Respiratory Medicine Case Reports 23 (2018) 103–106

Contents lists available at ScienceDirect

Respiratory Medicine Case Reports

journal homepage: www.elsevier.com/locate/rmcr

Case report

Acute exacerbation of idiopathic pulmonary fibrosis triggered by *Aspergillus* empyema

Atsushi Suzuki[a,b], Tomoki Kimura[a], Kensuke Kataoka[a], Toshiaki Matsuda[a], Toshiki Yokoyama[a], Yuta Mori[a], Yasuhiro Kondoh[a,*]

[a] Department of Respiratory Medicine and Allergy, Tosei General Hospital, Seto, Aichi, Japan
[b] Department of Respiratory Medicine, Nagoya University Graduate School of Medicine, Nagoya, Aichi, Japan

ARTICLE INFO

Keywords:
Idiopathic pulmonary fibrosis
Acute exacerbation
AE-IPF
Triggered AE
Aspergillus infection

ABSTRACT

Acute exacerbation (AE) is a severe and life-threatening complication of idiopathic pulmonary fibrosis (IPF). In 2016, the definition and diagnostic criteria for AE-IPF were updated by an international working group. The new definition includes any acute, clinically significant respiratory deterioration (both idiopathic and triggered events) characterized by evidence of new widespread alveolar abnormality in patients with IPF. There are no currently proven beneficial management strategies for idiopathic and triggered AE-IPF. This is the first report describing AE-IPF triggered by *Aspergillus* empyema, which was improved by a combination of corticosteroid, systemic antifungal therapy, local antifungal therapy, and additional pharmacological therapies. Future research may reveal optimal strategies for both idiopathic and triggered AE-IPF.

1. Introduction

Acute exacerbation (AE) is the most severe complication of idiopathic pulmonary fibrosis (IPF) [1–8]. In 2016, an international working group revised the definition and diagnostic criteria for AE-IPF [5]. In the new criteria, AE-IPF can be diagnosed from both idiopathic and triggered events resulting in worsening respiratory symptoms and widespread alveolar damage [4,5]. There are no currently proven beneficial management strategies for patients with idiopathic and triggered AE-IPF [5]. This is the first case report to show AE-IPF triggered by *Aspergillus* empyema, which was successfully treated with a combination of corticosteroid, systemic antifungal therapy, local antifungal therapy, and additional pharmacological therapies.

2. Case report

In July 2008, a 56-year-old man was referred to our hospital because of exertion dyspnea and abnormal chest X-ray findings indicating interstitial lung disease (ILD) in primary care. He was an ex-smoker (56 pack-years) and had no medical illness, no environmental exposure, and no family history. There were no extra-thoracic manifestations to suggest the presence of an underlying connective tissue disease. Based on the integration of clinical information, radiological findings, and histopathological findings from surgical lung biopsy, he was diagnosed with IPF. He demonstrated a gradual worsening of pulmonary function over 4 years (forced vital capacity [% pred.] 4.02L [108%] → 3.78L [102%]). In April 2012, he started treatment with pirfenidone, which resulted in the stability of pulmonary function.

In May 2014, he presented with a 1-month history of cough and dyspnea. Initial vital signs revealed a temperature of 37.0 °C, respiratory rate of 16 breaths per minute, and O_2 saturation of 93% on room air. Fine crackles were heard in the bilateral lung fields. Laboratory examinations revealed a white blood cell (WBC) count of 8800/mm^3 (neutrophils: 69.5%) and C-reactive protein (CRP) of 7.89 mg/dl. A computed tomographic (CT) scan of the chest showed consolidation of the left lower lobe superimposed on a background honeycomb pattern (Fig. 1). He was initially diagnosed with bacterial pneumonia and was admitted for antimicrobial therapy (ceftriaxone and azithromycin). No significant bacteria were detected in sputum smear and culture test. On day 22, he developed left-sided chest pain and worsening dyspnea. A chest CT scan showed remaining consolidation in the left lower lobe, pleural effusion and pneumothorax on the left side (Fig. 2). A chest tube was inserted into the left thoracic cavity, and his symptoms improved. Pleural effusion culture was

