A COVID-19 Case Report from Asymptomatic Contact: Implication for Contact Isolation and Incubation Management

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Abstract

Background: An outbreak caused by coronavirus disease 2019 (COVID-19) occurred in Wuhan City, Hubei Province, China, in December 2019. Up to March 2, 2020, at least 80180 cases have been reported. Most of the patients had a history of visiting Hubei Province or contacting with people who had ever stayed in or passed by Hubei Province, or exposed to symptoms. Some patients got infected only from asymptomatic contacts. This study aimed to report the epidemic features and lab identification of a patient confirmed with COVID-19 infection only from asymptomatic contact.

Case presentation: A 44-year-old man, who lives in Nanchang, Jiangxi province, China, suffered from cough on January 27.

Fever symptoms appeared on January 28, with a maximum temperature of 38.8°C, accompanied by cough, sore throat, headache, fatigue, muscle ache, joint ache, and other symptoms. The symptoms continued until he was hospitalized on January 30. Coronavirus conventional polymerase chain reaction (PCR) assay was positive for the throat swab sample.

Conclusions: This report suggests that in the early phase of COVID-19 pneumonia, routine screening would miss patients who are virus carriers. Highlighting travel history is of paramount importance for early detection and isolation of SARS-CoV-2 cases.

Keywords: COVID-19, Coronavirus, infection, particular contacting

Background

Coronavirus (CoV) is a kind of single strand positive RNA virus [1]. Many kinds of mammals, such as hedgehog, pangolin, civet, bat, et al, can serve as storage hosts of coronavirus [2-6]. Six CoVs have been identified to be pathogenic, including four endemic (HCoV-OC43, -229E, -NL63, and -HKU1) and two epidemic (SARS-CoV and MERS-CoV) viruses [7,8]. Unfortunately, an outbreak caused by coronavirus disease 2019 (COVID-19) occurred in Wuhan City, Hubei Province, China, in December 2019. Up to March 2, 2020, at least 80180 cases have been reported. Most of the patients had a history of visiting Hubei Province or contacting with people who had ever stayed in or passed by Hubei Province, or exposed to symptoms [9].

Some patients got infected only from asymptomatic contacts. This study aimed to report the epidemic features and lab identification of a patient confirmed with COVID-19 infection only from asymptomatic contact (Fig.1).

Case presentation

A 44-year-old man, who lives in Nanchang, Jiangxi province, China, got a fever of 38.8°C on 27th January. He wore a mask and drove himself to see a doctor in a local hospital in Nanchang on 30th January. He was immediately hospitalized in an isolation room. Coronavirus conventional polymerase chain reaction (PCR) assay was positive (Fig.2) for the throat swab sample based on the COVID-19 acid amplifying kids of Novel Coronavirus (2019-nCoV) Real Time RT-PCR Kit. The patient is an instructor at a university and has been to the city of Huangmei, Hubei province. The patient stayed with his parents and his brother's family, but denied any exposure to a febrile patient, wild animals, or visits to wet markets, including the Sea Food Market in Wuhan.

Before the onset of symptoms, on January 23, 2020, the patient, along with his wife and son, drove from Nanchang to Honghu City, Hubei province, where his parents and brother live. They arrive on the same day. and didn't stop by any of the expressway service area. After arriving, they stayed at home and didn't present at any public place in Honghu City. In addition, his parents stayed at home 20 days with his younger brother's family before they got back. His younger brother and one of his brother's children visited Wuhan on January 5 and came home on January 6, 2020. After staying with his parents and brother's

family for three days, on the 25th, the patient drove back to Nanchang and arrived on the same day. On the way home, they stopped by Tongshan service area, Hubei Province, without close contacting with any other people. After arriving home in Nanchang city, Jiangxi province, none of them left their residence.

The patient began to cough at 9:00 pm. on January 27, 2020, and took Cefalexin capsule by himself. Fever symptoms appeared at 9:00 am on January 28, with a maximum temperature of 38.8℃, accompanied by cough, sore throat, headache, fatigue, muscle ache, joint ache and other symptoms(Fig. 3). The symptoms continued until he went to the doctor. At the hospital's fever clinic, he was given blood routine examination and lung CT examination (Fig.4).

