CASE REPORT

Coinfection of pulmonary mucormycosis and aspergillosis presenting as bilateral vocal cord palsy

Arun H Mahadevaiah,¹ Natarajan Rajagopalan,¹ Mahantesh Patil,² Shivaprasad C²

¹Department of Pulmonology and Critical Care, Narayana Hrudayalaya Hospital, Bangalore, Karnataka, India
²Department of Critical Care Services, Narayana Hrudayalaya Hospital, Bangalore, India

Correspondence to
 Natarajan Rajagopalan,
 gopanya@hotmail.com

SUMMARY

Invasive pulmonary coinfection with *Mucor* and *Aspergillus* is rare. Bilateral vocal cord paralysis resulting from coinfection with these two fungi to our knowledge has not been reported in the literature. We report a young woman with diabetes who presented with symptoms of community acquired pneumonia in association with hoarseness of voice. Investigations revealed air space consolidation of the right upper lobe, evidence of mediastinal involvement extending into the paratracheal space and entrapment of right upper lobe pulmonary artery. Bronchoscopy revealed bilateral vocal cord paralysis and sloughing of mucosa of the right upper lobe bronchus and the bronchus intermedius. Microbiological and pathological results confirmed *Mucor* and *Aspergillus*. Extensive vascular and mediastinal involvement precludes surgical debridement. Despite aggressive medical management the patient deteriorated and died of respiratory failure. Strong suspicion of invasive fungal infections in immune compromised patients presenting with unresolving pneumonia and hoarseness of voice, early aggressive treatment is crucial for the patient survival.

BACKGROUND

Pulmonary mucormycosis is an uncommon infection with high mortality. It occurs usually in immune-compromised states. The first case was reported in 1876 and so far a very few cases of invasive pulmonary mucormycosis with vocal cord palsy have been reported.

Invasive pulmonary aspergillosis is also an opportunistic infection which occurs more frequently than *Mucor* infection. Coinfection with *Aspergillus* and *Mucor* has been rarely reported in bone marrow transplant recipients. Here we are reporting a combined pulmonary infection with *Mucor* and *Aspergillus* in a young woman with diabetes presenting with bilateral vocal cord palsy.

CASE PRESENTATION

A 27-year-old south Indian woman with a medical history of adult onset diabetes mellitus of 5 years duration presented to the hospital with a fever, a cough of 15 days duration and shortness of breath along with hoarseness of voice of 5 days duration.

On clinical examination she was febrile, tachypnoeic, and bronchial breath sound was heard over the right upper lobe region.

INVESTIGATIONS

Investigations showed type 1 respiratory failure with increased alveolar–arterial gradient and high

Figure 1 Chest X-ray showing right upper and mid zone air space consolidation on admission.

white cell count. A chest radiograph showed right upper and mid-zone homogeneous air space consolidation (figure 1)

Initial investigations carried out are shown in table 1.

DIFFERENTIAL DIAGNOSIS

- Community acquired pneumonia
- Lung malignancy
- Granulomatous diseases

TREATMENT

She was started on empiric antibiotics for community acquired pneumonia with cefepime sulbactam and levofloxacin.

On the second day, a video laryngoscopy showed bilateral vocal cord palsy. A thorax CT was performed on suspicion of malignancy, which showed a large upper lobe consolidation and cavitation with occlusion of the right upper lobe pulmonary artery along with mediastinal invasion (figure 2A, B).

Fibre optic bronchoscopy was carried out on day 5, which showed immobile vocal cords (figure 3) and greyish white slough in the right main bronchus, right upper lobe bronchus and extending into the bronchus intermedius (figure 4A–D).

Broncho-alveolar lavage showed broad right angled branching aseptate hyphae on KOH mount. Broncho-alveolar lavage for Gram stain and acid fast bacilli smear was negative. Histopathology of endobronchial biopsy showed aseptate hyphae with right angled branching (figure 5).

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Table 1 Investigations on day 1

Haemoglobin	9.5 g/dL
Red blood cell count	3.87 millions/mm ³
Platelet count	4 99 000/mm ³
Total white cell count	13.9 000/mm ³
Differential count	Neutrophils—73.2%, eosinophils—1.3%, basophils—0.1%, lymphocytes—17.2%, monocytes—8.2%
Urine glucose	+++
Urine ketone bodies	+
Serum creatine	0.8 mg/dL
Serum electrolytes	Normal
Liver function tests	Normal
H1N1 throat swab	Negative for H1N1
HIV ELISA	Non-reactive
Sputum for acid fast bacilli	No acid fast bacilli seen
Sputum Gram stain	Moderate inflammatory cells, epithelial cells and normal upper respiratory tract flora seen

Figure 2 Mediastinal window (A) and lung window (B). CT thorax images showing right upper lobe dense consolidation with early cavitation along with mediastinal involvement and right upper lobe pulmonary artery occlusion.

