Acute Fibrinous and Organizing Pneumonia: A Case Report and Review of the Literature

Ailing Cao (✉ caoailing@aliyun.com)

Jiangsu Provincial Hospital of Traditional Chinese Medicine <https://orcid.org/0000-0002-6372-2196>

Qian Wang

Affiliated Hospital of Nanjing University of Chinese medicine

Xianmei Zhou

Affiliated Hospital of Nanjing University of Chinese Medicine

Case Report

Keywords: acute fibrinous and organizing pneumonia, chest computed tomography, pathology, case report

Posted Date: March 3rd, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-15863/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background Acute fibrinous and organizing pneumonia is an unusual histopathological pattern of acute lung injury. To improve the understanding of acute fibrinous and organizing pneumonia, we herein present one case of a patient with acute fibrinous and organizing pneumonia proven by percutaneous lung biopsy along with clinical features, chest imaging and pathology.

Case presentation A 70-year-old man was admitted to our department and was initially diagnosed to have community-acquired pneumonia. He had no specific symptoms and signs on presentation. Chest computed tomography scan showed a high-density shadow in the right basement of the lower lobe. The patient was preliminarily diagnosed with community-acquired pneumonia; however, antibacterial treatment was ineffective. To confirm the diagnosis, we performed twice percutaneous lung biopsy, and pathology was consistent with acute fibrinous and organizing pneumonia. After he was treated with glucocorticoids, the shadow seen on imaging dissipated during the follow-up period.

Conclusion Acute fibrinous and organizing pneumonia is a rare histopathological diagnosis, which often has a delay in diagnosis. Clinicians need to consider the possibility of acute fibrinous and organizing pneumonia in the case of invalid antibacterial therapy. Further studies are needed to better classify acute fibrinous and organizing pneumonia, and characterise its clinical presentations, course and treatment.

Background

Acute fibrinous and organizing pneumonia (AFOP) is a histological pattern associated with acute lung injury and has been referred to as a rare pathological type in recent years. After Beasley[1] first described it in 2002, AFOP cases have been increasingly reported as a rare pathological type in recent years[2–4]. To improve the understanding of AFOP, we herein present one case of a patient with AFOP proven by pathology, whose chest computed tomography (CT) showed remarkable improvement by glucocorticoid treatment. Our case reflects a unique clinical presentation not previously described in AFOP.

Case Presentation

A 70-year-old male, a declared nonsmoker with history of coronary heart disease, his chest CT was suggestive of alveolar consolidation in the lower right lobe because of an occasional medical examination. He *had no discomfort* complaints. On his admission, vital signs were within normal limits. Chest auscultation revealed breath sounds with fine crackles in the right lung. Apart from this, no other findings were remarkable. The chest CT (Fig. 1) showed patchy opacities and high density shadow in the right basement of the lower lobe. Ferritin was 395.50ng/ml. The other laboratory tests all were negative, including blood routine, liver, kidney and coagulation function tests, arterial blood gas analysis, autoimmune and tumour biomarkers, *T cell spot test for tuberculosis infection*, sputum culture, tubercle bacillus of sputum smears and erythrocyte sedimentation rate.

On admission, the patient was treated empirically with piperacillin-tazobactam for community-acquired pneumonia. After 10 days of treatment, chest CT scan (Fig. 2) showed the foci absorbed of inferior lobe of right lung, but new lesions were observed in the upper lobe of the left lung. The *imaging* findings in the lungs of this patient seemed appear migratory patchy shadow. To confirm the diagnosis, we conducted a CT-guided percutaneous needle lung biopsy of the left upper consolidated lung. Pathology (Fig. 3) revealed alveolar septum widened with lymphocyte, plasma cell and eosinophil infiltration, cellulose exudate in a few alveolar cavity. Special staining including periodic acid-schiff, acid-fast bacilli and silver staining were all negative. Considering no symptoms with the patient, we ordered follow-up chest CT after one month. In subsequent follow-up, he remained asymptomatic. However, followed up for one month, scan lesions in the upper lobe of the left lung were found to be increasing enlarged (Fig. 5). The lesions seemed to be shift and migratory. The patient was admitted to hospital for second percutaneous lung biopsy. Before admission, he had a 4-day history of persistent a dry cough. The second pathology (Fig. 4) revealed massive cellulose exudate with organization in the alveolar cavity, alveolar septum widened and lymphocytes and plasmocyte infiltration. No necrosis, bleeding, neutrophil infiltration and granulomas were observed, neither any evidence of diffuse alveolar damage, alveolitis or eosinophilic infiltration. No evidence of special infections. The biopsy was reviewed independently by two pathologists, and a diagnosis of AFOP was made. Subsequently, the patient was switched to methylprednisolone 28mg orally, with a reduction of 4 mg fortnightly after discharge from our hospital. There were no adverse and unanticipated events on treatment. Repeat chest CT scan (Fig. 5) revealed significant improvement, and lesions in the upper lobe of the left lung almost disappeared after one-month steroid treatment. To prevent recurrence, active follow-up of this patient was done to ensure that he benefit from treatment. No recurrent lesions were seen on the chest CT after 3 months.

