

Pleural effusion. An unfamiliar presentation of ABPA

Komaldeep Kaur, Aditi Gupta, Gagandeep Kaur, Vishal Chopra

Department of Pulmonary Medicine, Government Medical College, Patiala, India

Abstract

Pleural effusion is rarely encountered in patients of allergic bronchopulmonary aspergillosis (ABPA). We report the case of a 17-year-old male who presented with complaints of fever, cough and increasing shortness of breath for 3 weeks. Patient had breathlessness with seasonal variation. Patient had right lower lobe consolidation with pleural effusion which did not respond to antibiotics. Pleural fluid was exudate with neutrophilic predominance and low ADA. Skin prick test for aspergillus fumigatus was positive, both total IgE and specific IgE against aspergillus fumigatus were raised.

Introduction

Allergic bronchopulmonary aspergillosis (ABPA) is a complex immunological pulmonary disorder caused by hypersensitivity to *Aspergillus* species, mainly *Aspergillus fumigatus* [1].

Correspondence: Dr. Komaldeep Kaur, Department of Pulmonary Medicine, Government Medical College, H. No. 560, Indra Nagar, Nangal, Roopnagar, Punjab, India.
Mobile: +91.9464391818.
E-mail: bhatti.komal@gmail.com

Keywords: Allergic bronchopulmonary aspergillosis; asthma; pleural effusion.

Authors' contributions: All the authors have equally contributed to the manuscript. All the authors have read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Conflict of interest: All the authors declare no conflict of interest.

Funding: not applicable.

Informed consent: Informed consent was taken from the patient.

Received for publication: 15 May 2020.

Accepted for publication: 8 July 2020.

©Copyright: the Author(s), 2020

Licensee PAGEPress, Italy

Monaldi Archives for Chest Disease 2020; 90:1380

doi: 10.4081/monaldi.2020.1380

This article is distributed under the terms of the Creative Commons Attribution Noncommercial License (by-nc 4.0) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The disease presents with varied clinical and radiological manifestations ranging from an asymptomatic patient with or without pulmonary infiltrates to severe uncontrolled asthma with or without central bronchiectasis (CB) and pulmonary fibrosis [2]. The diagnosis is mainly based on clinical suspicion in patients of asthma and on total and *Aspergillus* specific IgE levels. Pleural effusion is a rare feature in ABPA. We report a case of pleural effusion related to ABPA as initial pathology presentation.

Case Report

A 17-year-old male, presented with history of fever, cough with expectoration and shortness of breath for 3 weeks. Patient had history of dust allergy and wheeze with seasonal variation since childhood. History of occasional nebulization therapy use was present but there was no history of use of regular controller therapy. Patient did not give any history of tuberculosis in the past. There was no family history of bronchial asthma. On physical examination, patient was febrile (39.4°C), heart rate 100/min, blood pressure 120/70 mmHg, respiratory rate 20/min. On examination, there was dull percussion note with decreased breath sounds in right infra-scapular area and bilateral rhonchi. Chest X-ray was suggestive of right sided pleural effusion with consolidation (Figure 1). Total leucocyte count (TLC) was 14,800 mm³ with neutrophilic predominance and absolute eosinophilic count (AEC) count of 558 mm³. Sputum for AFB was negative and pyogenic cultures were also sterile. Mantoux test was negative and ESR was 5 mm/1st h. Computed tomography of chest revealed central bronchiectasis with collapse consolidation in right lower lobe along with pleural effusion (Figure 2). Straw colored pleural fluid was aspirated which showed TLC-450 mm³ with neutrophilic (80%) predominance, LDH 1654 U/l, proteins 4.90g/dl, glucose 3 mg/dl, choride 102 mmol/l and ADA 14 IU/L. Pleural fluid was negative for AFB on ZN staining and GeneXpert. Pyogenic and fungal cultures were sterile and fluid was negative for malignant cytology. Skin prick test for *A. fumigatus* was positive. Total IgE and specific IgE against *A. fumigatus* were markedly elevated with values of 13705 KU/L and 54.70 kuA/L respectively. A diagnosis of ABPA was made and patient was put on oral prednisolone in a dose of 0.75 mg/kg body weight which was tapered gradually over six months along with antifungal (itraconazole) for 16 weeks to which he improved. After six weeks of follow up, chest radiograph (Figure 3) showed complete resolution of consolidation and effusion.

Discussion

As to our knowledge very few cases in relation to ABPA associated pleural effusion have been reported. Many of those

patients had prior history of asthma and were on controller medications [3-7]. Typically, patients of ABPA present with poorly controlled asthma, wheezing, hemoptysis and productive cough [8]. Among all the patients of ABPA with bronchial and pleural involvement as per CT imaging, only <0.5% had pleural effusion according to Panchal *et al.* [9].

