ORIGINAL RESEARCH PAPER

General Medicine

A CASE OF ASPERGILLUS PNEUMONIA: THE DIAGNOSTIC VALUE OF RADIOLOGICAL FINDINGS

KEY WORDS: Aspergilliosis, lung infection, bird nest sign, bronchoscopy

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ABSTRACT

This case report presents a challenging diagnostic scenario of Aspergillus pneumonia in a patient with multiple comorbidities manifesting as respiratory symptoms. Despite extensive investigations and inconclusive bronchoscopy results, identification of the characteristic radiological finding, the "bird's nest sign," facilitated the diagnosis. Subsequent histopathological examination following repeat bronchoscopy confirmed Aspergillus infection. This report underscores the diagnostic complexity and rarity of such infections, emphasizing the pivotal role of recognizing classic radiological signs and the utility of histopathology in resolving diagnostic dilemmas in complex fungal infections.

INTRODUCTION:

Aspergillus species are opportunistic pathogens prevalent in the environment, known for causing a spectrum of diseases, including allergic reactions to invasive infections [1]. Among these, Aspergillus pneumonia poses a significant clinical challenge, particularly in immunocompromised individuals and those with chronic underlying conditions. The lungs serve as the primary site of infection, where inhaled conidia can lead to invasive pulmonary aspergillosis (IPA), a condition associated with high morbidity and mortality.

Aspergillus species are filamentous fungi that produce airborne conidia, capable of colonizing the respiratory tract upon inhalation [5]. These conidia germinate into hyphae pathogenically, which can invade blood vessels, leading to tissue necrosis and potential dissemination [5]. The host immune response, predominantly involving neutrophils and macrophages, plays a critical role in controlling the infection. Factors such as immunosuppression, neutropenia, and impaired macrophage function significantly enhance susceptibility to invasive disease.

Radiological imaging, especially high-resolution computed tomography (HRCT), plays a pivotal role in the early detection and diagnosis of Aspergillus pneumonia [4]. Characteristic radiological findings, such as the "bird's nest sign," defined by centrilobular nodules and patchy consolidation, are crucial in distinguishing Aspergillus pneumonia from other pulmonary infections [4]. This sign is particularly valuable when traditional diagnostic methods, including fungal cultures and smears, yield inconclusive results.

The incidence of IPA has been rising, particularly among patients with hematologic malignancies, those undergoing chemotherapy, recipients of stem cell and organ transplants, and individuals on prolonged corticosteroid therapy [3]. Additionally, patients with chronic obstructive pulmonary disease (COPD), cystic fibrosis, tuberculosis, and advanced HIV infection are at increased risk due to compromised pulmonary defenses and immune responses [2].

This case report emphasizes the importance of recognizing specific radiological signs, such as the "bird's nest sign," in diagnosing Aspergillus pneumonia [4] when in diagnostic dilemma .

CASE PRESENTATION

Chief complaints include a persistent fever and cough over three weeks, alongside initial symptoms of low-grade fever with chills, rigor, and dry cough, accompanied by a three-month history of weight loss. The patient has a significant medical history of chronic calcific pancreatitis, type 3C diabetes mellitus, and chronic kidney disease. On physical examination, the patient was conscious, oriented, and afebrile, exhibiting pallor and bilateral pitting pedal edema. Systemic examination revealed normal heart sounds and bilateral air entry with crepitation's.

Parameter	Value (Normal Range)	Parameter	Value(Normal Range)
HAEMOGLOBIN	7.2g/dL(13.0-17.0 g/dL)	SGOT(AST)	134 U/L (<50 U/L)
TOTAL COUNT	20170cells/L (poly-82.2%, lymph-5.4%,eos-8.4%)	SGPT(ALT)	98 U/L (<50 U/L)
PLATELETS	3.17 × 10^11/L(1.5-4.5 × 10^11/L)	ALP	297 U/L (32-120 U/L)
MCV	72.6 fL (83-101 fL)	TOTAL PROTEIN	66 g/L (66-83 g/L)
ESR	73mm/h(4-12 mm/h)	ALBUMIN	21 g/L (3.5-5.2 g/L)
C-REACTIVE PROTEIN	7.9 mg/dl (< 0.8 mg/dl)	GLOBULIN	45 g/L (2.0-3.5 g/L)
BUN	14.2 mmol/L(2.82-7.14 mmol/L)	TOTAL BILIRUBIN	6.28 mol/L (5.13-20.52 mol/L)
CREATININE	220 mol/L (70.72-114.92 mol/L)	DIRECT BILIRUBIN	3.28 mol/L (<3.42 mol/L)
SODIUM	132mmol/L (136-146 mmol/L)	INDIRECT BILIRUBIN	3.00 mol/L (1.71-17.1 mol/L)
POTTASIUM	3.2 mmol/L (3.5-5.1 mmol/L)	I.N.R	1.5

