

# Pulmonary aspergillosis is a rare finding in diabetic patients: a case report

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## ABSTRACT

**Background:** Aspergillosis is an infection caused by a common mold (type of fungus) named *Aspergillus*. Its spores are present in air but usually do not cause any disease in immune-competent people. However, it can cause various types of diseases, which most commonly involve the respiratory system. Early recognition and treatment are important for better outcomes.

**Case Presentation:** A middle-aged diabetic male presented with high blood glucose levels leading to hyperosmolar hyperglycemic non-ketotic coma and was treated accordingly. His baseline chest X-ray showed reticulo-nodular shadowing and cavitary lesion in left middle zone and was being treated on the lines of pneumonia. After 4 days of treatment, the patient did not improve and had had contrast enhanced CT-scan chest showing a reverse halo sign along with a fungal ball in the lung cavity. His white blood cells were increased, erythrocyte sedimentation rate was normal, and sputum for acid-fast bacilli was negative, but positive for *Aspergillus* species.

**Conclusion:** Diagnosis of pulmonary aspergillosis was made and the patient was managed accordingly with intravenous anti-fungal therapy. Early diagnosis and treatment is necessary.

**Keywords:** Aspergillosis, reverse halo sign, aspergilloma, diabetes.

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## Background

Aspergillosis is a fungal infection caused by the *Aspergillus* species. It is usually seen in immune-compromised patients with depressed immunity but is rarely seen in immune-competent people with certain risk factors. It usually affects the respiratory system and has a high morbidity and mortality rate. Here, I represent a rare case in which there was no documented risk factor for pulmonary aspergillosis.

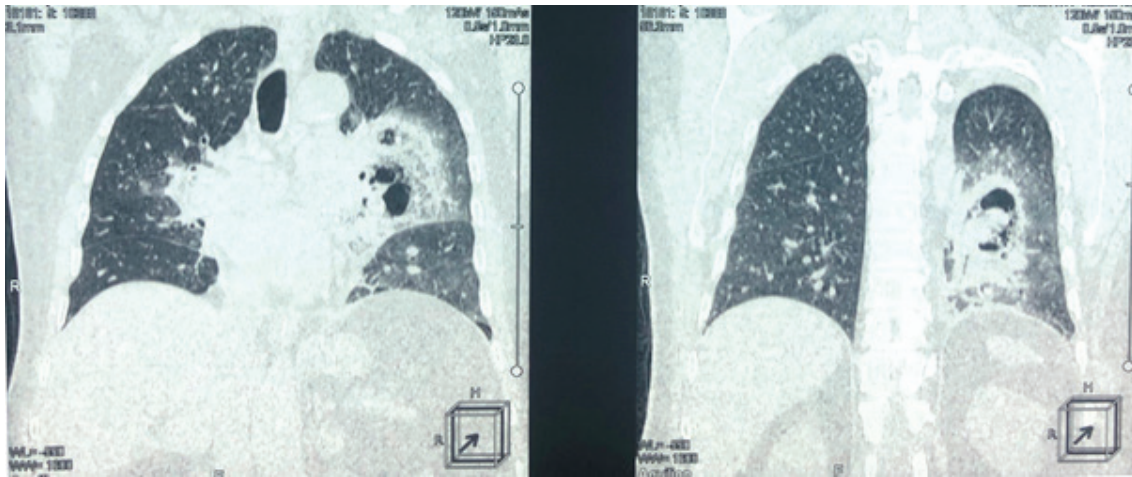
## Case Presentation

A 65-year-old male who was diabetic for the last 10 years presented with complaints of generalized body weakness, decreased appetite, and dry cough. He was vitally stable with a blood pressure of 130/80 mmHg, pulse rate of 90/minutes, afebrile, respiratory rate of 16/minutes, and oxygen saturation of 98% at room air. On examination, his chest had end inspiratory coarse crepitations on the left middle zone. Other systemic examinations were unremarkable. Blood investigations showed mildly elevated total leukocyte count, with normal hemoglobin and platelet count. C-reactive protein was 45 and random blood glucose was 790 mg/dl. Liver function tests, renal function tests, urine routine examination, and serum electrolytes were normal. Serum osmolality was high. Blood culture was negative. Chest X-ray was carried out which showed a cavitary lesion (Figure 1). The patient was managed

on the lines of hyperosmolar hyperglycemic non-ketotic coma (HONK) precipitated by lower respiratory tract infection. After a day, the patient was out of HONK but his lung cavity was increasing in size and he started having productive cough. Sputum routine examination, culture, and sensitivity were sent and antibiotics were started. After a day, the patient started having hemoptysis. So, computed tomographic scan (CT-scan) chest with contrast



**Figure 1.** Chest X-ray showing a cavitary lesion.



**Figure 2.** CT-scan of the chest coronal view showing pulmonary aspergillosis.

was carried out which showed a reverse halo sign along with aspergilloma (Figure 2). Sputum culture and sensitivity showed *Aspergillus* species; so eventually, intravenous voriconazole was started.

