CASE REPORT

Reversal of lung fibrosis: an unexpected finding in survivor of acute respiratory distress syndrome

C.-H. Chang\textsuperscript{1,2,3}, Y.-H. Juan\textsuperscript{2,4}, H.-C. Hu\textsuperscript{1,5}, K.-C. Kao\textsuperscript{1,5} and C.-S. Lee\textsuperscript{1,2,3}

From the \textsuperscript{1}Department of Thoracic Medicine, Chang Gung Memorial Hospital, Linkuo Branch, No.5, Fuxing St., Guishan Dist., Taoyuan City 333, Taiwan, \textsuperscript{2}School of Medicine, College of Medicine, Chang Gung University, No.259, Wenhua 1st Road, Guishan Dist., Taoyuan City 333, Taiwan, \textsuperscript{3}Division of Pulmonary and Critical Care, Department of Internal Medicine, Saint Paul’s Hospital, No.123, Jianxing St., Taoyuan Dist., Taoyuan City 330, Taiwan, \textsuperscript{4}Department of Medical Imaging and Intervention, Chang Gung Memorial Hospital, Linkuo Branch and Chang Gung University, No.5, Fuxing St., Guishan Dist., Taoyuan City 333, Taiwan and \textsuperscript{5}Department of Respiratory Therapy, College of Medicine, Chang Gung University, No.259, Wenhua 1st Road, Guishan Dist., Taoyuan City 333, Taiwan

Address correspondence to C.-S. Lee, Division of Pulmonary and Critical Care, Department of Internal Medicine, Saint Paul’s Hospital, No.123, Jianxin St., Taoyuan Dist., Taoyuan City, Taiwan. email: jraacyk@gmail.com

Learning point for clinicians

- Radiologic signs of delayed pulmonary fibrosis from acute respiratory distress syndrome, such as reticular opacities and traction bronchiectasis, can potentially be reversed.
- Whether corticosteroid has benefit to lung fibrosis remains controversial.

Introduction

Acute respiratory distress syndrome (ARDS) has high mortality rates. The survivors after ARDS may also have pulmonary or non-pulmonary sequelae, such as cognitive impairment, pulmonary function impairment and decreased health-related quality of life. We would present a case, a survivor of ARDS with reversal of lung fibrosis 7 months after treatment.

Case report

A 67-year-old man was transferred to our hospital due to acute respiratory failure requiring mechanical ventilation. The patient never smoked and had hypertension under medical treatment. He had progressive dyspnea 2 weeks earlier before admission, and he was treated with intravenous antibiotics for suspected pneumonia at the local hospital. However, the symptoms aggravated with development of acute respiratory failure. The arterial blood gas analysis under mechanical ventilation on 60\% of FiO\textsubscript{2} showed PO\textsubscript{2} 116 mmHg, PCO\textsubscript{2} 35.7 mmHg, pH 7.366, SaO\textsubscript{2} 98\% and bicarbonate 20 meq/L. The positive end-expiratory pressure was 12 cm H\textsubscript{2}O. The diagnosis of ARDS was made. Chest computed tomography (CT) examination showed bilateral lung
infiltration and lung fibrosis with bronchiectasis changes (Figure 1A). Because of ARDS with unknown etiology, bronchoalveolar lavage was done, but the microbiology and cytology results were all negative. Surgical lung biopsy was done, and the pathological results showed diffuse alveolar damage. After supportive treatment in intensive care unit, mechanical ventilation was gradually weaned off on the 33rd day, and the patient was extubated. He was discharged after 56 days of hospitalization.

Two months later after discharge from the hospital, he was re-hospitalized because of pneumonia associated with cough and fever. Repeated chest CT at the emergent department showed persistent of lung fibrosis and new onset of ground glass opacity (GGO), compatible with new onset of infection. After antibiotics treatment, the patient was discharged and was followed up at our outpatient clinic. He has received short course of corticosteroid treatment prednisolone 10 mg daily for 3 months.

After 7 months of illness, the chest CT showed resolution of the GGO and a significant improvement in lung fibrosis (Figure 1B). One year after the illness, his pulmonary function was normal: the forced vital capacity 80%, forced expiratory volume in 1 s 86%, diffusing capacity for carbon monoxide 61% and diffusing capacity divided by the alveolar volume 80%. He returned to his normal daily activities.

Discussion

The common CT findings in ARDS are GGOs, consolidations, interstitial thickening, traction bronchiectasis and honeycomblings. The typical pathological findings of ARDS is diffuse alveolar damage. Increased lung area involvement and increased bronchiectasis is also associated with high mortality rate in patients with pathology confirmed ARDS. Fibrosis can be a result of various types of injuries, such as skin scar, liver cirrhosis or lung fibrosis. A recent review article indicated that the process of fibrosis and dysregulated extracellular matrix remodeling are not all irreversible.

The anti-fibrotic targeted therapy regulated important proinflammatory and profibrotic cytokine cascades, and it reduced collagen synthesis and fibroblast proliferation. Both nintedanib and pirfenidone could reduce the rate of lung function decline in idiopathic pulmonary fibrosis, but its effect on the reversal of pulmonary fibrosis remained uncertain. As for our presented case, the fibrosis resolved after 3-month low dose of corticosteroid treatment. Whether corticosteroid treatment has benefit in ARDS remains controversial. The potential side effect of corticosteroid will influence clinical physicians whether use of steroid in ARDS.

Ethics

This study was approved by the institutional review boards at Chang Gung medical foundation (IRB Number: 201700566B0).

Conflict of interest: None declared.

References