Discussion

AFOP is a newly recognized histopathological entity of acute lung injury and has been proposed as a possible autonomic interstitial lung disease, although it is not included in the ATS/ERS classification of idiopathic interstitial pneumonias[5]. The pathological hallmark of AFOP was massive cellulose exudate with organization in the alveolar spaces, rather than the fibrous tissue and fibroblast proliferation seen in organizing pneumonia; the numerous eosinophils, macrophage infiltration and eosinophil abscesses formed in eosinophilic pneumonia; or the hyaline membranes seen in diffuse alveolar damage[6-8]. It could be idiopathic or could also be associated with infection[9,10], connective tissue disease[11,12], environmental exposures to diverse agents[13], drugs reaction[14], etc (Table 1). There was no history of connective tissue disease for AFOP in this case, with no environmental toxin exposure, chemical exposure, pets or recent travel.

Table 1. The clinical associations with AFOP

cause of disease	disease
Autoimmune diseases	Ankylosing spondylitis
	Antiphospholipid syndrome
	Anti-synthetase syndrome
	Dermatomyositis
	Sjogren's syndrome
	Systemic lupus erythematosus
	Polymyositis
	Primary biliary cirrhosis
	Undifferentiated connective tissue disease
	Abacavir
Drugs	Amiodarone
	Bleomycin
	Decitabine
	Everolimus
	Sirolimus
	Nivolumab
Environmental causes	Aerosols Aerosols
	Asbestos
	Coal

Dusts

Infections

Acineto Aspergillus fumigatus

Chlamydia pneumoniae

Cytomegalovirus

H1N1 Influenza

Haemophilus influenzae

Histoplasmosis

Human immunodeficiency virus

Corona virus

respiratory syncytial virus

other

Allogenic hematopoietic stem cell transplant

lymphoma

The most commonly reported presenting symptoms of AFOP include dyspnea, cough, fever, and progressive respiratory failure. The symptoms of AFOP can mimic those of community acquired pneumonia. These nonspecific symptoms result in a delay in the diagnosis of AFOP. The case we have presented of AFOP highlights the nonspecific symptoms and signs on presentation, resulting in delayed diagnosis and treatment. There are two distinct clinical courses that have emerged: acute and subacute onset, and clinical outcomes are directly related to the mode of onset. Patients with acute and severe AFOP show a clinical course similar to that of patients with diffuse alveolar damage and typically have a poor prognosis[15]. In the case we have presented, the first pathology revealed cellulose exudate in a few alveolar cavity, while massive cellulose exudate with organization in the alveolar spaces in second pathology. The lung lesions seemed to be shift and migratory. This partly reflects the evolution of the subacute onset and a unique

clinical presentation not previously described in AFOP. It performed similarity to cryptogenic organizing pneumonia with respect to clinical manifestations, imaging findings, treatment efficacy, and prognosis. This clinical pattern of AFOP has a less aggressive nature with slower progression.