He is not obese and is without previous basic disease. On admission (January 30, 2020), the physical examination revealed a body temperature of 38.8°C, a respiratory rate of 19-21 breaths per minute, a pulse of 62-88 per minute, and a blood pressure of 76/128 mmHg. The initial chest radiography showed glass density shadow of both lungs (Fig. 4A), but higher solution computed tomography (HRCT) on February 3, 2020 (day 4 of illness) showed multiple, ground-glass opacities located in both subpleural spaces (Fig. 4 B-E). The laboratory tests showed mild changes, including neutrophils, lymphocyte. During admission, he developed nasal congestion, cough, sputum and pleuritic chest discomfort.

On January 31, 2020, blood routine examination showed the results: WBC $7.4*10^9$/L，LY $0.6*10^6$/L. Another routine test on January 31 showed WBC $4.4*10^9$/L, a deeply decreased, CRP 4.9mg/L, and lungs CT examination at 20:00 PM showing

lung lesions significantly larger than the last day.

Further tracing the source of virus

Before the patient's vist to Honghu, his relatives, including his parents and brother's family, had no particular contacting and clustering disease. After he was hospitalized, results of coronavirus conventional polymerase chain reaction (PCR) assay with his parents and brother's family, performing twice every other day, showed negative. There is no farmer's market near their residence. He did not go to any farmer's market. His wife and son, two close contacts with final contact time of January 30, 2020, had no symptoms or signs till today, February14, 2020 (Fig 5 and Fig 6).

Discussion and conclusions

This patient was diagnosed SARS-CoV-2 infected with PCR positive result and negative results with seasonal influenza and adenovirus infection, despite flu-like symptoms and pneumonia during the first week of illness. In this case report, the COVID-19 caused by the novel coronavirus infection can be diagnosed by PCR test or clinical symptoms combined with CT scan [10].

It is difficult to know exactly the incubation period and infection period of COVID-19 pneumonia [11]. What made the problem more confusing was that who passed the infection to him could not be predicted because any of the relatives could have served as an intermediary of the virus except for his wife and son (Fig.7). None of his relatives showed signs of infection, not even a slight cough till February 19, 2020.   The coronavirus nucleic acid testing produced negative results for all four of

them, except his parents and one of his nephews. No suspected or confirmed cases were reported in Nanchang within 14 days of his departure from the site on January 23.

This case highlights the possibility of developing Severe Acute Respiratory Syndrome Coronavirus 2(SARS-CoV-2) infection and epidemic from asymptomatic infection. This indicates the need for contact isolation, especially for those who return from the epidemic area without symptoms [12-13]. In addition, this report suggests that in the early phase of COVID-19 pneumonia, routine screening can miss diagnosing patients who are virus carriers. how common are such transmissions of asymptomatic infection remains to be determined. The scale of transmission from asymptomatic contact during the early phase of infection needs to be explored urgently.

In conclusions, this report suggests that in the early phase of COVID-19 pneumonia, routine screening would miss patients who are virus carriers, and highlighting travel history is of paramount importance for early detection and isolation of SARS-CoV-2 cases. When there is a global outbreak trend of COVID-19, It's hoped this report can be used for reference in epidemic prevention and control.

Abbreviations

COVID-19: Corona Virus Disease 2019; CoV: Coronavirus; nCoV: Novel Coronavirus; SARS: Severe acute respiratory syndrome; MERS: Middle East respiratory syndrome; PCR :Polymerase chain reaction ; CT: Computed tomography ; HRCT :Higher solution computed tomography; WBC:

White blood cell; LY: Lymphocyte; CRP:C-reactive Protein; PM: Post meridiem

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Authors' contributions

C-QZ,S-DG and W-LT wrote the manuscript and carried out the analysis; C-HW and B-Z designed and supervised this study;, YL,HL,Y-SL and C-MS investigated the case; X-HY ,FY,L-LA and R-CL involved in laboratory works. All authors read and approved the final manuscript.

