

Case Report : Challenges in the Management of Pneumothorax for COVID-19 Patient

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Abstract

Background: Pneumothorax has been reported in minority of COVID-19 cases. Spontaneous Pneumothorax is an uncommon complication of COVID-19. The incidence and risk factors are still unknown. Here we will review where there are challenges with case of Pneumothorax in COVID-19 patients.

Case: We report one case at Dr. Saiful Anwar hospital, a 42 years old man was diagnosed with Spontaneous Pneumothorax and tested positive for COVID-19 via nasopharyngeal swab. Management in this case requires consideration from emergency treatment, risk of virus transmission and the aerolization of the procedure. Invasive procedure such as insertion chest tube and pharmacologic therapy be the treatment in this case. After 2 weeks of treatment, there was improvement on clinical and radiological imaging.

Conclusion: Spontaneous Pneumothorax is a rare complication of COVID-19. Management in this case requires consideration from emergency treatment, risk of virus transmission and the aerolization of the procedure.

Keywords: Pneumothorax; COVID-19; Chest Tube

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1. Introduction

Pneumothorax has been reported in minority of COVID-19 cases.¹ Retrospective studies of patients with COVID-19 have suggested that pneumothorax might occur in 1% of those requiring hospital admission, 2% of patients requiring intensive care unit (ICU) admission and 1% of patients dying from the infection.¹

Spontaneous Pneumothorax is an uncommon complication of COVID-19.² The incidence and risk factors are still unknown.² The term spontaneous pneumothorax refers to the presence of air in the pleural space that is not caused by trauma or

other obvious precipitating factor (trauma or iatrogenic during a procedure).² While primary spontaneous pneumothorax occurs without a clinically apparent lung condition secondary spontaneous pneumothorax is a complication of preexisting lung disease.² COVID-19 associated secondary spontaneous pneumothorax is significant cause of morbidity.⁷

Diagnostic work up can include physical examination, chest X-ray, and/or Ct Scan thoraks.¹⁰ The Complication of pneumothorax affect only 1% patients with COVID – 19.³ The incidens at RSUD Dr. Saiful Anwar Malang only 0.36%. COVID-

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19 may cause cystic features of lung parenchyma which can resolve or progress to larger blebs.⁴ This can place patients at risk for rupture resulting in mediastinal and subcutaneous emphysema or spontaneous pneumothorax.⁴

The proposed mechanism of spontaneous pneumothorax in patient with COVID-19 disease is thought to be related to the structural changes that occur in the lung parenchyma. These include cystic and fibrotic changes leading to alveolar tears.²

Chest tube insertion is one of the most common procedures performed in trauma hospitals, Intensive Care Units, and elective surgery services. It is a procedure with great potential for generating aerosol during the procedure and the convalescence of the disease that generated the indication for drainage, especially in patients with continuous aerial escape. Chest tube thoracostomy in patients with airborne precautions requires special consideration, as air leaks are a potential source of airborne infection.⁸

2. Case

A 42 years old man came to hospital with chief complaint of shortness of breath since 2 weeks ago. PND (-), DOE (-), orthopneu (-), and shortness of breath not related to activity, shortness does not depend on time, History of shortness of breath (-). The patient admits that there is a bloody cough since 3 weeks ago with volume ½ tea

spoon. And then sometimes he had cough withish sputum intermittent. In addition, the patient also has fever intermittent since 2 weeks ago. There have been night sweats since 2 weeks ago. The patient has decreased appetite with nausea and without vomiting. The patient has lost 6 kg in weight in the last 2 weeks. The patient referred from Hermina hospital and then was referred to RSUD Dr. Saiful Anwar Malang for further management. The patient entered the ER and was hospitalized in the in-covit room because the results of the eclia were reactive and the PCR swab was positive.

Based on physical examination found blood pressure was 119/80, heart rate was 117x/minute, respiratory rate was 25x/minute, and the temperature was 36,10C. His oxygen saturation was 98% on 4 L/min nasal cannula oxygen, His height was 169 cm, His weight was of 63 kg and he had body mass index (BMI) of 22,1. The general physical examination was found unequal breath sounds, hyperresonance sinistra with percussion hemithoraks sinistra, and decreased wall movement on the affected side of the chest. In this patient, a laboratory examination was leucocyte 12.580/μL, with lymphopenia 15,6%, lymphocyte count 1960, CRP 2.05 m/dL, Ddimer 4.41 mg/dL, Ferritin 695.40 ng/mL. The second result of

RT PCR SARS CoV-2 via nasopharyngeal swab was positive.

