Multiple Lung Abscesses Due to Ochroconis gallopavum, a Dematiaceous Fungus, in a Nonimmunocompromised Wood Pulp Worker*

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An occurrence of multiple chronic lung abscesses managed by lobectomy is described. These abscesses were present for 13 years in the patient, a nonimmunocompromised wood pulp worker. The patient had hemoptysis at presentation. The organism isolated was Ochroconis gallopavum, a dematiaceous fungus known to cause disease in immunocompromised patients and epidemic encephalitis in poultry. The fungus is typically found in warm environments and in decaying compost; for this reason, we postulate that his illness was occupationally acquired.

(CHEST 2000; 118:1503–1505)

Key words: dematiaceous fungi; lung; occupational disease; phaeohyphomycosis; pulmonary surgery; surgery

Dematiaceous fungi are increasingly recognized as pathogens in immunocompromised patients, but virtually no reports of systemic infection due to the genus Ochroconis have been published documenting its occurrence in the normal human host. Infection of the skin and subcutaneous tissues occurs, but isolated involvement of the lungs is rare. The purpose of this report is to document such a case. The occupation of the patient may have relevance to the development of his disease.

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Case Report

A 38-year-old man with a 6-year history of coughing that produced thin watery secretions with occasional hemoptysis was referred to the Mayo Clinic. In 1985, when he was 26 years old, a chest radiograph obtained as part of a routine physical examination demonstrated an abnormality in the right upper lobe. Because the lesion did not respond to antibiotic therapy, a right thoracotomy was done. Biopsy specimens demonstrated inflammatory tissue. The pathology report documented extensive fibrosis with a focally dense chronic inflammatory component. The surrounding pulmonary tissue showed multiple intra-alveolar dust macrophages. Acid-fast and methenamine silver stains were negative for organisms. A subpleural lymph node showed reactive hyperplasia. In the surrounding lung parenchyma of the lymph node were small, subpleural granulomas consisting of multinucleated giant cells and epithelial cells. A crystalline-like material was present within the granulomas. It was not birefringent on polarized-light microscopy. Culture of lung tissue revealed a Scopelobasidium species.

In 1992, coughing productive of intermittent hemoptysis developed. Investigations by the patient’s local physician, including bronchoscopy on multiple occasions, were negative for malignant disease and for tuberculosis. Chest radiographs and CT scans demonstrated that multiple opacities confined to the right upper lobe had increased in size from 1992 (Fig 1) to 1998 (Fig 2). There was no CT evidence of mediastinal lymphadenopathy or bronchiectasis.

The patient’s occupation may have been relevant to the disease. In 1981, he began working in the wood yard of a paper mill. He held this job for 8 years. His primary task was associated with the debarking of trees. Trees were placed in a large revolving drum and debarked by friction. The bark was then filtered through gaps beneath the drum. His responsibility was to load the bark with a front-end loader and transfer it to a bark silo. He did not wear a mask and was exposed to a significant amount of dust. He stated that considerable heat was produced within the layers of bark.

Because previous attempts to obtain a definitive diagnosis had been unsuccessful and because the lesions were increasing in size (Fig 2) and causing symptoms, right upper lobectomy was performed. At operation, the lung was densely adherent to the chest wall, and mobilization was extremely tedious and associated with considerable blood loss. There were extremely large (up to 5 mm in diameter) and tortuous intercostal arteries. Much of the blood supply to the right upper lobe appeared to originate from the chest wall. During dissection, a large amount of thin pus was evacuated from cavities. Histologic examination of the lobe showed marked chronic inflammation with abscess formation and obliteration, by fibrosis, of the normal lung parenchyma. Special stains were negative for acid-fast bacilli, fungal forms, Fungi mocyctis, and other bacteria. Polarized-light microscopy did not detect foreign material. Noncaseating granulomatous inflammation was present in a lymph node. Because fungal elements were visualized following potassium hydroxide preparation, administration of itraconazole was begun. Culture revealed a pure growth of Ochroconis gallopavum.

The patient’s postoperative course was relatively uneventful. Itraconazole therapy was continued for 6 months. Subsequent laboratory investigations for evidence of an immunocompromised state (including HIV), cellular and humoral immunity studies with T-cell and B-cell analyses, and gamma globulin determination produced negative or normal results.
Discussion

