CASE REPORT

CHRONIC NECROTIZING PULMONARY ASPERGILLOSIS: A CASE REPORT

Asha Mahadevappa¹, Sapna Patel², Anurag Mohan³, Sunila Ravishankar⁴, Gubbanna V Manjunath⁵

HOW TO CITE THIS ARTICLE:

Asha Mahadevappa, Sapna Patel, Anurag Mohan, Sunila Ravishankar, Gubbanna V Manjunath. "Chronic necrotizing pulmonary aspergillosis: a case report". Journal of Evolution of Medical and Dental Sciences 2013; Vol2, Issue 39, September 30; Page: 7518-7522.

ABSTRACT: Chronic necrotizing pulmonary aspergillosis or semi-invasive pulmonary aspergillosis is one of the forms of pulmonary aspergillosis typically found in mildly immunocompromised patients. It is an indolent, cavitary and infectious process of the lung parenchyma secondary to local invasion by aspergillus species. We report a case of a male patient aged 55 years with complaints of chronic productive cough with blood tinged sputum, orthopnea, acute episode of hemoptysis and post percutaneous transluminal coronary angioplasty status 6 weeks back. X-ray and computed tomography of the chest revealed consolidation with interposed cavitation in the right upper lobe and pleural thickening. Computed tomography guided fine needle aspiration cytology smears showed aspergillus hyphae with abundant necrotic material and inflammatory cells. Fungal stains were positive for aspergillus. Based on the clinical, radiological and cytological findings, the patient was diagnosed with chronic necrotizing pulmonary aspergillosis and treated successfully with oral itraconazole. In view of difficult diagnosis of chronic necrotizing pulmonary aspergillosis, fine needle aspiration cytology plays important role when biopsy is not possible, contributing to early treatment with systemic antifungal therapy and preventing its morbidity and mortality. Surgery plays a small role in the treatment because of poor overall lung function in many patients.

KEYWORDS: Pulmonary aspergillosis, Immunocompromised, FNAC Lung.

INTRODUCTION: Aspergillus species are ubiquitous fungi that are widespread in the environment and commonly isolated from both outdoor environment (soil, plant debris) and indoor environment, including hospitals. Aspergillosis refers to the spectrum of disease caused by aspergillus species acquired by inhalation of airborne spores. This condition presents with a spectrum of illnesses, ranging from allergic reactions to colonization of pre-existing pulmonary cavities to invasion and destruction of lung tissue with pyaemic spread to the brain, skin and other organs⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾. Pulmonary aspergillosis is classified as (Figure1): Invasive pulmonary aspergillosis (IPA), Semi-invasive or chronic necrotizing pulmonary aspergillosis (CNPA), Aspergilloma and Allergic bronchopulmonary aspergillosis (ABPA) ⁽¹⁾. IPA is a severe disease in severely immunocompromised patients, critically ill patients and those with chronic obstructive pulmonary disease (COPD). The major risk factors for IPA are neutropenia, hematopoietic stem-cell transplantation and solid-organ transplantation, prolonged therapy with high-dose corticosteroids, hematological malignancy, cytotoxic therapy, advanced acquired immunodeficiency syndrome (AIDS) and chronic granulomatous disease. CNPA is a locally invasive disease described in patients with chronic lung disease or mild immunodeficiency. Aspergilloma and ABPA are non-invasive pulmonary diseases. Aspergilloma is a fungus ball that develops in a pre-existing cavity in the lung parenchyma, while ABPA is a hypersensitivity disease of the lungs that almost always affects patients with asthma or

CASE REPORT

cystic fibrosis ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾. In this report, we report a case of CNPA in a patient with post percutaneous transluminal coronary angioplasty (PTCA) status.

CASE HISTORY: 55 years old male patient presented with complaints of chronic productive cough with blood tinged sputum, orthopnea since 1 month and acute episode of hemoptysis. Patient gave a history of post PTCA 6 weeks back and was a known case of diabetes mellitus (DM), hypertension (HT) and ischemic heart disease (IHD). All laboratory investigations were within normal limits except for raised erythrocyte sedimentation rate (ESR) -90 mm at the end of one hour. Chest X-ray and Computed tomography (CT) of the chest revealed consolidation with interposed cavitation in the right upper lobe and pleural thickening (Figure 2). Fine needle aspiration cytology (FNAC) smears showed characteristic acute angle branching septate aspergillus hyphae with abundant necrotic material and inflammatory cells (Figure 3). Special stain for fungal elements Grocott's methenamine silver (GMS) (Figure 4) and Periodic Acid-Schiff (PAS) were positive for aspergillus and acid fast stain for tuberculosis was negative on the smears. Based on the clinical, radiological and cytological findings, the patient was diagnosed with chronic necrotizing pulmonary aspergillosis and treated successfully with oral itraconazole on regular follow up. The ESR level came down to normal level after 2 weeks of treatment.

