



# Pulmonary Blastomycosis Masquerading as Malignancy in India; Case From a Tertiary Hospital in South India



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## Abstract

**Introduction:** Blastomycosis is an endemic granulomatous fungal infection involving multiple organ systems predominantly the lungs. The diverse clinical spectra of the pulmonary disease encompass a subclinical infection, an acute infection mimicking a bacterial pneumonia and a chronic variant masquerading as tuberculosis or malignancy.

**Case Presentation:** Here we report a case of a middle-aged gentleman who was evaluated for a malignant pulmonary mass which was later identified as pulmonary blastomycosis. The diagnosis of blastomycosis was made through histopathology and was retrospectively correlated with a travel history to an endemic region.

**Conclusion:** The endemicity of this infection contributes to the diagnostic dilemma in the non-endemic setup. This warrants a high clinical suspicion in patients with a chronic pulmonary syndrome with a travel history to an endemic area.

**Keywords:** Blastomycosis, Pulmonary Cancer, Hemoptysis

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## Introduction

Blastomycosis is a systemic granulomatous fungal infection predominantly involving the lungs following inhalation of the infectious conidia and hyphal forms of the fungi.<sup>1</sup> Hematogenous dissemination accounts for the metastatic spread of this fungi to distant sites like bones, skin and the central nervous system. The etiological agents of blastomycosis are a group of fungi which demonstrate thermal dimorphism belonging to the genus *Blastomyces*; with species including *B. dermatitidis*, *B. gilchristii*, *B. percursorus*, *B. helices*, *B. parvus* and *B. silvrae*.<sup>2,3</sup> It is endemic in North America – mainly Midwest, south central and southeastern states including watershed areas for Mississippi, Ohio, Savannah, Saint Lawrence and areas surrounding the Great Lakes.<sup>4</sup>

Pulmonary blastomycosis is often misdiagnosed as bacterial pneumonia in acute stages but majority of the cases become evident once the disease is chronic. The disease has propensity to target immunocompetent as well as immunocompromised individuals.<sup>5,6</sup> Infection follows after inhalation of the conidia and transition to pathogenic yeast forms is essential to the disease process.<sup>7</sup> The yeast forms of *Blastomyces* sp. are

characterized by broad based budding with a doubly refractile cell wall. The mycelial forms are characterized by the septate hyphae which produce the asexual spores.<sup>8</sup>

## Case Presentation

A middle-aged gentleman from Chennai presented with complaints of low-grade fever and chronic cough for two months with a recent onset shortness of breath. The cough was nonproductive with no hemoptysis, which worsened with exertion. The gentleman had significant weight loss of 10 kg over a period of 3 months before presentation to the hospital. He was a chronic smoker (25 pack years) with no significant medical history. His pet, home and occupational history were non-contributory. He visited Ohio state, USA, in the recent year for 3 months. The initial blood investigations were within normal limits excepting an elevated ESR. His serology was negative for human immunodeficiency virus (HIV). His chest X-ray demonstrated a homogenous opacity in the left lung field. (Figure 1a) CT scan of the chest demonstrated a mass lesion in the left upper lobe. (Figure 1b) A positron emission tomography (PET/CT) revealed an 18-fluoro-2-

deoxyglucose (FDG) uptake in the left upper lobe mass lesion measuring 6\*5.5\*3.5 cm with a maximum standardized uptake value of 15.

In view of a suspected pulmonary malignancy, the patient was referred to a cardiothoracic surgeon. His radiological diagnosis was suggestive of a lung malignancy with T2N0M0 staging. He had sudden hemoptysis following which he underwent lobectomy of the left upper lobe and the tissue was sent for histopathological examination. The histopathology revealed patchy pneumonitis with extensive suppurative granulomatous inflammation with spherical to oval yeast forms with multiple nuclei and thick double contoured walls with rare budding forms consistent with blastomycosis. (Figure 1c and Figure 1d) Intraoperative cultures were not sent as malignancy was the pre-operative clinicoradiological diagnosis. The patient was initiated on oral itraconazole for a duration of six months and is doing clinically well on follow up visits.

### Discussion

Chronic pulmonary blastomycosis may present as chronic cough, weight loss, and hemoptysis, often misdiagnosed as TB or malignancy.<sup>9</sup> The patient in this report presented with a chronic pulmonary syndrome with a distant history of travel to the endemic area. This an example of an imported disease acquired from an endemic area. Before a definitive diagnosis could be obtained by a biopsy the patient had to undergo lobectomy due to massive hemoptysis. Identification through tissue culture is the gold standard for diagnosis of blastomycosis.<sup>10</sup> We could obtain only a histopathological diagnosis as the preoperative diagnosis was a malignant lesion.