Invasive pulmonary mucormycosis was diagnosed and amphotericin-B was started.

OUTCOME AND FOLLOW-UP

As the patient failed to respond to amphotericin-B and because of extensive mediastinal involvement, cardio-thoracic surgeon opinion was sought to consider mediastinal debridement.

Bronchoalveolar cultures showed mucor initially at day 7 and exuberant growth of *Aspergillus fumigatus* at day 10. The patient was started on intravenous voriconazole.

Subsequently, the patient became hypoxic and hypotensive and was intubated on day 15. The patient deteriorated very rapidly and went into septic shock and died on day 18.

DISCUSSION

Incidence of invasive pulmonary fungal infections although rare in immuno-competent individuals, can affect individuals with immunosuppression more frequently.¹

Invasive pulmonary aspergillosis occurs most commonly in individuals with neutropenia² and prolonged immunosuppressive therapy.³ Risk factors for mucormycosis include solid tumours^{4 5} and renal failure.⁶ Fungal infections commonly occurs in individuals with diabetes mellitus. Lungs are the most common organ involved by *Aspergillus*. Primary pulmonary infection secondary to mucormycosis is less common than rhinocerebral disease.⁷

Pulmonary mucormycosis often results in angioinvasion. Hoarseness of voice has been reported previously in patients with endobronchial mucormycosis; however, the exact anatomical basis for the same has not been mentioned.⁸ Cases of pulmonary mucormycosis presenting with recurrent laryngeal nerve palsy have been reported across the world.⁹

The left recurrent laryngeal nerve has a deeper intrathoracic course and is closely opposed to the tracheo-oesophageal groove than the right. For this reason, the left recurrent laryngeal nerve is affected more often (75%) than the right (15%), and the rest being bilateral.¹⁰

Aspergillus and *Mucor* can often invade tissues and spread both locally and systemically. Pulmonary mucormycosis has a predilection to invade the adjacent organs such as the pericardium, chest wall and mediastinum. Invasion of the large mediastinal vessels can lead to massive haemoptysis, which could occasionally be fatal.^{11 12}

Figure 3 Bronchoscopic image showing immobile vocal cords.

Figure 4 (A–C) Bronchoscopic images showing greyish white slough extending along the right main bronchus into the right middle lobe bronchus. (D) Biopsy taken from the endobronchial lesion.

Vascular invasion in mucormycosis results in thrombosis and frank ischaemia followed by haemorrhagic infarction and tissue necrosis. On chest imaging, pulmonary mucormycosis may present with focal consolidation, lung masses, pleural effusions or multiple nodules.¹³

Direct histological examination of the tissue biopsy remains the gold standard for diagnosis. The histopathological findings reveal irregular broad non-septate hyphae and spores.¹⁴

Figure 5 Histopathological examination showing aseptate hyphae with right angled branching.

Amphotericin B or its newer lipid formulation—liposomal amphotericin-B (L-AmB) along with extensive surgical debridement to remove the necrotic tissue, remains the mainstay of therapy.¹⁵ Spontaneous resolution has been reported in some cases following treatment with antifungals alone.^{16–20} Six patients with mucormycosis with left vocal cord paralysis have been reported, five of whom died. Left recurrent laryngeal nerve in these patients was involved secondary to direct tracheal wall involvement by the fungus. Tracheal debridement with rigid bronchoscopy and amphotericin-B were the mode of management in these patients.²¹

In spite of aggressive treatment, the mortality with invasive pulmonary fungal infections is high.²²

Our patient was unique in that her only predisposing condition was adult onset diabetes mellitus. Bronchoscopy was undertaken promptly and diagnosis of mucormycosis was established. The patient had significant mediastinitis which most likely involved the left recurrent laryngeal nerve. The CT scan also showed inflammation extending up into the right paratracheal space possibly involving the right recurrent laryngeal nerve. Invasion and occlusion of the right pulmonary artery along with extensive mediastinal necrosis place this patient at an unacceptable high risk for surgery.

It is important for the clinicians to have strong suspicion of invasive fungal infections in those who are immunosuppressed and present with non-resolving pneumonia and hoarseness of voice. To our knowledge, invasive pulmonary coinfection with *Aspergillus* and *Mucor* presenting with bilateral vocal cord palsy has not been reported.

