Challenges in lung cancer diagnosis during the outbreak of COVID-19

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Abstract

A pandemic of 2019 novel coronavirus diseases (COVID-19) outbreak is a major public health emergency that has spread in the fastest speed, and caused the most extensive infection world widely. Transbronchial biopsy (TBB) and computed tomography guided percutaneous needle biopsy (CTPNB) is the most common and significant method for the diagnosis of lung cancer. During the COVID-19 pandemic, the indications of TBB and CTPNB must be managed strictly. Therefore, it is extremely indispensable to perform meticulous and individualized management for lung cancer patients to protect the patients from COVID-19.

Key words: 2019 novel coronavirus diseases (COVID-19), Lung cancer, Diagnosis

Review criteria

During the outbreak of COVID-19, how to diagnose lung cancer patients is a challenge for clinicians.

Message for the clinic

TBB and CTPNB are the most significant diagnostic procedures in lung cancer. During the COVID-19 epidemic, in order to protect the patients and medical personnel safety, a series of appropriate measures need to be taken.

Introduction

Coronavirus disease 2019 (COVID-19), caused by the newly discovered strain of the coronavirus family severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has rapidly evolved into a worldwide pandemic and caused a public health emergency

of major international concern (1, 2). As a result, a profound restructured of hospital wards and clinical activities are happening worldwide to deal with the increasing number of COVID-19-positive patients who require hospitalization and intensive care support (3). This comprehensive reallocation of health resources is of particular concern to patients with potentially chronic diseases, including lung cancer.

Lung cancer is the most common cancer as well as the leading cause of cancer related deaths worldwide (4). TBB and CTPNB is the most common and important method for the diagnosis of lung cancer (5, 6). During the outbreak of COVID-19, the indications of TBB and CTPNB are strictly controlled. Screening for COVID-19 should be performed in patients scheduled for biopsy. For confirmed or suspected patients, three-level protective measures shall be taken during operation. Disinfection and isolation measures shall be strictly implemented during operation. Therefore, in this period of time, how to carry out meticulous and individualized clinical management of lung cancer patients still needs attention.

Epidemiological characteristics of cancer complicated with COVID-19

The Chinese Center for Disease Control and Prevention described and analyzed the epidemiological characteristics of 72,314 cases reported in mainland China. It showed that 107 of the basic diseases of patients with COVID-19 were cancer patients, of which 6 died, with a crude mortality rate of 5.6 %, which was 2.3 % higher than that of the whole population (7). A new study reveals the correlation between COVID-19 and cancer. Among the counted COVID-19 patients, about 1 % has cancer history, which is higher than the national cancer incidence rate of 0.29 %. Lung cancer is the most common cancer among COVID-19 patients. At the same time, cancer patients have a higher risk of serious events than non-cancer patients, and the symptoms worsen more rapidly (8).

The two cohorts showed that cancer patients are susceptible to infection and poor

prognosis during the COVID-19 pandemic. Analysis of the causes may be as follows: First, cancer patients are relatively older, the understanding of the epidemic is relatively slower than that of young people, and the prevention ability of the epidemic is poor; Second, due to the low immune function, poor resistance and high risk of infection in tumor patients. Third, patients are relatively poor physical condition, often complicated with many basic diseases, especially lung cancer. They have many basic diseases and poor lung function. Once COVID-19 is complicated, the symptoms often become severe and their condition may deteriorate rapidly (9).

Differential diagnose with other lung diseases

The novel coronavirus is susceptible to the immune characteristics of lung cancer patients. After novel coronavirus infection in healthy individuals, most of the clinical manifestations were fever, fatigue, dry cough, and a few of them were mainly symptoms of gastrointestinal symptoms or muscle soreness (10, 11). Novel coronavirus infection is sometimes difficult to distinguish from lung cancer patients who may have cough, fever, fatigue, or even dyspnea. The symptoms and CT manifestations are different from those of new coronavirus. In laboratory examination, novel coronavirus infection in healthy individuals showed that the white blood cell counts were normal or low, and the proportion of lymphocytes was normal or decreased. In some patients, aminotransferase, myozyme and myoglobin increased, while in lung cancer patients, due to the low white blood cell count of myelosuppression itself. It is difficult to distinguish from novel coronavirus infection.

For suspected novel coronavirus infection should be tested for nucleic acid in time, except for the epidemiology history. Nucleic acid detection is the gold standard, but there is also possibility of false negatives. Based on the original nucleic acid detection and sequencing, serological tests are added as the basis for new type of coronavirus specific IgM antibody and IgG or specific IgG antibody turned from negative to positive or 4 times higher than that in acute phase can also be diagnosed, and epidemiological history is also important.