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Availability of data and materials

All original data and materials are available from the corresponding author upon request.

Ethics approval and consent to participate

The ethics committee approved the study. Written informed consent has been obtained from the patient in accordance with the Declaration of Helsinki.

Competing interests

The authors declare that they have no competing interests.

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Figures and Legends
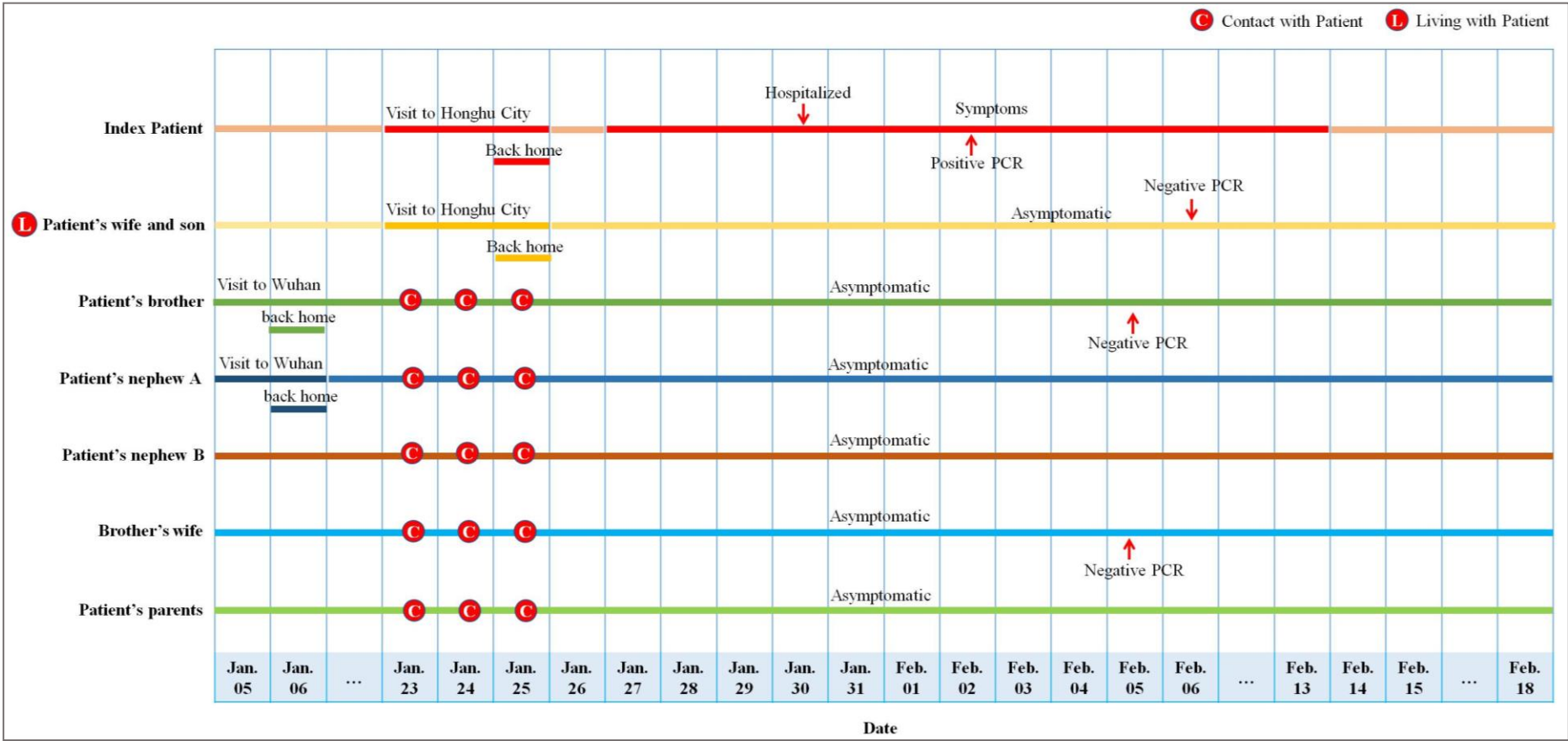
Fig. 1 Timeline of Exposure to Index Patient with Asymptomatic 2019-CoV Infection in China.
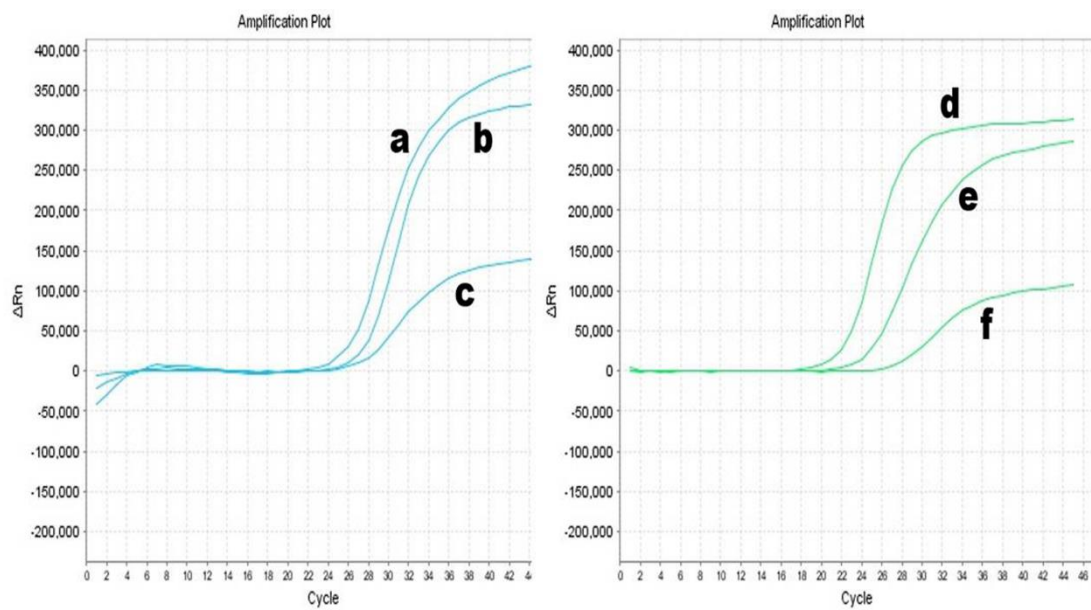
Fig. 2 Imaging of the patient using reverse transcription PCR. A：Positive Control of ORF1ab(a),