Learning points

- Invasive pulmonary coinfection with *Mucor* and *Aspergillus* is rare but can happen. It needs a high index of clinical suspicion.
- Surgical debridement is the key in successful management of invasive fungal infections.
- Early institution of combination of antifungal agents covering *Mucor* and *Aspergillus* should be considered as culture reports can be delayed.

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Competing interests None.

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REFERENCES

- 1 Lee FYW, Mossad SB, Adal KA. Pulmonary mucormycosis: the last 30 years. *Arch Intern Med* 1999;159:1301–9.
- 2 Fahimzad A, Chavoshzadeh Z, Abdollahpour H, et al. Necrosis of nasal cartilage due to mucormycosis in a patient with severe congenital neutropenia due to HAX1 deficiency. *J Invest Allergol Clin Immunol* 2008;18:469–72.
- 3 Devlin SM, Hu B, Ippoliti A. Mucormycosis presenting as recurrent gastric perforation in a patient with Crohn's disease on glucocorticoid, 6-mercaptopurine, and infliximab therapy. *Dig Dis Sci* 2007;52:2078–81.
- 4 Salinas-Lara C, Rembao-Bojórquez D, de la Cruz E, et al. Pituitary apoplexy due to mucormycosis infection in a patient with an ACTH producing pulmonary tumor. *J Clin Neurosci* 2008;15:67–70.
- 5 Johnson KE, Leahy K, Owens C, et al. An atypical case of fatal zygomycosis: simultaneous cutaneous and laryngeal infection in a patient with a non-neutropenic solid prostatic tumor. *Ear Nose Throat J* 2008;87:152–5.
- 6 Georgopoulou S, Kounougeri E, Katsenos C, et al. Rhinocerebral mucormycosis in a patient with cirrhosis and chronic renal failure. *HepatoGastroenterology* 2003;50:843–5.
- 7 Spellberg B, Edwards J, Ibrahim A. Novel perspectives on mucormycosis: pathophysiology, presentation, and management. *Clin Microbiol Rev* 2005;18:556–69. [PMC free article] [PubMed]
- 8 Bigby TD, Serota ML, Tierney LM, et al. Clinical spectrum of pulmonary mucormycosis. *Chest* 1986;89:420–3.
- 9 Suresh V, Bhansali A, Sridhar C, et al. Pulmonary mucormycosis presenting with recurrent laryngeal nerve palsy. *J Assoc Physicians India* 2003;51:912–3.
- 10 Stell PM, Maran AGD. *Head and neck surgery*, 2nd edn. London: William Heinemann Medical Books, 1978:194–204.
- 11 Muqetadnan M, Rahman A, Amer S, et al. Pulmonary mucormycosis: an emerging infection. *Case Rep Pulmonol* 2012;2012:120809.
- 12 Nathalie Casau MD. Beth Israel Deaconess, 20 December 2000.
- 13 Chamilos G, Marom EM, Lewis RE, et al. Predictors of pulmonary zygomycosis versus invasive pulmonary aspergillosis in patients with cancer. *Clin Infect Dis* 2005;41:60–6.
- 14 Ellis D. Identification of medically important fungi. http://www.mycology.adelaide.edu.au/Fungal_Descriptions/
- 15 Petrikos G, Drogari-Apiranthitou M. Zygomycosis in immunocompromised non-haematological patients. *Mediterr J Hematol Infect Dis* 2011;3:e 2011012.
- 16 Mendoza-Ayala R, Tapia R, Salathe M. Spontaneously resolving pulmonary mucormycosis. *Oxford J Clin Infect Dis* 25:1335–6.
- 17 Abraham P, Govil S, Srivastava VM, et al. Spontaneous regression of pulmonary mucormycosis. *Postgrad Med J* 1995;71:435–9.
- 18 Griffin GK, Ellis AR, Kim TC. Cure of isolated pulmonary mucormycosis: case report. *V Med* 1983;110:550–2.
- 19 Hauch TW. Pulmonary mucormycosis: another cure. *Chest* 1977;72:92–3.
- 20 Fahey PJ, Utell MJ, Hyde RW. Spontaneous lysis of mycetomas after acute cavitating lung disease. *Am Rev Respir Dis* 1981;123:336–9.
- 21 Sales-Badia JG, Hervás VZ, Galbis-Caravajal JM. [Tracheal mucormycosis]. *Arch Bronconeumol* 2009;45:260–1.
- 22 Roden MM, Zaoutis TE, Buchanan WL, et al. Epidemiology and outcome of zygomycosis: a review of 929 reported cases. *Clin Infect Dis* 2005;41:634–53.

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