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Letter to the Editor

Infection Control in the Medical Imaging Department During the COVID-19 Pandemic

Dear Editor,

Until March 25, 2020, more than 416,686 people have been diagnosed with coronavirus disease 2019 (COVID-19) infection in 196 countries and regions all over the world. Reverse transcriptase–polymerase chain reaction test of COVID-19 is the gold standard for diagnosis, but the shortage of supply test kits may not meet the needs of a growing infected population. Chest computed tomography (CT) has a high sensitivity for diagnosis of COVID-19 cases in the early stage and helpful for patients with high clinical suspicion of COVID-19 infection but negative reverse transcriptase–polymerase chain reaction screening [1–3].

With the extensive application of chest CT examination in the diagnosis of COVID-19, measures to avoid the infection of radiographers during the examination are very important [4]. Many health care workers were also infected during the severe acute respiratory syndrome outbreak [5]. To reduce the risk of radiographers being infected during the examination, it is recommended that the medical imaging department pay attention to the following points (Figure 1):

First, an emergency prevention and control team for COVID-19 should be set up including the department director, radiologists, radiographers, nurses, and clerical staff. Based on the guidelines and on protection experience, this radiologist-nurse-radiographer interactive emergency management program (RNRIEMP) is designed to optimize the examination process for patients with fever.

Second, according to function, the radiology examination area should be divided into a clean area, a semi-polluted area, and a polluted area; isolated digital radiography and CT examination rooms and a dedicated fast track and elevator for patients with fever should be set up.

Third, central air conditioning should be turned off immediately before the suspected patients arrive. A study found that the air flow in central air-conditioning systems could spread the virus (the space of the *Diamond Princess* cruise ship was relatively closed, its dependence on the central

air-conditioning system was high, and the isolation effect was poor, leading to a large-scale COVID-19 infection) [6].

Fourth, the disinfection efforts within the medical imaging department should be strengthened. In addition to ultraviolet disinfection lamps, a special air-disinfecting machine should be run in the isolated digital radiography and CT examination rooms 24 hours a day. After the patient is examined, immediately wipe the surface of CT equipment and the ground of the examination room with chlorine-containing disinfectant (1,000 mg/L). And spray disinfection in the special channel used by suspected patients with the hydrogen peroxide air sterilizer. (With the help of the high-frequency resonance of the ceramic atomizer, a special sterilizer can atomize the disinfectant, throw off its water surface, and form 1 to 5 micron particles which float in the air to conduct a comprehensive sterilization of the air and objects.)

Fifth, owing to the shortage of protective materials, the protective wearable equipment requirements for radiology staff in different positions differ according to the specific nature of their work (general patient examination, suspected patient examination). The purpose of this differentiation is to allow detailed planning for and allocation of reusable resources given the shortage of protective materials.

Sixth, communication with the fever clinic should be strengthened. The living history of the areas with COVID-19 outbreaks and the contact history of confirmed COVID-19 patients are important evidence for the diagnosis of COVID-19 patients. The doctors in the fever clinic can conduct preliminary screening of the patients by tracing the contact history and the exposure history of patients in areas with COVID-19 outbreaks and can determine each patient's degree of suspicion. Patients with suspected COVID-19 infection should be guided and carefully transferred from the fever clinic to the medical imaging department through the fast track for examination to reduce their movement range and avoid transmission to others. After the patients are examined, they should be guided back to the isolation area of the

