

Suggestions of Infection Prevention and Control in Digestive Endoscopy During Current
2019-nCoV Pneumonia Outbreak in Wuhan, Hubei Province, China

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Up to 3 February 2020, over 15000 laboratory-confirmed cases of novel coronavirus (2019-nCoV) infection have been reported in China, of which more than 60% are in Wuhan City and Hubei Province. The patients display a wide range of symptoms. Some patients could be asymptomatic or show minimally symptoms after infected. Although fever, fatigue and dry cough are the most common symptoms, diarrhea has been observed in many young patients as first-symptom, while abdominal discomfort and poor appetite shown in aged population. Our data had shown that more than 50% infected or suspected patients present diarrhea (16/28). The transmission rate indicated by reproductive number (Ro) is 4.08 according to a most recent study^[7]. Although the total mortality rate of Wuhan new pneumonia is only 2%, according to the analysis of public data, the mortality rate of severe cases of Wuhan pneumonia is 10-40% in different days of the pneumonia outbreak in Wuhan.

As the Chinese Spring Festival holiday has come to an end, most endoscopy centers in China are going to open to patients who need endoscopic operation. 2019-nCoV has been described to be transmitted from respiratory secretions, feces and contaminated environmental surfaces^[1,2]. And this virus is not only spread by patients with symptoms, but also by asymptomatic persons. Due to the inevitable exposure of respiratory secretions during Up GI endoscopy and exposure of feces during colonoscopy, it's highly risky for all the people in endoscopy centers, especially the staff in operation rooms. To prevent 2019-nCoV transmission in endoscopy centers, we summarize and recommend the following infection prevention and control workflow in digestive endoscopy during current outbreak of 2019-nCoV according to the epidemiological characteristics we observed, combined with past experience and literature.

1. In the outbreak area such as Hubei province, only emergency endoscopy should be performed to treat patients with diseases such as acute gastrointestinal bleeding, foreign bodies in the gastrointestinal tract and acute suppurative cholangitis. In the epidemic area, after the following screening process, the basic protection requirements of the medical staff in the endoscopy center should reach at biosafety level 2 for all kinds of GI endoscopic procedures^[3,4]. Protection at biosafety level 3 is required for all endoscopic procedure in 2019-nCoV infected or suspected patients, and for those with very high risk of potential exposure to 2019-nCoV such as tracheal intubation, airway care and sputum suction in non 2019-nCoV suspected patients.
2. In the other area of China, the routine endoscopy should be performed with extra precautions to avoid the hospital transmission from those patients with 2019-nCoV infection. To identify the patients with potential 2019-nCoV infection is the first critical step in our prevention and infection

control. Chest CT is the most reliable approach base on our experiences, since some patients have no clinical manifestations or only slight digestive tract symptoms, CT scan can detect the presence of interstitial pneumonia in the outer zone of one or both lungs. Moreover, we found that CT manifestations may be earlier than nucleic acid detection, and a few patients with epidemiological history, typical chest CT manifestations and typical clinical outcome of 2019-nCov pneumonia, the viral pneumonia aetiologies in local region including 2019-nCov aetiology detection are all negative. Therefore, we believe that CT examination of lung is faster and more effective than etiology examination for the screening of 2019 nCov pneumonia. Compared with other kinds of viral pneumonia, the family aggregation of 2019-nCov pneumonia is more obvious.

The following workflow is recommended for all endoscopy center in China as reference at 2019-nCoV Pneumonia Outbreak Time in Wuhan, Hubei Province, China:

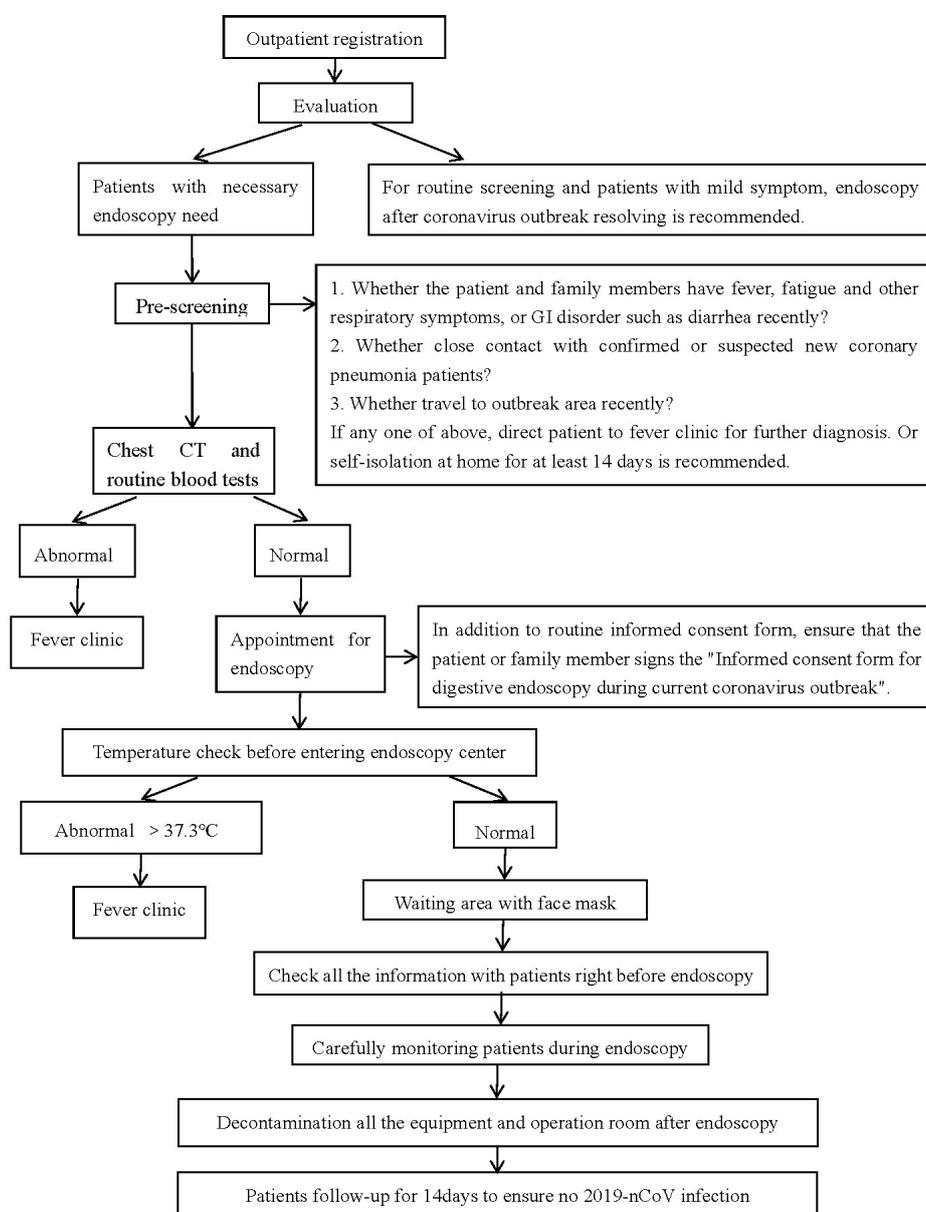


Figure 1 Diagnosis and treatment workflow in GI endoscopy center during 2019-nCoV outbreak

3. Staff protection

Another important step is to ensure a safe and clean working environment for the staff. The following approaches are recommended to prevent staff from 2019-nCoV transmission in endoscopy centers:

- (1) Any staff showing fever, fatigue and dry cough, or contact history with 2019-nCoV infected patients have to identified and treated appropriately.
- (2) Temperature checking is required for everyone before entering work area every day.
- (3) Hand hygiene: staff is required to wash hands following "six-step hand-washing method" or clean hands with quick-drying hand sanitizer for 2 minutes.
- (4) Protection at biosafety level 2 is required for staff directly in contact with patients, such as wearing the disposable gowns, N95 masks, goggles, caps and shoe covers during operation.
- (5) Protection at biosafety level 3 is required while performing tracheal intubation, airway care and sputum suction in non 2019-nCoV suspected patients.
- (6) Protection at biosafety level 3 is required while performing all kinds of endoscopic procedure in 2019-nCoV infected or suspected patients.
- (7) The exam report could be completed by other qualified staff in the cleaned area, supervised by doctors from the operation area. It could avoid the potential contamination.
- (8) After operation, staff is required to remove all the protective wearing, clean hands before entering the rest area. The general medical mask is required in all the area.
- (9) During the off-duty, staff is required to stay at home as much as possible.

4. Disinfection management

Since coronavirus including 2019-nCoV is easy to be inactivated by many commonly used disinfectants, there is no additional approach that should be taken for the endoscope cleaning and disinfection^[5,6]. As for endoscopy center environment, UV irradiation and ozone treatment are recommended for the cleaning and sterilization of air and all the surfaces such as endoscopic equipment, office table and the wall of examination room. Chlorine-containing detergent is recommended for floor cleaning every day^[5,6].

In general, we propose that endoscopy performances during the current combat against 2019-nCoV should be strictly limited throughout China. For the necessary operation, the pre-screening of patients and staff protection are critical to avoid the hospital transmission.

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