Figure 1 chest x ray showing cavitary lesion in right middle lobe.

Laboratory investigations demonstrated hemoglobin levels at 7.2 g/dL, a total count of 20,170, sodium at 132mmol/L, potassium at 3.1 mEq/L, BUN at 14.2 mmol/L, and creatinine at 220 mol/L (Table 1). Imaging studies revealed a cavitary lesion in the middle lobe on chest X-ray (Figure 1). Initial bronchoscopy results were negative. The patient was treated with injection Meropenem but showed no improvement after 48 hours. Due to the lack of clinical response, a high-resolution computed tomography (HRCT) thorax was performed, showing features suggestive of fungal pneumonia with cavitary lesions in the right upper and left middle lobes, along with the classic "bird's nest sign" (Figure 2).

Figure 2 high-resolution computed tomography (HRCT) thorax showing bird's nest sign

Despite initial negative bronchoscopy results, the characteristic radiological findings raised suspicion of a fungal etiology. A subsequent bronchoscopy was performed for further evaluation. Repeat fungal cultures and smears were negative, biopsy of the tissue revealed septate hyphae with acute angle branching, confirming Aspergillus infection (Figure 3). The patient was started on appropriate antifungal therapy and showed clinical improvement.

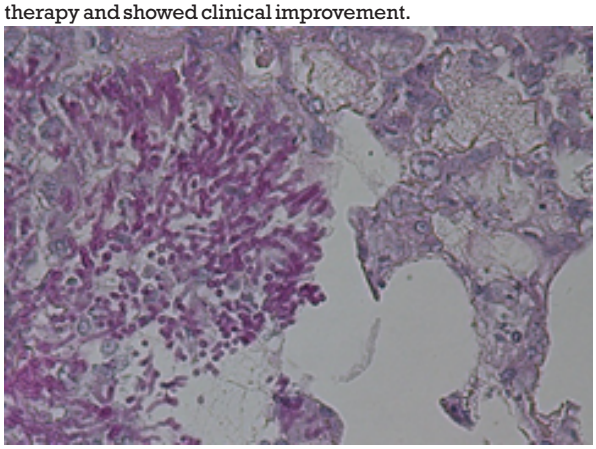

Figure 3 lung biopsy specimen showing Aspergillus hematoxylin and eosin stain ×400 with Aspergillus hyphae have a uniform diameter, with branching at acute angles.

DISCUSSION

The presented case underscores the diagnostic challenges of Aspergillus pneumonia, particularly in patients with multiple comorbidities that compromise the immune system, predisposing them to opportunistic fungal infections. Despite negative initial bronchoscopy results, characteristic radiological findings, including the classic "bird's nest sign," were instrumental in guiding further diagnostic procedures. These findings highlight the importance of high-resolution computed tomography (HRCT) in the early detection of fungal pneumonia, facilitating timely intervention and management [5]. Histopathological examination following a repeated bronchoscopy confirmed Aspergillus infection, emphasizing the need for a multidisciplinary approach in managing complex cases [6]. The successful identification of Aspergillus underscores the utility of histopathology in cases where traditional diagnostic methods yield inconclusive results [2].

CONCLUSION

This case highlights the diagnostic value of radiological findings, particularly the "bird's nest sign," in identifying Aspergillus pneumonia, especially in patients with multiple risk factors. Prompt recognition and appropriate management are essential for improving patient outcomes in such cases [7]. Additionally, interdisciplinary collaboration between clinicians, radiologists, and pathologists is crucial for achieving accurate diagnosis and guiding effective treatment strategies [8].

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