### Discussion

The patient was diagnosed with pulmonary aspergillosis which is a rare entity in immune-competent people. He presented with HONK, which was managed as bacterial pneumonia as bacterial infections are more common in diabetic patients. A rare entity in my patient was that he had no documented risk factor for aspergillosis and sputum was positive for *Aspergillus* species. *Aspergillus* species are fungi which usually cause disease in immune-compromised patients that usually includes patient with acquired immunodeficiency syndrome, on chemotherapeutic agents, leukemia, lymphoma, solid organ transplants, or immune-competent individuals with chronic granulomatous diseases, pre-existing lung cavities, suppurative infections or steroid usage [1,2]. The underlying risk factors greatly increased the cases of fungal infections [4]. There are different forms of clinical syndromes caused by *Aspergillus* infection, including aspergilloma, chronic necrotizing aspergillosis, invasive pulmonary aspergillosis, and allergic broncho-pulmonary aspergillosis. Invasive pulmonary aspergillosis is more common in hematological malignancies than in non-hematological diseases [3]. *Aspergillus fumigatus* is usually a more common species found in patients with posttuberculous cavitation [4]. Aspergilloma is usually formed in previously insulted lungs with cavities. It is non-invasive and the most common form of *Aspergillus* infection is of lungs. It is usually formed by fungal hyphae, inflammatory cells, mucous, fibrin, and tissue debris [5]. Although diabetes mellitus increases the risk of bacterial infections, it can rarely be a cause of fungal infection [6,7]. Symptoms of *Aspergillus* infection include dry or productive cough, respiratory distress, wheezing, or fever [2,4,7]. Aspergilloma

is usually asymptomatic but can cause hemoptysis if it invades local blood vessels. It can cause hemoptysis that can be due to bleeding from bronchial blood vessels lining the cavity and mechanical irritation of blood vessels inside the cavity by movement of the fungus ball [5]. Diagnosis depends on blood sampling, sputum examination, imaging modalities, bronchoscopy, and broncho-alveolar lavage. Blood cultures are often negative because *A. fungemia* is very rare, and *Aspergillus hyphae* may be difficult to proliferate in a blood culture bottle. Often, in critically ill and intubated patients, tissue sampling is not feasible and identification of *Aspergillus* species in sputum sample of immune-competent people represents respiratory colonization [2]. Diagnosis is often difficult due to non-specific symptoms of the disease and is often delayed because of less prevalence of disease without classic risk factors [2]. CT-scan analysis may help diagnose pulmonary aspergillosis at early stage, which helps in early treatment and decreases morbidity and mortality from this rare disease. Main CT-scan findings usually are small or large nodules, consolidated, and peri-bronchial infiltrates with or without tree-in-bud appearance [8]. Voriconazole is a better treatment option for pulmonary aspergillosis as compared to other treatment options [2,9]. If patients have recurrent hemoptysis, then surgical resection of fungal ball can be done if pulmonary function tests are good enough [5]. Long-term prognosis was not good enough due to underlying diseases and needs prolonged treatment.

### Conclusion

Diabetes is considered as a risk factor for poor outcomes in pulmonary aspergillosis, but early recognition and treatment is important for better outcomes. Generally considered, aspergilloma-related hemoptysis has a high mortality rate.

### List of Abbreviation

CT-scan Computed tomographic scan  
HONK Hyperosmolar hyperglycemic non-ketotic coma

**What is new?**

A rare entity in my patient was that he had no documented risk factor for aspergillosis and sputum was positive for *Aspergillus* species.

**Consent for publication**

Written consent for publication was obtained from the patient.

**Ethical Approval**

Institutional approval was obtained in compliance with the regulation of our institution and generally accepted guidelines governing such work.

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**Summary of the case**

1	<b>Patient (gender, age)</b>	Male, 65-year old
2	<b>Final diagnosis</b>	Pulmonary aspergillosis is a rare finding in diabetic patients: a case report
3	<b>Symptoms</b>	Generalized body weakness, decreased appetite, dry cough
4	<b>Medications</b>	Voriconazole
5	<b>Clinical procedure</b>	Nil
6	<b>Specialty</b>	Pulmonology