DISCUSSION: Geftter et al. and Binder et al. first described CNPA in 1981. It is a rare indolent, cavitary and infectious process of the lung due to invasion by aspergillus species. It usually affects middle-aged and elderly patients with altered local defenses, associated with underlying chronic lung diseases such as COPD, previous pulmonary tuberculosis, thoracic surgery, radiation therapy, pneumoconiosis, cystic fibrosis, lung infarction or sarcoidosis. It may also occur in patients who are mildly immunocompromised due to DM, alcoholism, chronic liver disease, prolonged low-dose corticosteroid therapy, malnutrition, or connective tissue diseases such as rheumatoid arthritis and ankylosing spondylitis. In contrast to IPA, CNPA runs a slowly progressive course over weeks to months, and vascular invasion or dissemination to other organs is unusual ⁽²⁾⁽⁴⁾⁽⁵⁾⁽⁶⁾.

Clinical manifestations of which depends on the virulence of the fungus, intensity of exposure, patient's immunological status. Patients presents with constitutional symptoms such as fever, malaise, fatigue and weight loss of 1–6 months duration, in addition to chronic productive cough and hemoptysis which varies from mild to severe⁽⁷⁾⁽⁸⁾. Although imaging findings in pulmonary aspergillosis may be nonspecific, chest radiograph and chest CT scan usually show consolidation, pleural thickening and cavitary lesions in the upper lung lobes. Pathologically, CNPA is characterized by necrosis of lung tissue, acute or chronic inflammation of the cavity wall and presence of hyphae consistent with aspergillus species. The differential diagnosis includes tuberculosis, cavitary histoplasmosis and coccidioidomycosis, and neoplasias ⁽¹⁾⁽²⁾⁽⁹⁾. The definite diagnosis is made through the histological demonstration of tissue invasion by the fungus and the growth of aspergillus species in a culture. CNPA is an uncommon pathology and frequently, difficult to diagnose and is often delayed because of an indolent course, non-specific clinical, radiological presentation with prior pulmonary pathology and contributing to increase its morbidity and mortality. Due to the difficulty in confirming the diagnosis, the diagnostic criteria were established by Denning et al ⁽⁸⁾ and together are highly indicative of CNPA (Table 1) ⁽²⁾⁽³⁾⁽⁴⁾⁽⁸⁾. Once diagnosis is established, the antifungal treatment should be started immediately. Itraconazole is currently a good option due to its excellent efficacy, low toxicity and easy administration. Due to the cost, new drug, voriconazole is reserved to the treatment of severe infections or infections that do not respond to

CASE REPORT

other antifungal agents. The ideal treatment duration has not yet been defined and depends on the extension of the disease, the patient's response to treatment, the underlining disease and the patient's immunological condition. At times, a lifelong therapy may be required ⁽²⁾⁽⁷⁾⁽⁹⁾⁽¹⁰⁾.

Surgical resection plays a minor role in the treatment of CNPA, being reserved for healthy young patients with focal disease and good pulmonary reserves, patients not tolerating antifungal therapy, and patients with residual localized but active disease despite adequate antifungal therapy. The incidence of infection with aspergillus has increased in recent years, primarily due to the increasing number of immunosuppressed patients. Early therapy is critical for a successful outcome, but the diagnosis remains difficult and knowledge of the clinical presentation and risk factors can lead to a heightened suspicion enabling earlier diagnosis. Finally, prevention of invasive pulmonary aspergillosis may be possible in high-risk patients. Recent data also suggest the incidence of invasive aspergillosis is increasing in non-immunosuppressed patients in the intensive care setting ⁽²⁾⁽³⁾⁽⁴⁾.

In our case the patient presented with post PTCA status in a background of mild immunodeficiency (DM, HT and IHD). Based on the clinical, radiological and cytological findings, the patient was diagnosed with chronic necrotizing pulmonary aspergillosis as per diagnostic criteria and treated successfully with oral Itraconazole.

CONCLUSION: CNPA is an uncommon disease, it's an indolent character and an association with patients having a prior pulmonary pathology contributes towards delayed diagnosis. In view of difficult diagnosis of CNPA, FNAC plays important role when biopsy is not possible, along with clinical and radiological manifestation. This contributes to early treatment with systemic antifungal therapy and preventing its morbidity and mortality. Surgery plays a small role in the treatment of CNPA because of poor overall lung function in many patients.

