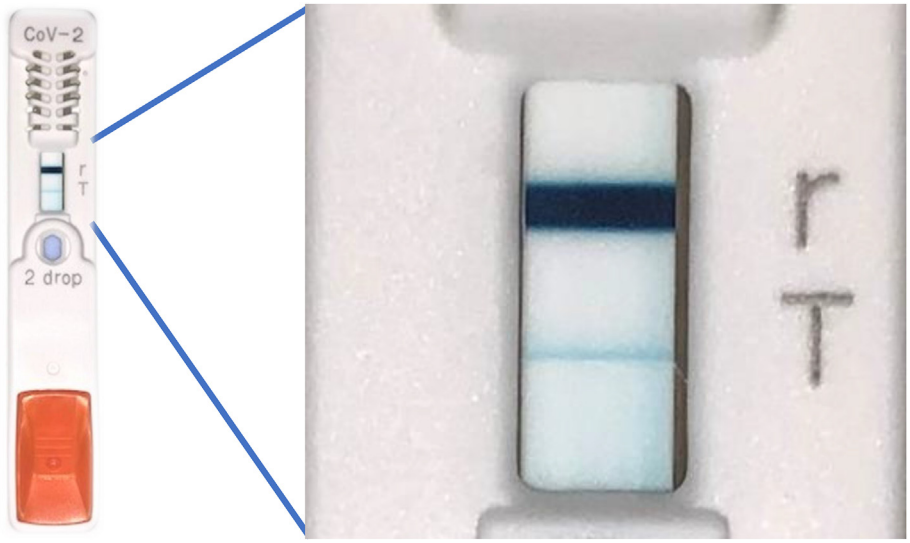

Figure 1. SARS-CoV-2-specific antigen test (ESPLINE SARS-CoV-2®, Fujirebio Inc.) results for this case at 1.5 months after onset. The figure on the right is an enlargement of a part of the kit. The r line is the reference line, and the T line is the judgment line. Because the judgment line was thinner and lighter than the reference line, we judged it weakly positive.

In some countries and regions where RT-PCR cannot be easily performed or when influenza and COVID-19 co-exist, immunochromatographic SARS-CoV-2-specific antigen tests may be widely used for COVID-19 diagnosis. However, as seen in this case, unless the sensitivity and specificity of the antigen-detecting rapid test are further improved, it is not recommended for clinical use as a single modality for COVID-19 diagnosis.

Declaration of Competing Interest

None.

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