AFOP also has nonspecific and variable radiographic appearances. The most common imaging finding is bilateral patchy infiltrates at the lung bases with ground-glass appearance and inter-lobar septal thickening[16]. Other radiographic findings reported include diffuse bilateral miliary infiltrates, as well as generalized nodules with lobar consolidation[17,18]. In addition, the images may appear similar to those in other lung diseases such as interstitial pneumonia, pulmonary edema, and infectious pneumonia[19]. The main findings in the lungs of this patient with AFOP were patchy shadows in the left upper lung rather than at the lung bases. The *imaging* findings in the lungs of this patient with AFOP seemed appear migratory patchy shadow, which exhibited a remarkably *similar* pattern to cryptogenic organizing pneumonia. The case we have presented of AFOP highlights the importance of lung biopsy diagnosis and suggests that clinicians should consider the possibility of AFOP when antibiotics are ineffective in the suspected diagnosis of community-acquired pneumonia patients with pulmonary consolidation and shadow.

The standard treatment for AFOP is still under investigation. Therapy with steroids alone or combined with immune suppressants was attempted, but the dosage and duration of steroid treatment are still unclear. Usually 0.5-1 mg/kg daily of prednisone (or equivalent) are prescribed initially[20]. There is no consensus on treatment duration, and relapse may occur during the period when the dosage of steroids is reduced. One case[21] reported a long duration of steroid treatment of nearly 24 months. For subacute onset of AFOP, most are likely to have responded favorably to steroids. But an acute onset of the disease usually presents a fast progression to death due to respiratory failure and multi-organ dysfunction, which have a modest benefit with steroids and immunosuppressive therapy[17]. The dosage and duration of steroid should be individualized according to the medical course, etiology, radiological evolution and the side reaction, and more studies on

treatment of AFOP are required in order to reduce the complication and improve the survival rate. Meanwhile, long-term follow-up is necessary. Attention should be paid to recurrence of the disease during hormone reduction and discontinuation.

Conclusion

In conclusion, AFOP, which is referred to as a relatively new and rare histopathology, can easily be misdiagnosed. Clinicians need to take into consideration the possibility of AFOP in the case of invalid antibacterial therapy. Further studies are needed to better classify AFOP and characterise its clinical presentations, course and treatment. This case was not novel but of significant clinical importance and very instructive.

Abbreviations

AFOP: Acute fibrinous and organising pneumonia; CT: Computed tomography.

Declarations

Acknowledgments

Not applicable.

Authors' contributions

ALC and QW wrote the initial draft of the manuscript. XMZ have read and approved the final manuscript. All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Funding

This work was supported by the Project of Key Discipline for TCM Construction of Jiangsu Province, China (no. JS1302).

Ethics approval and consent to participate

Not applicable.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Consent for publication

Written informed consent was obtained from the patient for the publication of this case report.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Respiratory Medicine, Affiliated Hospital of Nanjing University of Chinese Medicine, Nanjing, Jiangsu, China.

References

1. Beasley MB, Franks TJ, Galvin JR, Gochuico B, et al. Acute fibrinous and organizing pneumonia: a histological pattern of lung injury and possible variant of diffuse alveolar damage. *Archives of Pathology Lab Med.* 2002; 126(9): 1064–1070
2. Wang Y, Zhao S, Du G, et al. Acute fibrinous and organizing pneumonia as initial presentation of primary Sjögren's syndrome: a case report and literature review. *Clinical Rheumatology.* 2018; 37(7) : 2001-2005.
3. Ning YJ, Ding PS, Ke ZY, et al. Successful steroid treatment for acute fibrinous and organizing pneumonia: A case report. *World Journal of Clinical Cases.* 2018; 6(15): 1053-1058.
4. Mittal V, Kulshrestha R , Arya A , et al. Acute fibrinous and organising pneumonia presenting as complete lung consolidation. *Singapore Medical Journal.* 2011; 52(5): e88.
5. Chen S, Zhou H, Yu L, et al. A case of herbicide-induced acute fibrinous and organizing pneumonia?. *BMC Pulmonary Medicine.* 2017; 17(1): 203.
6. Kligerman SJ, Franks TJ, Galvin JR. From the radiologic pathology archives: organization and fibrosis as a response to lung injury in diffuse alveolar damage, organizing pneumonia, and acute fibrinous and organizing pneumonia. *Radiographics.* 2013; 33(7):1951–1975.