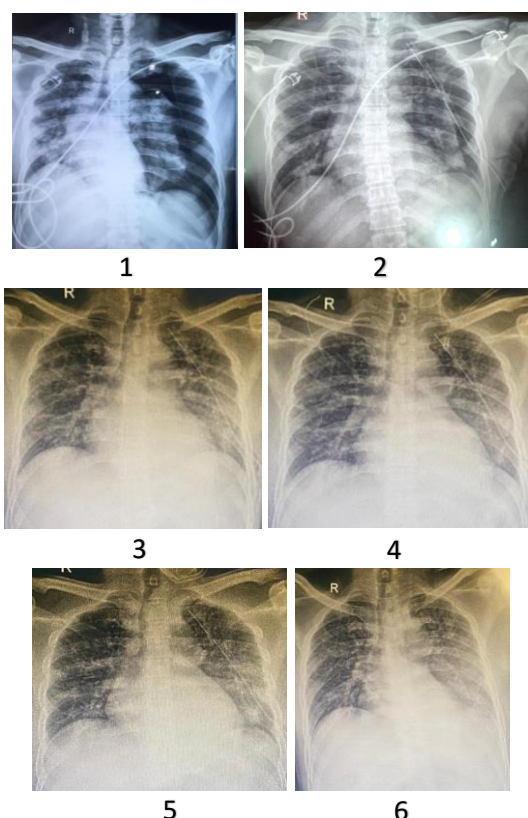


Figure 1-6. Pre thoraks drain with Tension Pneumothoraks S and Pneumonia typical ec viral (Fig.1), Post thoraks drain D-1, D-4, D-7, D-9 with Pneumothoraks S on chest tube and Pneumonia typical ec viral (Fig.2-5), Post Aff thoraks drain D-11 (Fig.6)

In this patient, a chest X-Ray (Fig.1) was find infiltrate airbronchogram basal area and then in pulmo sinistra was find clear space with pleural line and lung collapse sinistra. Chest X-ray (Fig.2-5) was insertion thoraks cateter at ICS 5 and inserted as high 14 cm and fibroinfiltrat all area dominant perifer area and infiltrate airbronchogram in basal area and then clear space with pleural line and lung collaps sinistra resolved. Chest X-ray (Fig.6) Post Aff thoraks drain.

The chest tube was removed on day 11 after the patient's recovery. The patient was weaned off oxygen and then the patient was breathing exercise. He was treated with antibiotic, vitamin, symptomatic, hydroxychloroquin and oseltamivir.

3. Discussion

COVID-19 infection symptoms has fever, myalgia, cough, fatigue, and dyspnea are the most common symptoms in COVID-19 patients, it has been reported that approximately 1% of patients with COVID-19 may experience pneumothorax during the diagnosis and treatment processes.⁷

As many as 90% patients with spontaneous pneumothorax have blebs or bullae present at the time occurrence. This has led many clinicians to believe that bleb rupture is the cause of spontaneous pneumothorax.¹⁰

COVID-19 infection has already shown lung parenchymal changes that progressed to large bullae.^{4,6} The rupture of blebs and bullae, as well as a rise in intrathoracic pressure resulting from prolonged coughing, cause spontaneous pneumothorax in the majority of patients.^{2,4,6}

The pathophysiology of cystic changes and bullae formation in COVID-19 is still unknown. Further studies are needed to evaluate the long-term pulmonary consequences of COVID-19 pneumonia and the

risk of pneumothorax in patients who recover from the initial acute respiratory failure. The utility of follow-up chest imaging to evaluate bulla formation and other structural changes needs to be investigated. Bulla formation and spontaneous pneumothorax is a possible complication of COVID-19. Spontaneous pneumothorax should be considered in a patient with COVID-19 pneumonia who develops chest pain or acute worsening of dyspnea.⁹

Diagnostic work up can include physical examination, chest X-ray, and/or Ct Scan thoraks.¹⁰ However, because we hadn't done CT scan thoraks for this patient, we didn't find any bullae.

Given the route of transmission of the SARS-Cov-2 virus and the aerosolizing aspect of the surgery itself, chest tube thoracostomy should be considered for patient with COVID-19.⁵ The use of personal protective equipment complete with gloves, cap, N95 or PFF2 mask, face shield, and waterproof apron is essential.⁸

Modification in technique were critical in the COVID-19 patient to minimize pleural air exposure during chest tube placement.⁵ The drainage system must be adjusted to suction and the room must be negative pressure.⁵ New approaches, such as the use of a filter with high particle detention power (HEPA), should be considered in order to reduce viral contamination.⁸

4. Conclusion

The management of pneumothorax in COVID-19 requires consideration of emergency treatment, the risk of virus transmission, and aerolization procedures.

Personal protective equipment, modified procedures, and drainage system maintenance are all important aspects of chest tube thoracostomy preparation to minimizing exposure to health care personnel.

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