Phaeohyphomycosis (Greek *phaeo*, gray or black) is an umbrella term coined to encompass infections caused by phaeoid (dark-colored) and hyaline, septate, filamentous molds that assume a mycelial tissue form in affected patients. The term *dematiaceous* is used to describe in general terms the dark fungi causing the infections. The fungus *O. gallopavum* belongs to the genus *Ochroconis*, which is a dematiaceous hyphomycete. Fungi of this genus produce characteristic darkly pigmented, septate hyphae or conidia. The terminology is somewhat confusing because names are frequently added and change as techniques develop; Kralovic and Rhodes² refer to naming as a taxonomic challenge. As a further example, in a 1994 review, 101 species in 57 genera were listed as causing phaeohyphomycosis.⁶ The fungus *O. gallopavum* was initially termed *Diplorhinotrichum gallopavum* in 1964.⁷ It was reexamined and reclassified by Bhatt and Kendrick⁸ in 1968, and a new combination was proposed: *Dactylaria gallopava*. In 1973, de Hoog and von Arx⁹ described the genus *Ochroconis* for most species formerly classified under the genus *Scolecobasidium*. In 1983, de Hoog¹⁰ included *D. gallopava* as *O. gallopavum*, under the genus *Ochroconis*, as a pathogen to humans and lower animals. As mentioned, a *Scolecobasidium* species was initially isolated in the patient, and it is possible that his chronic illness was due to persistence of the same organism, albeit by a different name.

The disease or infection produced by one of these fungi (phaeohyphomycosis) may logically be separated into four categories under the headings superficial, cutaneous, subcutaneous, and systemic diseases. Some of these disease processes are known by well-established names, such as pityriasis nigra, sporotrichosis, and chromoblastomycosis. They have a broad spectrum of clinical features, from superficial and mild to life threatening. Systemic *Ochroconis* infection has been described in immunocompromised patients but not has not previously been described in immunocompetent patients.

The fungi belonging to the genus *Ochroconis* tend to grow in warm environments and are typically found in soil and decaying vegetation, which can undergo composting associated with the generation and release of heat.¹¹–¹³ The fungi have been isolated from fowl broiler-house litter,¹³ which is subject to composting. They have also been found in thermal soils, hot spring effluents, and nuclear power plant effluents.¹⁴–¹⁶ The fungi cause new lumber to darken.¹⁷ Systemic disease may follow inhalation and subsequent dissemination of conidia.²,¹⁸–²⁰ This assumption of pulmonary acquisition is supported by the epidemic encephalitis occurring in hundreds of turkeys and chickens.¹¹,¹² The disease has been reproduced experimentally by injecting *Dactylaria* (old terminology, but cited as such) into the birds’ respiratory tracts.²¹ Sinus involvement by other dematiaceous fungi, suggesting inhalation as a cause, has

Figure 1. Posteroanterior radiograph (top) and CT scan (bottom) obtained in 1992 show multiple opacities involving the upper lobe of the right lung.

Figure 2. Posteroanterior radiograph (top) and CT scan (bottom) obtained in 1998 show progression of chronic right upper lobe opacities.
also been described.\textsuperscript{23–26} Isolated cases of allergic bronchopulmonary fungal disease attributed to dematiaceous fungi (Curvularia and Bipolaris species) have also been described and reviewed.\textsuperscript{27} In humans, infection by Ochr conis species occurs infrequently and almost exclusively in immunocompromised patients.\textsuperscript{1–5}

In our patient, it is highly probable that the infection was acquired occupationally. He was exposed to considerable dust and to the warm or hot environment of composting bark, an ideal environment for the growth of Ochr conis. The occurrence is atypical because there was no evidence that the patient was immunocompromised. A previously described instance of pulmonary involvement occurred in a heart transplant recipient who was a landscape gardener.\textsuperscript{4} As with our patient, it is tempting to link his association with compost with the disease. Two cases of pulmonary involvement (\textit{Bipolaris spicifera} and \textit{Bipolaris hawaiiensis}, other dematiaceous fungi) were described by Sharkey et al.,\textsuperscript{22} but the occupations of the patients were not stated. In one of these patients, progression to skin involvement occurred; in the other patient, who had incomplete surgical resection, persistent abnormalities were visible on chest radiographs. One of these patients was described as having a prolonged duration of untreated pulmonary involvement.\textsuperscript{22} In the nonimmunocompromised patient, the disease may thus be characterized as slow and indolent with few symptoms. The subcutaneous form of phaeohyphomycosis is similar in chronicity; it tends to form firm to fluctuant swellings without pain or tenderness.\textsuperscript{28}

The radiographic findings demonstrated multiple abscess cavities without fluid levels and with evidence of chronicity. The marked vascularity and enlargement of intercostal vessels seen at surgery could reflect the patient’s previous operation or the underlying disease. Although no definitive guidelines can be recommended for treatment of phaeohyphomycosis, surgical excision in combination with amphotericin B has been recommended.\textsuperscript{2} Itraconazole or flucytosine are reasonable effective agents if there is concern about the toxicity of amphotericin B.\textsuperscript{22} The optimal duration and dosage of antifungal therapy have not been determined.

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