7. Hashisako M, Fukuoka J. Pathology of idiopathic interstitial pneumonias. *Clinical Medicine Insights: Circulator Respiratory Pulmonary Medicine*. 2015; 9(Suppl 1):123–133.
8. Saxena P, Kumar K, Mittal S et al: Acute fibrinous and organizing pneumonia: A rare form of nonbacterial pneumonia. *Indian Journal of Critical Care Medicine*. 2016; 20(4): 245–247.
9. Cincotta DR, Sebire NJ, Lim E, et al. Fatal acute fibrinous and organizing pneumonia in an infant: The histopathologic variability of acute respiratory distress syndrome. *Pediatric Critical Care Medicine*. 2007; 8(4): 378-382.
10. Hwang DM , Chamberlain DW, Poutanen SM, et al. Pulmonary pathology of severe acute respiratory syndrome in Toronto. *Modern Pathology*. 2004; 18(1): 1-10.
11. Hariri LP, Unizony S, Stone J, et al. Acute fibrinous and organizing pneumonia in systemic lupus erythematosus: A case report and review of the literature. *Pathology International*. 2010; 60(11): 755-759.
12. Valim, Valéria, Rocha RH, Couto RB, et al. Acute fibrinous and organizing pneumonia and undifferentiated connective tissue disease: a case report. *Case Reports in Rheumatology*. 2012; 2012: 1-6.
13. Beasley MB, Franks TJ, Galvin J R, et al. Acute fibrinous and organizing pneumonia: A histologic pattern of lung injury and possible variant of diffuse alveolar damage. *Archives of Pathology & Laboratory Medicine*. 2002; 126(9): 1064-1070.
14. Piciucchi S, Dubini A, Tomassetti S, et al. A case of amiodarone-induced acute fibrinous and organizing pneumonia mimicking mesothelioma. *American Journal of Respiratory and Critical Care Medicine*. 2015; 191(1): 104-106.
15. Sverzellati N, Poletti V, Chilosi M, et al. The Crazy-paving Pattern in Granulomatous Mycosis Fungoides. *Journal of Computer Assisted Tomography*. 2006; 30(5): 843-845.
16. [Arnaud D](#), [Surani Z](#), [Vakil A](#), [Varon J](#), et al. Acute fibrinous and organizing pneumonia: a case report and review of the literature. *American Journal of Case Reports*. 2017; 12(18): 1242-1246
17. Garcia BA, Goede T, Mohammed TL. Acute fibrinous organizing pneumonia: a case report and literature review. *Current Problems in Diagnostic Radiology*. 2015; 44(5): 469-471.
18. Akhtar A, Abideen ZU. Acute fibrinous and organizing pneumonia masquerading as a lower respiratory tract infection: A case report and review of the literature. *BMC Research Notes*. 2015; 8(1): 38–43.
19. Valim, Valéria, Rocha RH, et al. Acute fibrinous and organizing pneumonia and undifferentiated connective tissue disease: A case report. *Case Reports in Rheumatology*. 2012; 2012: 1-6.
20. [Ning YJ](#), [Ding PS](#), [Ke ZY](#), Successful steroid treatment for acute fibrinous and organizing pneumonia: A case report. *Word Journal of Clinical Cases*. 2018; 6(15): 1053-1058.
21. Sauter JL, Butnor KJ. Expanding the spectrum of pulmonary histopathological manifestations of anti-synthetase syndrome: anti-EJ-associated acute fibrinous and organizing pneumonia. *Histopathology*. 2014; 65(4): 581-582.

Figures

Figure 1

Chest computed tomography scan on admission showed patchy and consolidation in the right basement lower lobe lesions (a), and the upper lobe left lung appears normal (b).

Figure 2

Repeat chest computed tomography scan showed the foci absorbed of inferior lobe right lung (c), but new lesions in the upper lobe left lung after 10 days antibacterial treatment (d).

Figure 3

Pathology revealed alveolar septum widened with lymphocyte, plasma cell and eosinophil infiltration, cellulose exudate in a few alveolar cavity (original magnification×4).

Figure 4

Pathological examinations revealed massive cellulose exudate with organization in the alveolar cavity, alveolar septum widened and lymphocytes and plasmocyte infiltration. (original magnification ×10).

Figure 5

Chest computed tomography scan showed an increase of patchy infiltration after one month (e, f). Repeat chest computed tomography scan after one-month steroid treatment showed significant improvement, and lesions in the upper lobe of left lung almost disappeared(g, h).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [CAREchecklistEnglish2013.pdf](#)