Abbreviations: AE, acute exacerbation; AMPH-B, amphotericin-B; CRP, C-reactive protein; CT, computed tomography; ILD, interstitial lung disease; IPF, idiopathic pulmonary fibrosis; rhTM, recombinant human soluble thrombomodulin; VRCZ, voriconazole; WBC, white blood cell

* Corresponding author. Department of Respiratory Medicine and Allergy, Tosei General Hospital, 160 Nishioiwake-cho, Seto, Aichi, 489-8642, Japan.
E-mail addresses: atsushi-suzuki@tosei.or.jp (A. Suzuki), tomoki_kimura@tosei.or.jp (T. Kimura), kataoka@tosei.or.jp (K. Kataoka), tmatsuda@tosei.or.jp (T. Matsuda), tosyokoyama@tosei.or.jp (T. Yokoyama), yuta_mori_1231@yahoo.co.jp (Y. Mori), konyasu2003@yahoo.co.jp (Y. Kondoh).

https://doi.org/10.1016/j.rmcr.2018.01.004
Received 5 December 2017; Accepted 19 January 2018

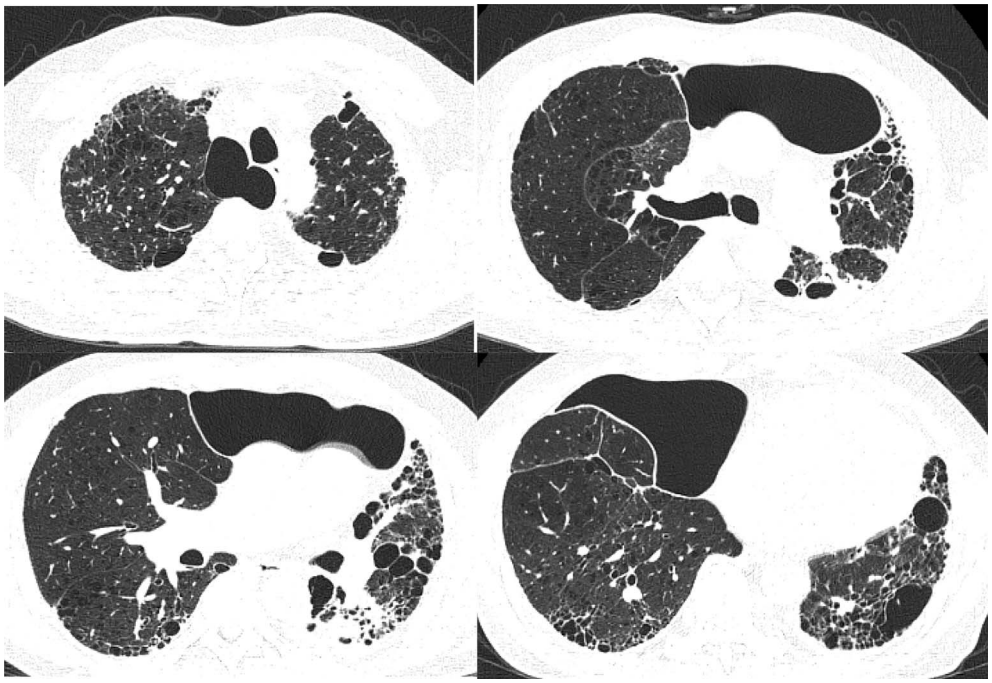

Fig. 1. Chest computed tomographic (CT) scan on admission Consolidation superimposed on a background honeycomb pattern in the left lower lobe.