Blastomycosis is rare in India with only a handful of cases being reported. The index case in India was reported in 1983 in which the fungi was isolated from the bronchial

specimens of the asthmatic female with chronic pneumonia syndrome. Before 1983, the cases of blastomycosis reported had insufficient data and were disregarded.<sup>9</sup> In a review done by Kumar et al, of five authentic cases of human infection, two cases were imported and three cases were autochthonous. All autochthonous cases were reported from the states of Rajasthan, Uttar Pradesh, and Madhya Pradesh in northern India. In his article he describes the first case of bilateral adrenal involvement in blastomycosis, as an autochthonous case from Arunachal Pradesh, India.<sup>11</sup>

Similarly in the case report by Randhawa et al, he describes a case of disseminated blastomycosis in a resident of Delhi with travel history to Chicago. The paper further reviews 7 cases of human blastomycosis reported from India with questionable diagnosis in view of histopathological evidence similar to that in our case with thick-walled budding yeast cells but unable to replicate the same findings in culture.<sup>12</sup>

Another case report by Anil Kumar et al, describes a case in 2014 of a 32-year-old male with discharging sinuses in his anterior chest wall with lobar lung consolidation which was misdiagnosed and treated as tuberculosis. In view of his travel and work history in Chicago, suspicion of blastomycosis was raised and subsequently confirmed with positive cultures for blastomycosis dermatitidis which was treated with itraconazole for 12 months.<sup>13</sup>

The choice of antifungal medication for blastomycosis depends on the disease severity. For severe disease, the recommended treatment is initial amphotericin B therapy for 1–2 weeks followed by oral itraconazole; for mild and moderate disease, the recommended treatment is oral itraconazole. A minimum of 6 months of treatment is required for all patients with pulmonary blastomycosis.<sup>11,14</sup>

### Conclusion

The causative organisms of blastomycosis grow in geographically restricted areas in proximity to waterways associated with acidic soil and decaying vegetable/organic matter which makes it a difficult diagnosis when considering it in non-endemic areas. A high index of suspicion is needed to detect blastomycosis in non-disease-endemic areas where TB is prevalent. Clinicians should elicit a thorough travel history from patients with illness that does not respond to tuberculosis medications. Biopsy from a suspected malignant tissue without a definitive preoperative diagnosis should be sent for fungal cultures in patients with a definitive travel history and diagnosis of blastomycosis must be entertained in cases which fit the clinical picture.

### Authors' Contributions

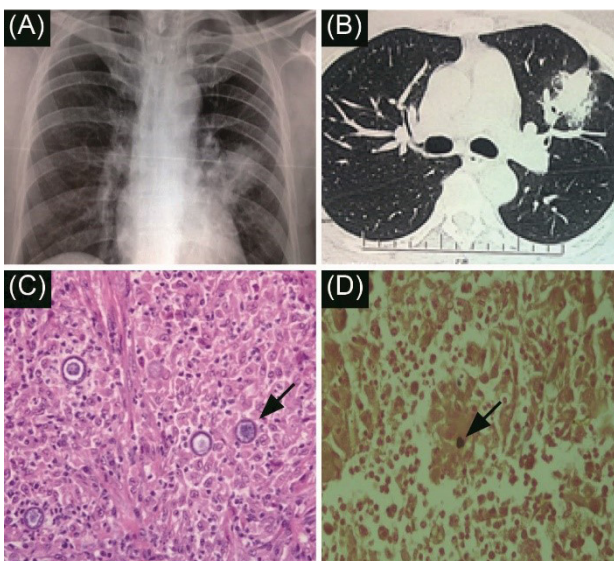
All authors contributed equally to this study.

### Conflict of Interest Disclosures

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Ethical Approval

The patient gave permission for the presentation of his case reports and followed ethical considerations of the declaration of Helsinki.



**Figure 1.** (A) chest Xray reveals a left homogenous opacity. (B) CT scan of chest with a mass lesion in the left upper lobe. Figure 1C is a histopathology slide of the lobectomy tissue revealing multiple granulomas with arrowhead demonstrating the granulomas. Figure 1D demonstrates positive GMS (Gomori methenamine silver stain), with yeast cells morphologically consistent with Blastomycosis.

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