

Loculated Pneumothorax in COVID-19 Patient – A Case Report

Lokulirani pneumotoraks u bolesnika s bolešću COVID-19 – prikaz slučaja

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Abstract. Aim: Loculated pneumothorax and multilocular cystic lung lesions are rare complications of acute respiratory distress syndrome in patients with COVID-19 infection. In this case report we wanted to emphasize that not only mechanically ventilated patients are at increased risk of pneumothorax and cystic lung lesions. Those lesions can also be found in non-ventilated patients. **Case report:** We present a case report of a 52-year-old man who was hospitalized because of COVID-19 pneumonia. MSCT pulmonary angiography revealed ground glass opacities, multilocular cystic lesions and loculated pneumothorax. On follow-up computerized tomography examination in an outpatient hospital two months later, there was a significant regression of the lung parenchymal ground glass opacities, as well as the regression of the cystic lesions with residual fluid-filled lesion in the oblique interlobar fissure. **Conclusion:** Only few case reports have been published on this specific lung pathology in COVID-19 disease. Increased incidence of complications such as pneumothorax in COVID-19 pneumonia is common, but physicians should also be aware of the possibility of other lung pathologies such as loculated pneumothorax and multilocular cystic lesions which can present not only in mechanically ventilated patients.

Keywords: COVID-19; pneumonia; pneumothorax

Sažetak. Cilj: Lokulirani pneumotoraks i multilokularne cistične lezije pluća rijetke su komplikacije akutnog respiratornog distres sindroma u bolesnika s infekcijom COVID-19. U ovom prikazu slučaja željeli smo naglasiti kako nisu samo mehanički ventilirani pacijenti izloženi povećanom riziku pneumotoraksa te komplikacija potput nastanka cističnih lezija pluća, već se komplikacije mogu pojaviti i kod neventiliranih pacijenata. **Prikaz slučaja:** Prikazan je slučaj 52-godišnjaka koji je bio hospitaliziran zbog COVID upale pluća. MSCT plućnom angiografijom prikazale su se plućne lezije u vidu zrnatog stakla, multilokularne cistične lezije i lokulirani pneumotoraks. Na kontrolnom pregledu nakon dva mjeseca kompjutoriziranom tomografijom utvrđena je značajna regresija promjena plućnog parenhima po tipu zrnatog stakla te cističnih lezija s rezidualnom kolekcijom tekućine u interlobarnoj fisuri. **Zaključak:** Do sada je objavljeno samo nekoliko prikaza slučaja o ovoj specifičnoj plućnoj patologiji u pacijenata s COVID pneumonijom. Komplikacije poput pneumotoraksa kod mehanički ventiliranih bolesnika s COVID upalom pluća relativno su česte, no ovaj prikaz slučaja ukazuje na to da se komplikacije poput lokuliranog pneumotoraksa i multilokularnih cističnih lezija ne pojavljuju isključivo u pacijenata na mehaničkoj ventilaciji.

Ključne riječi: COVID-19; pneumonija; pneumotoraks

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INTRODUCTION

Loculated pneumothorax (LPTX) and multicystic lung lesions can be associated with acute respiratory distress syndrome^{1,2}.

Clinical and radiological presentations of COVID-19 are often not typical. LPTX does not present with the typical chest X-ray findings such as visible visceral pleural line and lack of lung markings peripherally which is usually seen in the case of pneumothorax. In cases of LPTX air is visible in the pleural cavity, it does not move and remains localized³.

CASE REPORT

We present a case report of a 52-year-old man with no prior medical history, non-smoker, who was hospitalized for acute COVID-19 pneumonia in April 2021 for nine days (14th-22nd April). The patient was hospitalized on 22nd day of the disease. The infection was confirmed by a polymerase chain reaction test on 23rd March 2021. The patient had a severe cough and was initially subfebrile for 5 days. He had no symptoms of chest pain or dyspnoea. The patient did not have any past medical or family history of lung diseases. He was hemodynamically stable with peripheral oxygen saturation 93-95% on room air during entire hospitalization.

On multislice computed tomography pulmonary angiography (CTPA) (on 26th day of the disease) pulmonary embolism was excluded and typical bilateral inflammatory lesions, ground-glass opacities, and non-typical bilateral bullous lesions were confirmed. Multilocular cystic formation (10 cm × 6 cm) and localized pneumothorax (Figure 1) were seen to the right of the oblique interlobar fissure.

The patient had no need for supplemental oxygen therapy during the hospital stay. He was given low molecular weight heparin and proton-pump inhibitors. Thoracic surgeon recommended conservative treatment. For epidemiological reasons, invasive pulmonary workup bronchoscopy was not performed during the hospital stay. Sputum microbiology and hemocultures were negative. The patient did not have any signs of bacterial infection.

Control chest X-ray before hospital discharge was without significant change.

Intensive supervision of primary care physician and a structured follow-up in an outpatient clinic was recommended. On the control examination, the patient had no respiratory symptoms. He could perform normal physical activities. High-resolution computed tomography (HRCT) of the thorax two months later (Figure 2) revealed a regression of the previously described multilocular cystic formations and visible lesion in the oblique interlobar fissure on the right side (28 × 24 mm) containing liquid content with complete resorption of the air component.