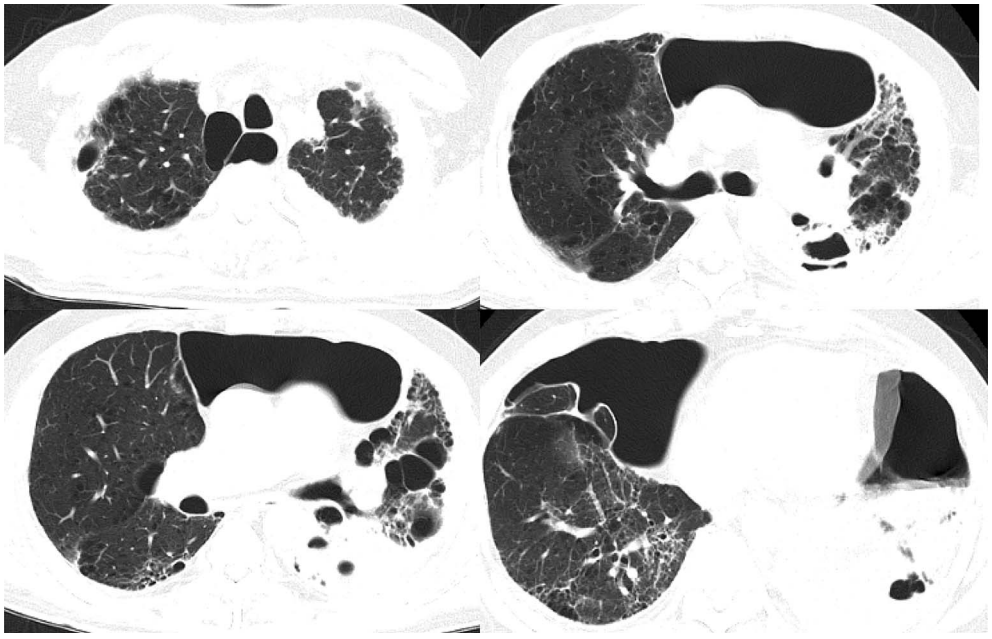

Fig. 2. Chest CT scan at the diagnosis of *Aspergillus* empyema and pneumothorax on day 22 Remaining consolidation in the left lower lobe and left-sided pleural effusion and pneumothorax.

positive for *Aspergillus fumigatus*. Serum *Aspergillus* galactomannan antigen test was negative, but serum *Aspergillus* precipitating antibody test was positive. With a diagnosis of *Aspergillus* empyema, treatment was switched to intravenous voriconazole (VRCZ). On day 47, while continuing systemic antifungal therapy, he experienced worsening of dyspnea. Laboratory examinations revealed a WBC count of 8900/mm^3 (neutrophils: 72.8%) and CRP of 18.25 mg/dl. The levels of serum brain natriuretic peptide and procalcitonin were 9.8 (< 18.4) pg/ml and 0.148 (< 0.5) ng/ml, respectively. Arterial blood gas analysis showed PaO_2 of 61.0 Torr and $PaCO_2$ of 31.3 Torr on 2L/min of O_2 via a nasal cannula. A chest CT scan showed new bilateral widespread consolidation and ground-glass opacity superimposed on a background honeycomb pattern (Fig. 3). Considering these findings and the clinical course, he was diagnosed with AE-IPF triggered by *Aspergillus* empyema.

He was treated with a combination of corticosteroid (methylprednisolone 1mg/Kg/day followed by titration of prednisolone) and intravenous recombinant human soluble thrombomodulin (rhTM). Intravenous VRCZ and pirfenidone were continued. On day 61, a chest CT scan showed improvement in bilateral consolidation and ground-glass opacity, but new right bulla effusion and left pleural effusion. Chest tubes were inserted to the right bulla and left thoracic cavity. Both effusion cultures were positive for *Aspergillus fumigatus*. Systemic antifungal therapy was switched from intravenous VRCZ to intravenous liposomal amphotericin-B. Because of poor resolution, intrathoracic infusion of amphotericin-B (AMPH-B) was added (2mg/day with a gradual dose increase to 10mg/day from each chest tubes). On day 95, cultures of the right bulla and left pleural effusions converted to negative. He was discharged 120 days after admission (Fig. 4).