

# Urine nucleic acid test positive in an asymptomatic patient with novel coronavirus 2019 infection: a case report

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## Case Report

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# Abstract

**Background:** With the emergence of coronavirus disease 2019 in many places around the world, the main medical resources currently focus on the treatment of confirmed patients and the screening of suspected cases. Asymptomatic patients are difficult to detect, but they may be contagious, which makes epidemic control more difficult. We found a case of asymptomatic patient with positive urine coronavirus nucleic acid test, and we hope to attract attention of all circles.

**Case presentation:** An asymptomatic patient with novel coronavirus infection was found in an epidemiological investigation of patients with confirmed coronavirus disease 2019. The patient was admitted to the hospital on February 24, 2020. She had no clinical manifestations such as fever, dry cough, and fatigue, and no abnormal signs. The examination showed that her throat swab was negative for nucleic acid but the urine was positive for nucleic acid. She was given antiviral and symptomatic supportive treatment. On February 26, her throat swab was checked for nucleic acid positive. On March 3 and 5, her throat swab and urine nucleic acid were negative. On March 9 and 12, her throat swab nucleic acid were negative. The patient was discharged from the hospital on March 13 and continued to be isolated and observed outside the hospital. Follow-up was conducted on March 26, the patient did not have any discomfort, the throat swab nucleic acid test was negative, and the isolation was lifted.

**Conclusion:** There are asymptomatic patients with coronavirus disease 2019, and their urine may be one of the sources of infection.

## Background

Since the first case of coronavirus disease 2019 (COVID-19) was confirmed in Wuhan, Hubei Province, China in December 2019, more than 200 countries including Korea, Italy, the United States, Australia, Algeria, and Brazil have also reported cases of COVID-19. The outbreak is classified as an international public health emergency by WHO. As of 14:20 on April 2, 2020, there were 82,725 confirmed cases in China and 856,423 in other countries. COVID-19 has been proven to be person-to-person [1, 2]. Current evidence shows that COVID-19 is mainly transmitted by droplets and close contact [3]. Although live novel coronavirus (SARS-CoV-2) has been isolated from feces, there is no evidence as to whether it can be transmitted via the fecal-oral route [4]. There are also reports of positive nucleic acid in feces, anal swabs, urine, and tears of patients diagnosed with COVID-19 [4-6], suggesting the diversity of COVID-19 transmission pathways. Although there have been reports of positive cerebrospinal fluid, tears, saliva, and urinary nucleic acid in confirmed patients, no virus beads have been isolated and it can only be inferred to be infectious.

Asymptomatic infections have no obvious clinical manifestations, and even no changes in chest imaging. It is difficult to find in daily life and routine diagnosis and treatment, and it is easy to cause loopholes in epidemic prevention and control. COVID-19 patients with unknown infections have been reported. The existence of patients with asymptomatic infection has been speculated, and it may be the

cause of the continuous outbreak [7, 8]. Our team found urine nucleic acid positive in an asymptomatic patient with novel coronavirus 2019 infection, suggesting a new route of transmission, hoping to attract attention and provide help for epidemic prevention and control.

## Case Presentation

Patient, female, 9 years old, Handan, Hebei (resident of Liulin, Shanxi). She was admitted for “A history of close contact with SARS-CoV-2 nucleic acid positive patient”. She returned to Handan, Hebei, from Liulin, Shanxi, with her mother and brother on January 13, 2020. Her uncle returned to Handan, Hebei from Beijing on January 18 and had close contact with the patient from January 18 to February 10. The patient had fever symptoms on February 4, 2020, with a maximum body temperature of 37.3°C. After taking cold medicine (specifically unknown), her body temperature returned to normal without symptoms of chills, sore throat, cough, and sputum. Her uncle returned to Beijing on February 11, then developed fever, sore throat, and cough symptoms on February 16. Her uncle was diagnosed SARS-CoV-2 nucleic acid positive on February 22 at a fever clinic in Beijing China-Japan Hospital. During the epidemiological investigation of her uncle, it was found that the patient and her mother and younger brother were all asymptomatic. On February 23, they went to the local hospital fever clinic. The patient’s chest computed tomography (CT) scans revealed no abnormalities and throat swab was weakly positive for SARS-CoV-2, then she was admitted to our hospital for isolation and treatment on February 24.

Physical examination on admission included body temperature of 36.8°C, blood pressure of 107/57 mmHg, respiratory rate of 20 breaths per minute, pulse of 88 beats per minute, and oxygen saturation of 97% in ambient air. Pharynx has no congestion and auscultation of her double lungs showed clear breath sounds and no dry-wet rales. She was normally healthy and had no underlying diseases.