Inhaled conidia of *Aspergillus* can persist and germinate into fungal hyphae in genetically predisposed asthmatic individuals leading to profound inflammatory process in the airways [10,11]. This further leads to release of cytokines and fungal translocation into the pleural space, leading to a local Th2-dependent inflammatory response. This has been postulated as the possible mechanism for the development of pleural effusion [5].

In countries where there is high prevalence of tuberculosis (TB), patients of ABPA are commonly misdiagnosed as TB, and put on antitubercular therapy. Pleural fluid in our patient was neutrophilic and exudative with low ADA which ruled out TB. ABPA was diagnosed as per Agarwal criteria [12] which includes obligatory criteria [type I *Aspergillus* skin test positive or elevated IgE levels against *A. fumigatus* and elevated total IgE levels (>1000 IU/mL)] and other criteria (presence of precipitating or IgG antibodies against *A. fumigatus* in serum; radiographic pulmonary opacities consistent with ABPA and total eosinophil count > 500 cells/L). For fulfilling the criteria, both obligatory and two out of three other criteria should be met in patients with underlying bronchial asthma or cystic fibrosis. Systemic glucocorticoids suppress the immune activity and antifungal agents attenuate the fungal load in the airways [13]. Treatment includes oral prednisolone of 0.5-0.75 mg/kg gradually tapered over 6-12 months and oral antifungals for 16 weeks duration. The patient

was put on steroids and anti fungal medications. There was clinical and radiological improvement.

Though ABPA is a rare cause of pleural effusion (Table 1), this case highlights that ABPA should be kept in differential diagnosis in patients of pleural effusion with history of asthma even in countries with high prevalence of tuberculosis.



Figure 1. Chest X-ray suggestive of consolidation with right sided pleural effusion.

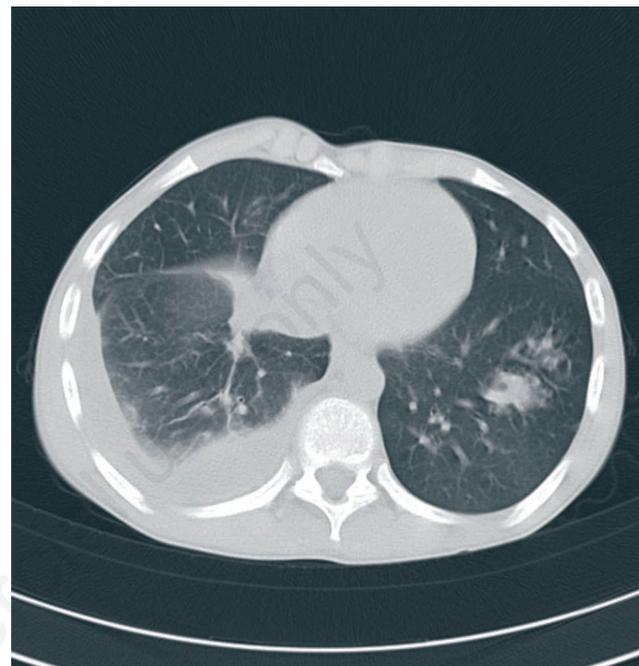


Figure 2. Computed tomography of chest showing right sided pleural effusion.

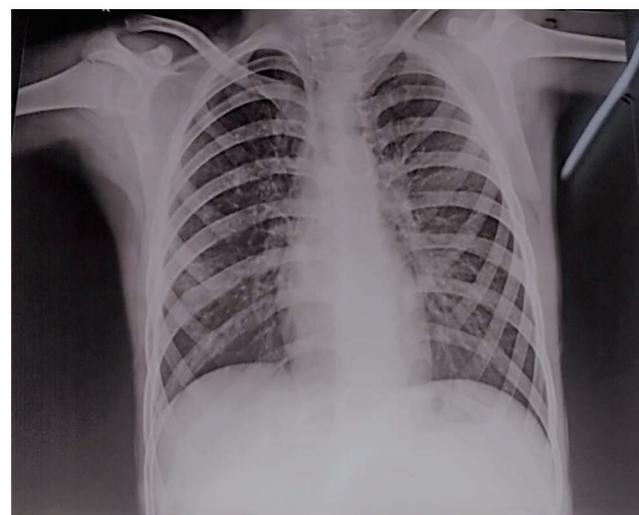


Figure 3. Follow up chest X-ray showing resolution of pleural effusion with treatment.

Table 1. Details of previous cases reported as ABPA associated pleural effusions in literature till date.