Pneumothorax is a marker of severe COVID-19 lung disease and can also be accompanied by pneumomediastinum. Patients with pneumothorax as a complication of the COVID-19 disease have longer hospitalization and higher mortality compared to the patients without pneumothorax.

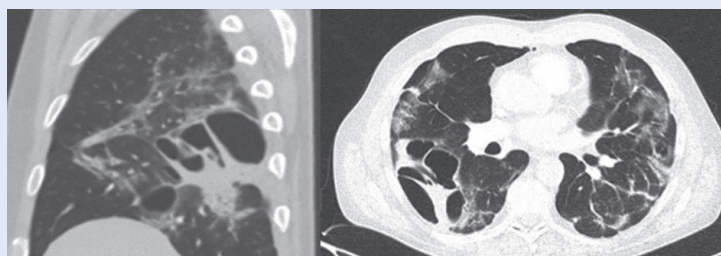


Figure 1. Sagittal and transverse plane of the thoracic computed tomography showing multilocular lesions and loculated pneumothorax on 26th day of the disease



Figure 2. Sagittal and transverse plane of the thoracic computed tomography showing marked resolution of multicystic lesions caused by SARS-CoV-2 infection with visible ground glass opacities and oval lesion containing thick liquid content

Table 1. Laboratory test results (comparison of laboratory findings during the acute phase of the disease and two months after the infection)

Laboratory findings	During hospitalization	Two months after infection
Leukocytes x10 ⁹ /L	9,9	4,5
Neutrophils %	78,6	52,8
Lymphocytes %	13,8	36
CRP (mg/L)	7,5	2

Not only mechanically ventilated patients are at risk of pneumothorax and development of the cystic lung lesions. These complications can also be found in COVID-19 patients with pneumonia who were not treated with artificial ventilation.

On CT scan there was a visible significant regression of the previously described inflammatory lesions of the lung parenchyma. Clinical status was unremarkable, pulmonary function tests (spirometry and lung diffusing capacity for CO) were within normal limits and arterial blood gas analysis was normal. Laboratory test results are shown in Table 1 (comparison of laboratory findings during the acute phase of the disease and two months later). The marker of lung fibrosis (also known as a tumor marker for breast and some other cancers) CA 15-3 which is seen in some post COVID-19 patients with lung damage, was within normal limits (18.0 U/mL). Erythrocyte sedimentation rate was within normal limits (7 mm/h) and ferritin level was increased (565 µg/L).

Bronchoscopy was not sought of follow-up because of significant regression of lung lesions. Further follow-up of the pulmonologist was recommended and on control examination in September the patient was in great clinical condition with normal lung functional tests.

DISCUSSION

The ongoing pandemic of coronavirus disease 2019 has posed difficult challenges for healthcare systems globally.

Studies have reported that COVID-19 pneumonia might result in lung cystic formation, even in the absence of positive pressure ventilation during mechanical ventilation. Inflammatory cells exude could be the cause of these lung lesions⁴.

In an analysis of 842 critically ill patients with COVID-19 infection, the incidence of pneumothorax was 10%. Pneumothorax was mostly found in patients who were intubated and mechanically ventilated and the rate of pneumothorax was over 13%. Pneumothorax is a marker of severe COVID-19 lung disease and sometimes is also accompanied by pneumomediastinum.

Patients with pneumothorax had longer hospitalization duration and mortality compared to the patients without pneumothorax⁵. The patient presented in this case report had pneumonia with atypical radiological findings. He was hospitalized on 22nd day of the disease and was respiratory stable during the whole hospitalization period.

We want to emphasize that physicians should be aware of this particular lung pathology even in patients who are not critically ill.

The primary cause of secondary PTX before the COVID-19 pandemic era was chronic obstructive pulmonary disease, primarily in the form of emphysema, which was present in 73.3% of cases⁶. This patient was a non-smoker and had no history of former lung diseases.

As seen in Figure 2 radiological findings recovered markedly on control HRCT and the patient did not have any respiratory symptoms.

Pneumothorax treatment is usually with chest tube placement^{7,8}, however, in this case surgical treatment was not required.

Cystic lesions, which regressed markedly over period of two months, were the result of lung damage caused by COVID-19.

Chest X-ray is not sufficiently reliable in detecting small air collections³. If there is any suspicion about the diagnosis, CT is the gold standard for the diagnosis.

Increased incidence of complications such as pneumothorax and pneumomediastinum in COV-

ID-19 patients can be expected due to lung parenchymal damage.

LPTX is radiologically seen as air trapped between the pleural layers which remains localized. Atypical clinical and radiological presentation can be seen in acute phase and in the post-COVID-19 period².

CONCLUSION

Loculated pneumothorax and multilocular cystic lesions are rare complications of acute respiratory distress syndrome in patients with COVID-19 infection. In this case report we wanted to highlight that not only mechanically ventilated patients are at increased risk of pneumothorax and cystic lung lesions, and that these complications can also be found in non-ventilated patients.

The long-term consequences of COVID-19 sequelae can be multiple and are still not sufficiently known, which is why regular follow-up of the pulmonologist is recommended.

Conflicts of interest: Authors declare no conflicts of interest.

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