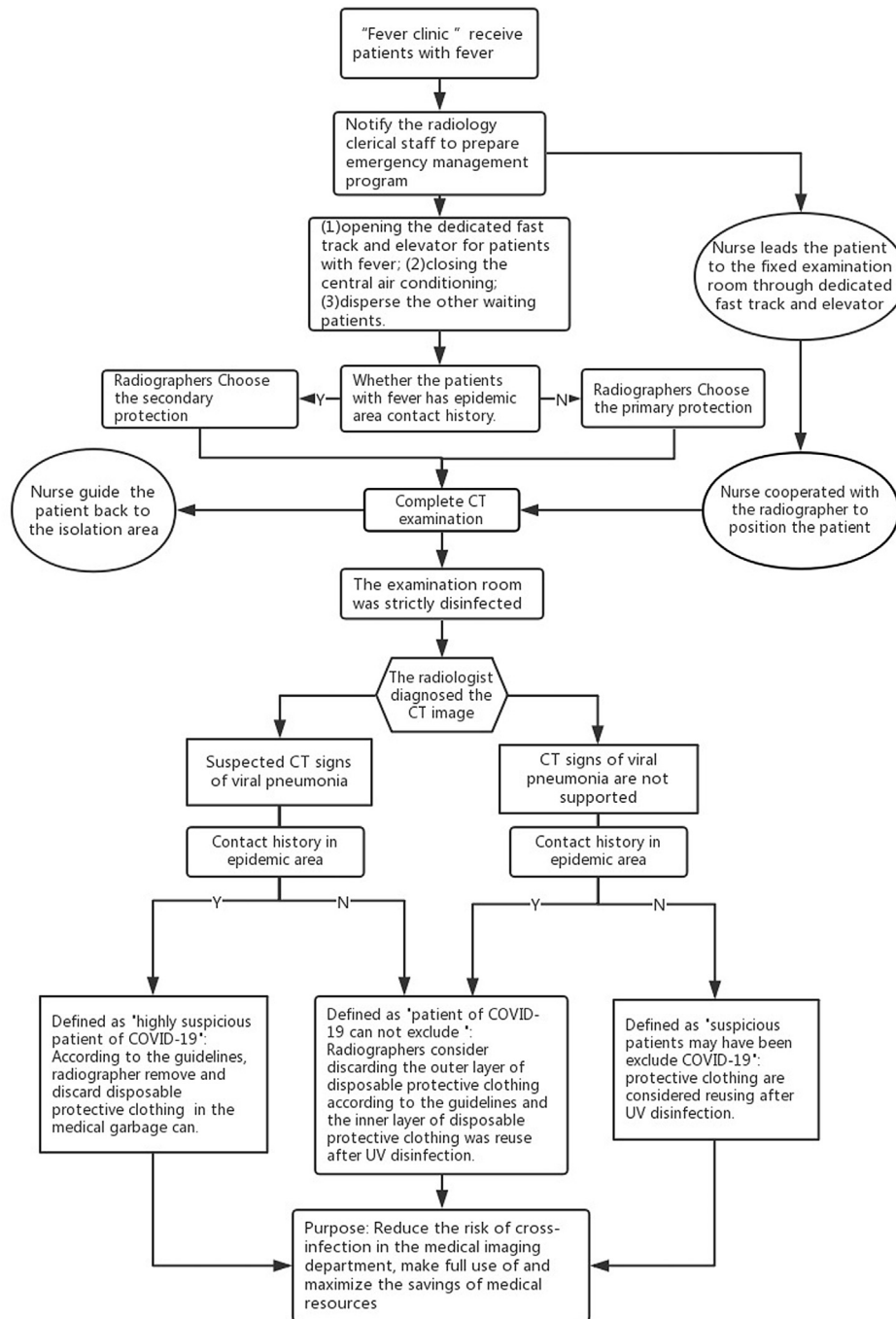


Figure 1. Flow chart of emergency management procedure (RNRIEMP).

fever clinic immediately to reduce their time in the closed environment and avoid cross-infection among patients during the examination.

Seventh, to further reduce the use of protective equipment, we may consider training colleagues in the fever clinic to coordinate with radiographers when they guide the patients to the medical imaging department for chest CT examination.

The radiographers can remain at the operating post to avoid direct contact with the patient. This can reduce the risk of cross-infection and the use of protective clothing, which is the biggest expense in terms of medical resources. In this way, the risk of cross-infection between patients and radiographers can be avoided, while the consumption of medical supplies is reduced.

This RNRIEMP is based on the ongoing work experience gained during the prevention and control of COVID-19 in our medical imaging department. This program can optimize the examination process of patients with fever, reduce the risk of infection of radiographers, reduce the risk of cross-infection in the medical imaging department, and make full use of and maximize the savings of medical resources.

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