Correlation biochemical tests showed no abnormalities:  $\beta$ 2-microglobulin 1.80 mg/L, urea 3.40 mol/L, creatinine 38  $\mu$ mol/L, alanine aminotransferase 13.0 lu/L, glutamine transaminase 19.0 lu/L, albumin 47.7 g/L, creatine kinase 67 lu/L, creatine kinase isoenzyme 27, lactate dehydrogenase 199 lu/L, myoglobin <21 ng/mL.

Improved detection of relevant infection indicators showed no obvious abnormalities: slightly higher C-reactive protein 0.61 mg/L, procalcitonin 0.036 ng/ml, erythrocyte sedimentation 23 mm/h, white blood cells  $6.18 \times 10^9$ /L, neutrophil count  $3.44 \times 10^9$ /L, lymphocyte count  $2.40 \times 10^9$ /L, neutrophil ratio 55.7%, lymphocyte ratio 38.8%, influenza A and B virus RNA negative, urine SARS-CoV-2 nucleic acid test positive, negative SARS-CoV-2 nucleic acid test in throat swabs. On February 26, the SARS-CoV-2 nucleic acid test of the throat swab was positive. Real-time fluorescent reverse transcription polymerase chain reaction detection mainly targets the open reading frame 1a/b (ORF 1ab) and nucleocapsid (N) genes in the SARS-CoV-2 genome. Being positive is the criterion for the diagnosis of SARS-CoV-2 infection [3].

After admission (February 26), we completed a high-resolution CT (HRCT) scans of the patient showing small nodules in the anterior outer basal segment of the left lower lobe (Fig. 1c).

## Discussion And Conclusion

SARS-CoV-2 is a single-stranded positive-strand RNA virus, and the known acute respiratory syndrome coronavirus (SARS-CoV) and the Middle East respiratory syndrome coronavirus (MERS-CoV) belong to the  $\beta$ -coronavirus genus [9]. Although SARS-CoV-2 is less pathogenic than SARS-CoV and MERS-CoV, the population is generally susceptible, and confirmed cases have been reported in more than 70 countries in the world. The common clinical manifestations of patients with COVID-19 are fever, dry cough, and fatigue, and a few patients may have digestive symptoms such as vomiting and diarrhea [1]. The underlying disease and elderly patients are more severe, and severe cases can quickly progress to acute respiratory distress syndrome, septic shock, and multiple organ failure [3]. Asymptomatic infections have no obvious clinical symptoms and signs and are difficult to detect. Recent studies have shown that a large number of infections occur in patients before the symptoms of COVID-19, suggesting that asymptomatic infections may be contagious [10–12]. In this case, the patient had fever on February 4th, and the body temperature returned to normal after oral administration of cold drug, which does not exclude that the fever at that time was caused by SARS-CoV-2 infection. Her uncle suffered fever, sore throat, and cough. was diagnosed SARS-CoV-2 nucleic acid positive on February 22 at a fever clinic in Beijing China-Japan Hospital. Fortunately, the patient was discovered during the epidemiological investigation of her uncle by the epidemic prevention staff, and the patient did not complain when she was admitted to the hospital.

Nucleic acid testing is the “gold standard” for patients diagnosed with COVID-19. Throat swabs, sputum and other respiratory secretions, blood, feces, etc. can be used as samples for SARS-CoV-2 nucleic acid detection, but they are susceptible to the course of the patient, the location of the material, and the type of material. Some patients are positive after multiple nucleic acid tests. Therefore, there may be false negatives in nucleic acid detection. Chest CT is the primary means of assessing the condition of suspected and confirmed COVID-19 patients, but imaging findings may be delayed and need to be distinguished from other viral pneumonias. This patient was found in the epidemiological investigation of confirmed cases. On February 23, her throat swab was positive for nucleic acid test (outer hospital), and chest CT (outer hospital) showed no obvious abnormalities. She was admitted to our hospital for isolation and treatment on February 24, and the tests showed that her urine nucleic acid was positive, but her throat swab was negative. On February 26, her throat swab was positive for nucleic acid, considering the false negative of throat swab on February 24. Her HRCT presented small nodules in the anterior outer basal segment of the left lower lobe (Fig. 1c), which our team considering nothing to do with novel coronavirus pneumonia. In this case, the throat swab and urine nucleic acid tested positive, and there were no clinical symptoms and changes in imaging of viral pneumonia. The family members (uncle) in close contact were diagnosed, and her mother and brother were also diagnosed asymptomatic infection (negative urine nucleic acid), so she was considered to be a family-clustered asymptomatic infection. On March 3 and 5, the patient was reviewed and her throat swab and urine nucleic acid were negative, and

no complaints were reported. On March 9 and 12, her throat swab nucleic acid were negative. The patient was discharged from the hospital on March 13 and continued to be isolated and observed outside the hospital. Follow-up was conducted on March 26, the patient did not have any discomfort, the throat swab nucleic acid test was negative, and the isolation was lifted.