REFERENCES:

1. Soubani AO, Chandrasekar PH. The clinical spectrum of pulmonary aspergillosis. *Chest* 2002; 121: 1988-1999.
2. Zmeili OS, Soubani AO. Pulmonary aspergillosis: a clinical update. *QJM* 2007; 100: 317-334.
3. Thompson GR, Patterson TF. Pulmonary Aspergillosis. *Semin Respir Crit Care Med*. 2008; 28(2):103-110.
4. Kousha M, Tadi R, Soubani AO. Pulmonary aspergillosis: a clinical review. (1) *Eur Respir Rev* 2011; 20: 121, 156-174.
5. Silva EFB, Barbosa MP, Oliveira MAA, Martins RR, Silva JF. Chronic necrotizing pulmonary aspergillosis. *J Bras Pneumol*. 2009; 35(1):95-98.
6. Carreira S, Lopes A, Pinto Basto R, Faria I, Pontes da Mata J. Necrotizing pulmonary aspergillosis: regarding two clinical cases. *Revista Portuguesa de Pneumologia*. 2011; 17:80-4.
7. Franquet T, Müller NL, Giménez A, Guembe P, de La Torre J, Bagué S. Spectrum of pulmonary aspergillosis: histologic, clinical, and radiologic findings. *Radiographics*. 2001; 21(4):825-37.
8. Denning DW, Riniotis K, Dobrashian R, et al. Chronic cavitary and fibrosing pulmonary and pleural aspergillosis: case series, proposed nomenclature change, and review. *Clin Infect Dis* 2003; 37: Suppl. 3, S265-S280.
9. Walsh TJ, Anaissie EJ, Denning DW, Herbrecht R, Kontoyiannis DP, Marr KA, et-al. Treatment of aspergillosis: clinical practice guidelines of the Infectious Diseases Society of America. *Clin Infect Dis*. 2008; 46:327-60.

CASE REPORT

10. Martinez R. An update on the use of antifungal agents. J Bras Pneumol. 2006; 32(5):449-60.

FIGURE 1. The spectrum of pulmonary aspergillosis. (Adopted- Ref 1,2)

Figure 1: The spectrum of pulmonary aspergillosis.

Figure 2: CT scan, revealing an ill-defined nodular lesion with a pleural tail (arrow) over the right upper lobe of the lung.

Figure 3: FNAC smears showing characteristic acute angle branching septate aspergillus hyphae with abundant necrotic material and inflammatory cells. (MGG, X100)

CASE REPORT

Figure 4: Fungal balls composed of massive acute angle branching septate aspergillus hyphae with parallel cell walls. (GMS, X100)

TABLE 1	Diagnostic criteria for chronic necrotising aspergillosis
Diagnostic criteria	Characteristics
Clinical	<ul style="list-style-type: none"> •Chronic (>1 month) pulmonary or systemic symptoms, including at least one of: weight loss, productive cough or haemoptysis. •No overt immunocompromising conditions (e.g. haematological malignancy, neutropenia, organ transplantation)
Radiological	<ul style="list-style-type: none"> •Cavitary pulmonary lesion with evidence of paracavitary infiltrate. •New cavity formation, or expansion of cavity size over time
Laboratory	<ul style="list-style-type: none"> •Elevated levels of inflammatory markers (C-reactive protein, plasma viscosity or erythrocyte sedimentation rate). •Isolation of <i>Aspergillus</i> spp. from pulmonary or pleural cavity, or positive serum <i>Aspergillus</i> precipitin test. •Exclusion of other pulmonary pathogens, by results of appropriate cultures and serological tests, that are associated with similar disease presentation, including mycobacteria and endemic fungi.

Adopted –Ref[2,8].

Table 1: Diagnostic criteria for chronic necrotizing aspergillosis.

AUTHORS:

1. Asha Mahadevappa
2. Sapna Patel
3. Anurag Mohan
4. Sunila Ravishankar
5. Gubbanna V Manjunath

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Pathology, JSS Medical College, JSS University, Mysore.
2. Assistant Professor, Department of Pathology, JSS Medical College, JSS University, Mysore.
3. Post Graduate Resident, Department of Pathology, JSS Medical College, JSS University, Mysore.

4. Professor, Department of Pathology, JSS Medical College, JSS University, Mysore.
5. Professor and HOD, Department of Pathology, JSS Medical College, JSS University, Mysore.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Asha M.
1036, 5th Main, 10th Cross,
1st Stage, Vijayanagar,
Mysore – 570017, Karnataka, Mysore.
Email- masha1036@yahoo.co.in

Date of Submission: 19/09/2013.
Date of Peer Review: 20/09/2013.
Date of Acceptance: 23/09/2013.
Date of Publishing: 26/09/2013.