Most of the chest CT manifestations are double lung lesions, and the imaging features are multiple ground glass opacity, which are mainly distributed outside the double lungs and under the pleura. At the same time, they can be accompanied by air bronchogram, interlobular septal thickening and pleura thickening. There is rarely pleural effusion and lymphadenopathy (12, 13). In view of the complexity of clinical and imaging manifestations, thin-layer CT of the chest is recommended scanning combined with previous image data and dynamic observation of laboratory examination results for identification.

Screening before TBB and CTPNB

As is well known, TBB and CTPNB are the most valuable diagnostic methods for lung cancer. In principle, operations should be reduced or avoided to the greatest extent during the COVID-19 epidemic. If the patient meets the indications of relevant operations and has no contraindications, COVID-19 should be screened before operation. The screening of COVID-19 includes epidemiological history, body temperature, chest CT, blood routine, CRP, procalcitonin, D-dimer, liver enzyme, lactate dehydrogenase, muscle enzyme, and detection of respiratory tract pathogens, including influenza virus, adenovirus, etc. When chest CT shows multiple plaques and interstitial lesions, SARS-CoV-2 nucleic acid detection should be carried out to confirm the diagnosis. Since the nucleic acid detection of COVID-19 is false negative, caution should be exercised even if the first nucleic acid detection is negative (14).

Disinfection and isolation measures for biopsy operation

Environment and material

Suspected or confirmed patients must be in the negative pressure diagnosis room or isolation ward, prohibited from entering the ordinary bronchoscope room for

operation. Meanwhile, biopsy should be arranged in an independent negative pressure operating room. Since bronchoscope can be extended into human channel and contact with lumen mucosa, these devices need to pass biological tests regularly to ensure high level of disinfection. After operation, the operators should press the suction button, suck out the residual mucus in the biopsy tube with clean water, wipe the surface of the bronchoscope with 75% alcohol gauze, and attract 75% alcohol to disinfect the operation channel of the bronchoscope, then place the bronchoscope in a sealed transfer vehicle and send it to the cleaning room for purification and disinfection.

Operators and patients

To avoid cross-infection is to minimize the number of people involved in the operation. It is recommended to have an operating doctor and a cooperating nurse. Meanwhile, participating medical staff need to execute biosafety level-3 protective measures, including disposable medical protective caps, medical protective masks (N95 masks), disposable protective clothing, goggles (or full-face protective screens), disposable shoe covers, disposable latex gloves, and anti-infiltration isolation gown. Strictly abide by the rules of wearing and taking off. Attention should be paid to selecting the appropriate N95 mask to ensure a good fit with the face shape. After wearing the mask, tightness test should be done. Necessarily, patients should wear masks to prevent secretions from splashing during surgery.

According to the patient's respiratory support, appropriate protection should be done before operation. Atomization inhalation anesthesia is prohibited for sober patients. It is suggested that cricothyroid membrane puncture anesthesia combined with intravenous moderate sedation can reduce severe cough as much as possible. Bronchoscopy is recommended for patients with invasive ventilation after deep sedation.

Postoperative management

All specimens are stored in a biological safety box in a sealed manner, and the outer surface of the biological safety box is disinfected and then put into a specimen transfer box to be sent to an auxiliary department for inspection. Operators should wear double gloves during inspection. After operation, the operating room shall be sprayed and disinfected with standard peroxide first, and then wiped with 1000ppm or 2000ppm chlorine-containing disinfectant. The operating room must be thoroughly disinfected and reused only after passing the examination by the infection management department. Precision instruments can be wiped with 75% alcohol and sprayed with peroxide disinfectant again.

Conclusion

As an oncologist, under the epidemic situation of COVID-19, do a good job in differential diagnosis between COVID-19 and other lung diseases. TBB and CTPNB are the most significant diagnostic procedures in lung cancer. During the COVID-19 epidemic, in order to protect the patients and medical personnel safety, a series of appropriate measures need to be taken. Besides, if lung cancer patients are be infected with COVID-19, which can result in severe and death cases more likely occurred. Therefore, we should give priority to the treatment of cancer patients infected with COVID-19.

Consent for publication

The authors declare that they have no competing interests.

Author contributions

CHX and WW were responsible for designing the study, writing the protocol and report, screening potentially eligible studies. CHX and JWW were responsible for conducting the search, writing the protocol, and report. LL contributed to data

extraction and provided feedback on the report. All authors read and approved the final manuscript.

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