N(b), E(c).B：Specimen Detection of ORF1ab(d), N(e), E(f).
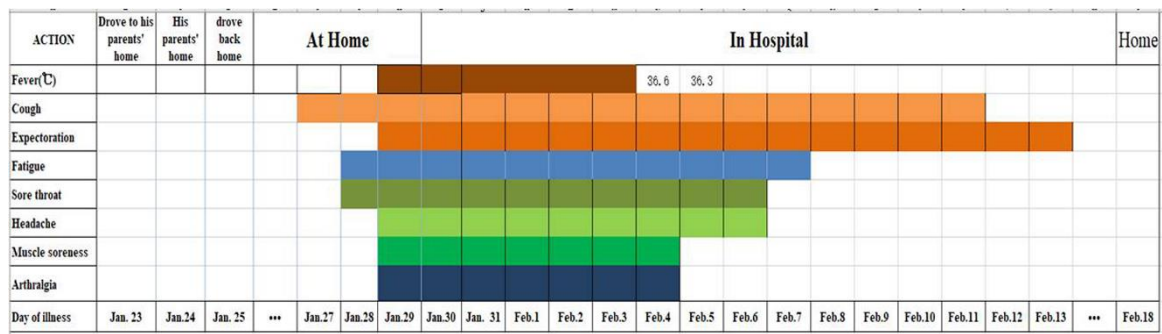
Fig. 3 Symptoms and maximum body temperatures according to the day of illness,, January 27 to February 18, 2020.
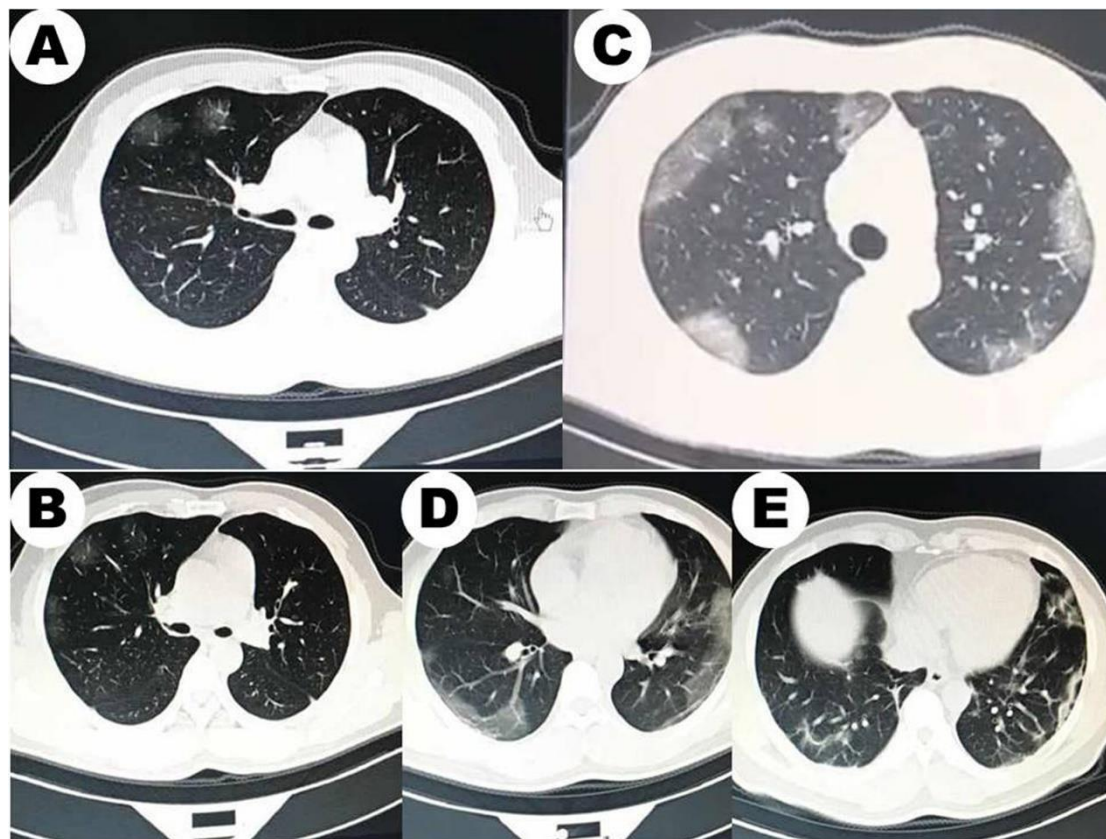
Fig. 4 Chest imaging of the patient. (A-B) Chest CT scans of the lung