Based on current epidemiological data, COVID-19 is mainly transmitted through droplets and close contact [3]. Although live SARS-CoV-2 has been isolated from feces, there is no evidence as to whether it can be transmitted through the fecal-oral route [4]. Previous studies have shown that MERS-CoV has fecal-oral transmission characteristics [13]. In this case, the patient was positive for urine nucleic acid when she was admitted to the hospital, suggesting that the patient may excrete the virus and may become a source of infection. According to the latest COVID-19 diagnosis and treatment guidelines in China, the diagnosis can be confirmed as long as the nucleic acid test is positive. Compared with nasopharyngeal swab and sputum specimens, feces and urine sampling is more convenient, and the quantity and quality of specimens are easily satisfied. Increasing their detection may increase the detection rate of asymptomatic infection.

Among major infectious diseases, asymptomatic infection has very important epidemiological significance (such as acquired immune deficiency syndrome, tuberculosis) [14, 15]. Asymptomatic patients with SARS-CoV-2 infection have no clinical symptoms or even biochemical changes, so they are mainly found through clustered epidemiological investigation and infectious disease source follow-up investigation. Asymptomatic infection should attract the attention of health administrative departments and researchers. Understanding and grasping the situation of asymptomatic infection not only facilitates the monitoring of the patient's condition, but also facilitates the establishment of a virus model to understand its scope and spread. At the same time, it should also be noted that whether asymptomatic infection can be transmitted through droplets and contact, and whether excreta (urine, feces, vomit, etc.) can be transmitted from person to person through contamination of water, food and the environment, it should be the control focus of epidemic prevention. The public should reduce going out, or wearing of masks when going out, put an end to crowd gathering, wash hands frequently. Taking a good job of disinfection and other correct protective measures are effective means to prevent infection.

COVID-19 can be present in asymptomatic individuals, and their urine may be one of the sources of infection.

## Abbreviations

SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2; COVID-19: Coronavirus Disease 2019; CT: computed tomography; HRCT: high-resolution CT; SARS-CoV: Severe acute respiratory syndrome coronavirus; MERS-CoV: Middle East respiratory syndrome coronavirus; ORF 1ab: open reading frame 1ab; N: nucleocapsid protein.

## Declarations

## **Ethics approval and consent to participate**

Written informed consent has been obtained from the patient's mother. The case report was written in accordance with the Declaration of Helsinki.

## **Consent for publication**

Written informed consent for publication of this case report was obtained from the patient's mother.

## **Availability of data and materials**

All data and material analyzed during this study are included in this published article.

## **Competing interests**

The authors declare that they have no competing interests.

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## **Authors' contributions**

RJ and LD collected the data and participated in manuscript writing, they contributed equally in this work. WY and CX conceived this study and participated in manuscript writing. WC, ZX, WJ, WY, TY, SY, GY and ZQ participated in patient management. All authors have read and approved the final manuscript.

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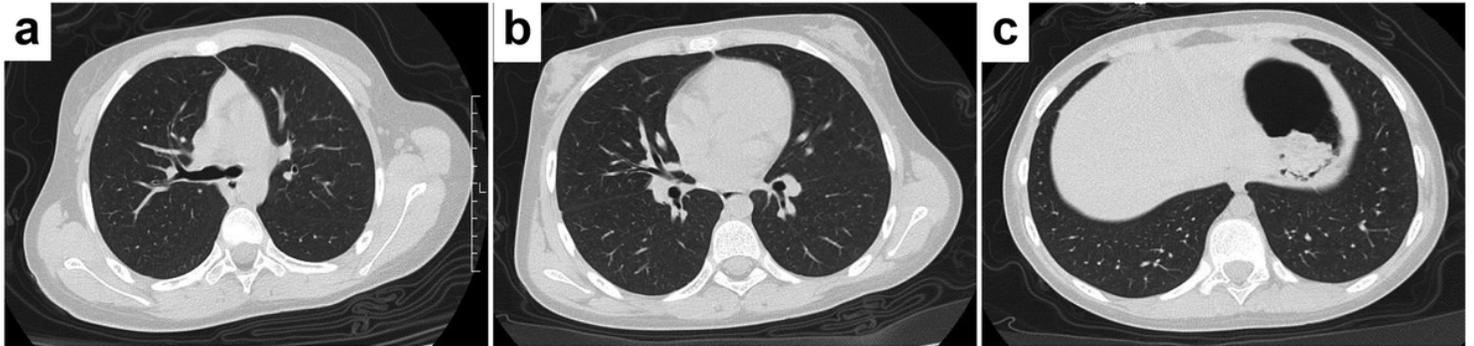
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## Figures



**Figure 1**

High-resolution CT of the chest. a, b: No abnormalities were seen at the level. c: The left lower lobe of the anterior and outer basal nodules

## Supplementary Files

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