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Pulmonary Lobectomy After COVID-19

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Concomitant coronavirus disease 19 (COVID-19) is a major risk factor for complications in any type of surgical procedure, especially in thoracic surgery, were the primary organ involved, the lung, is manipulated to perform parenchymal resection. However, it is not clear whether previous infection from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) may lead to increased morbidity and mortality for subsequent procedures once radiologic resolution is achieved. We report a young patient with lung cancer who successfully underwent a right upper lobectomy for primary adenocarcinoma by video-assisted thoracoscopic surgery with no complication in the early postoperative phase.

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Rapid spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) increased the number of patients who presented to emergency departments with respiratory distress related to coronavirus disease 2019 (COVID-19). More chest scans are performed along with nasal swab to correctly diagnose the novel syndrome; therefore, the chances to detect lung nodules increase and management of those patients may be difficult. When concomitant, COVID-19 increases complications of surgical procedures because of subsequent immune impairment. However, no data are available on whether previous infection with COVID-19 generates a persistent risk. We present a case of successful pulmonary lobectomy for lung cancer in a patient with a previous history of COVID-19.

A 46-year-old man with a previous 40 pack-year smoking history came to our emergency department for worsening dyspnea and fever. A chest roentgenogram showed diffuse bilateral opacities with peripheral distribution. A computed tomographic (CT) scan revealed peripheral bilateral ground-glass opacity (GGO) with crazy paving appearance plus a 40-mm nodule in the right upper lobe. A nasal swab tested positive for SARS-CoV-2, and the diagnosis of COVID-19 was made.

Overall, the patient’s condition was good, and treatment in the intensive care unit was not necessary. The patient was discharged 5 days later, A repeated nasal swab at 16 days was negative, and a positron emission tomography/CT after 30 days showed a standardized uptake value (SUV) of 9 for the nodule, with slight inflammatory uptake of hilar and mediastinal lymph nodes. Improvement of lung opacities was noted (Figure 1).

A CT-guided biopsy was offered, but the patient refused and preferred up-front operation. His medical history was positive for obstructive sleep apnea syndrome. Pulmonary function was within normal ranges, with forced expiratory volume in 1 second of 3.99 liters (102% of predicted value) and forced vital capacity of 4.98 liters (103%). Diffusion capacity of the lung for carbon monoxide (DLCO) was preserved (99%).

Upon arrival, the chest CT scan and nasal swab were repeated according to our hospital policy, showing, respectively, reduction of GGO and negativity for SARS-CoV-2.1

A standard right upper lobectomy with lymphadenectomy was performed with video-assisted thoracoscopic surgery after 45 days from the first diagnosis. During the surgical procedure, adhesions between the lung and mediastinal structure were noted (Figure 2). The surgeon experienced some difficulty, describing tissues around the hilum as very firm and tough when cutting, with extremely enlarged lymph nodes (Figure 3). Operative time was 215 minutes with no blood loss. There were no complications in postoperative period, and the patient was discharged after 3 days.

For comparison, we analyzed length of stay and time to completion of the right upper lobectomy from the same surgeon. No difference was present for length of stay, but time to completion was longer (152.5 vs 215 minutes). A 4.3-cm gray lesion was found in the specimen, and histopathologic diagnosis of pT2b N0 adenocarcinoma was made (14 lymph nodes all negative). No alteration was found in the rest of examined lung.

Comment

Is well established that COVID-19 that develops in perioperative time is a risk factor for increased length of stay, morbidity, and mortality.2 However, no data are available on patients who have recovered from this novel syndrome and been scheduled for elective surgical procedure. Appropriate timing is unclear. Pan and colleagues5 evaluated chest CT scans from 21 patients performed every 4 days after the initial diagnosis, finding maximum peak of lung consolidation at 9 to 13 days, with a reduction after 14 days. Lei and colleagues4 observed a 19.5-day interval for real-time polymerase chain reaction conversion with subsequent radiologic improvement.4 Delay in operation is an independent risk factor for upstaging and decreased median survival; however, 8 weeks is an acceptable time lapse according to British Thoracic Society Guidelines.5

DlCO is a reliable assessing method for postoperative complication risk in thoracic surgery, with 40% as threshold.6 Mo and colleagues7 tested DLCO in a patient with COVID-19 on the day of or 1 day before discharge,
finding a greater reduction in those with severe pneumonia and critically ill. Whether the reduction is persistent or transient is not clear, and further studies are needed.

Changes in the lung structure during the early phases of COVID-19 were previously described by Tian and colleagues, with alveolar edema, type II pneumocyte hyperplasia, and multinucleated giant cells. In a more recent report, autopsic examination of 7 lungs from COVID-19 patients confirmed findings of diffuse alveolar damage, with more prominent endothelial injury, intussusceptive angiogenesis, and capillary microthrombi compared with specimens from patients who died of acute respiratory distress syndrome or influenza A (H1N1).8

In the examined specimen from our patient, no alteration from the previous infection was found, thus meaning a complete restoration is possible in some cases, but further studies are mandatory. However, abnormal inflammation may negatively affect nearby structures (eg, visceral and parietal pleura, lymph nodes), which can cause adhesions and nodal swelling.

In conclusion, lobectomy after COVID-19 was safe, with no increase in length of stay. The mean operative time was longer due to presence of thickened tissues, adhesions, and enlarged lymph nodes, but no major complication occurred. In our experience, improvement of radiologic features along with a good DLCO were useful in predicting a good outcome; however, defining appropriate timing for surgical procedure may be hard. Due to an increased risk of upstaging, we recommend not to exceed 8 weeks from the diagnosis.

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