on January 30 and January 31, 2020 (3-4 days after the symptom onset) slight pulmonary infiltration. (C-D) The CT scans taken on February 03, 2020 (8 days after the symptom onset) obvious pulmonary infiltrates. (E) The CT scans taken on February 10, 2020 (15 days after the symptom onset). CT: high-resolution computed tomography.
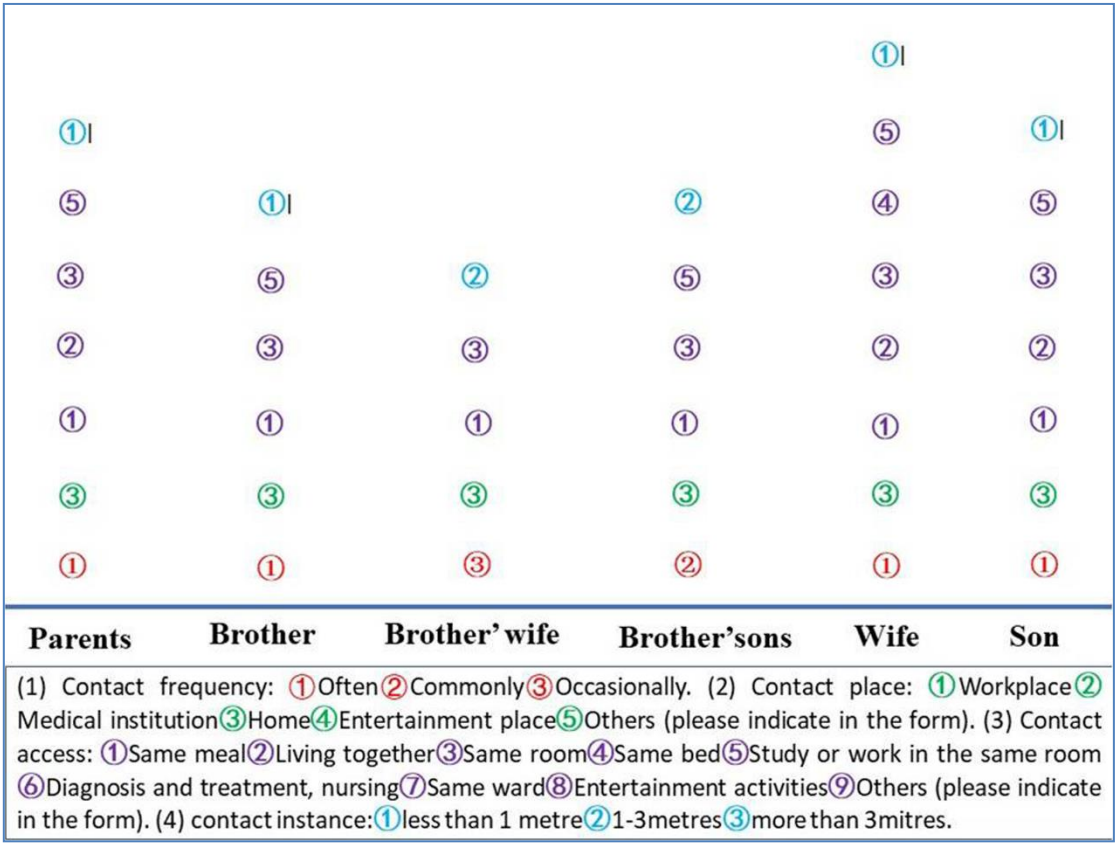
Fig. 5 Contact styles of the patient with his relatives and families.
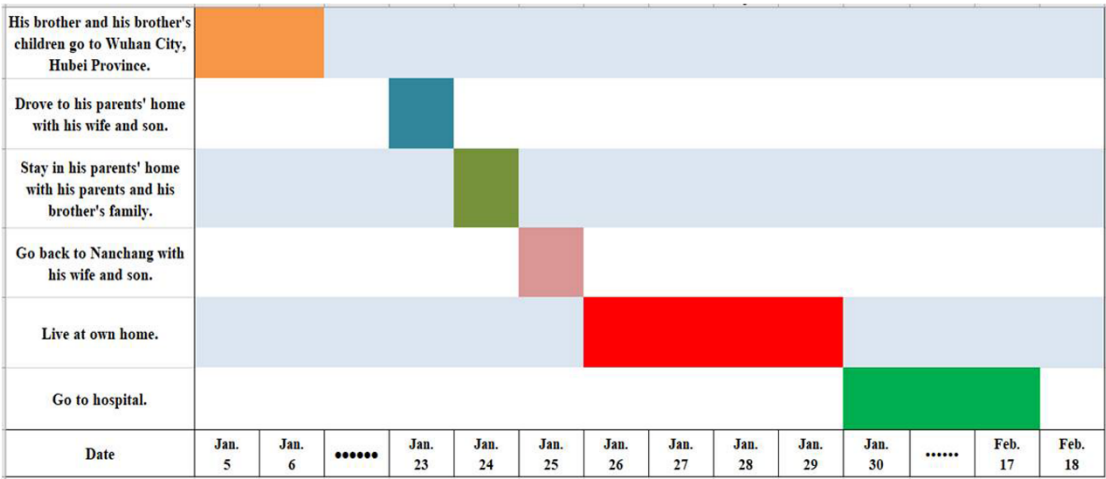
Fig. 6 Travel and Residence History of the patient and his family.
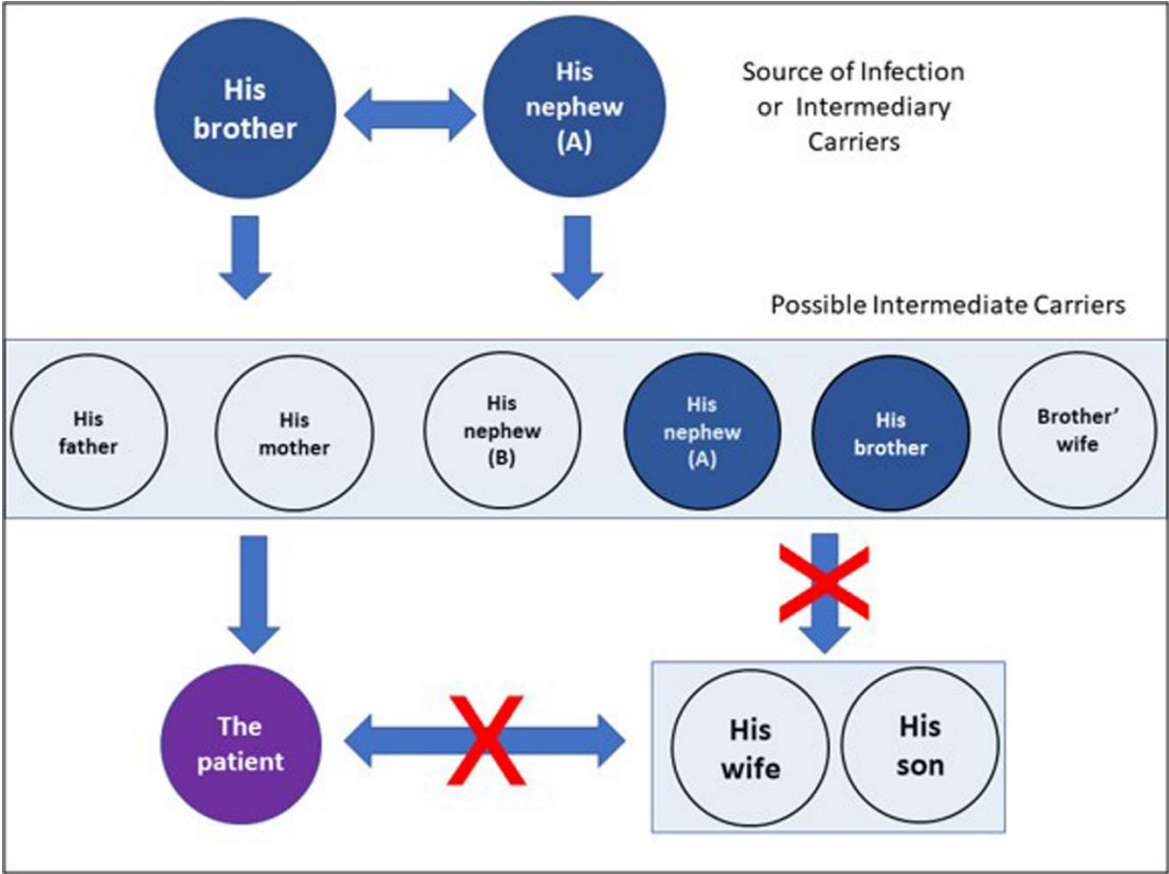
Fig. 7 Possible transmission of the virus among relatives.