Author - Year of publication	Age/Gender	History of asthma	Skin prick test	S. precipitins	IgE (total and Aspergillus specific)	Radiological findings	Final diagnosis	Treatment given	Follow up
Murphy <i>et al.</i> [3] 1981	12 yrs / male	Yes	Positive	Positive	NA	Left sided pleural effusion	ABPA	Steroids	Resolution of pleural effusion
Murphy <i>et al.</i> [3] 1981	64 yrs / male	Yes	Positive	Positive	NA	Left pleural effusion, partial collapse of left upper and right middle lobe and mediastinal lymphadenopathy	ABPA	Steroids	Resolution at 3 months; Recurrence while tapering steroid dose which responded to increase in steroid dose
Bhagat <i>et al.</i> [6] 1993	38 yrs / female	Yes	Positive	Positive	NA	Left lung collapse with effusion	ABPA	Steroids	Resolution at one month
Panchal <i>et al.</i> [9] 1997	54 yrs / male	Yes	Positive	Positive	Elevated	Left lower lobectomy with collapse of the remaining two left lobes and ipsilateral pleural effusion	ABPA	Steroids + antifungals	NA
Connor <i>et al.</i> [4] 2001	27 yrs / male	Yes	Positive	Positive	Elevated	Bilateral effusion and bilateral perihilar opacities and left lower lobe infiltrates	ABPA	Steroids	Resolution at 3 months
Ogasawara <i>et al.</i> [14] 2003	61 yrs / male	Yes	Positive	Positive	Elevated	Lung infiltrates Right sided effusion developed while on steroids	ABPA	Steroids + antifungals	Resolution after increasing steroid dose
Kirschner <i>et al.</i> [5] 2011	25 yrs / male	Yes	NA	NA	Elevated	Left upper lobe atelectasis and pleural effusion	ABPA	Steroids antifungals	Resolution at 6 months
Madan <i>et al.</i> [7] 2012	22 yrs / female	Yes	Positive	Positive	Elevated	Right sided pleural effusion	ABPA with Tubercular effusion	Anti-tubercular therapy	Resolution at 2 months

NA, not available; ABPA, Allergic bronchopulmonary aspergillosis.

References

- Agarwal R. Allergic bronchopulmonary aspergillosis. *Chest* 2009;135:805–26.
- Rosenberg M, Patterson R, Mintzer R, et al. Clinical and immunologic criteria for the diagnosis of allergic bronchopulmonary aspergillosis. *Ann Intern Med* 1977;86:405–14.
- Murphy D, Lane DJ. Pleural effusion in allergic bronchopulmonary aspergillosis: Two case reports. *Br J Dis Chest* 1981;75:91–5.
- O'Connor TM, O'Donnell A, Hurley M, Bredin CP. Allergic bronchopulmonary aspergillosis: A rare cause of pleural effusion. *Respirology* 2001;6:361–3.
- Kirschner AN, Kuhlmann E, Kuzniar TJ. Eosinophilic pleural effusion complicating allergic bronchopulmonary aspergillosis. *Respiration* 2011;82:478–81.
- Bhagat R, Shah A, Jaggi OP, Khan ZU. Concomitant allergic bronchopulmonary aspergillosis and allergic Aspergillus sinusitis with an operated aspergilloma. *J Allergy Clin Immunol* 1993;91:1094–6.
- Madan K, Bal A, Agarwal R. Pleural effusion in a patient with allergic bronchopulmonary aspergillosis. *Respir Care* 2012;57:1509–13.
- Agarwal R, Chakrabarti A. Clinical manifestations and natural history of allergic bronchopulmonary aspergillosis. In: A. Comarù Pasqualotto, editor. *Aspergillosis: From diagnosis to prevention*. Springer; 2010. p. 707–24.
- Panchal N, Bhagat R, Pant C, Shah A. Allergic bronchopulmonary aspergillosis: The spectrum of computed tomography appearances. *Respir Med* 1997;91:213–9.
- Tomee JFC, Wierenga ATJ, Hiemstra PS, Kauffman HF. Proteases from *Aspergillus fumigatus* Induce release of proinflammatory cytokines and cell detachment in airway epithelial cell lines. *J Infect Dis* 1997;176:300–3.
- Kauffman HF, Christomee JF, Van De Riet MA, et al. Protease-dependent activation of epithelial cells by fungal allergens leads to morphologic changes and cytokine production. *J Allergy Clin Immunol* 2000;105:1185–93.

12. Agarwal R, Chakrabarti A, Shah A, et al. Allergic bronchopulmonary aspergillosis: Review of literature and proposal of new diagnostic and classification criteria. *Clin Exp Allergy* 2013;43:850–73.
13. Moss RB. Critique of trials in allergic bronchopulmonary aspergillosis and fungal allergy. *Med Mycol* 2006;44:S269–72.
14. Ogasawara T, Iesato K, Okabe H, et al. A case of pleural effusion associated with allergic bronchopulmonary aspergillosis during a relapse of the disease. *Nihon Kokyuki Gakkai Zasshi* 2003;41:905–10.

Non-commercial use only