

## Miliary blastomycosis and HIV infection

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The profound immunosuppression seen in patients with acquired immunodeficiency syndrome (AIDS) has resulted in an increased occurrence of previously rare opportunistic infections. We report a case of miliary blastomycosis in a patient with human immunodeficiency virus (HIV) infection.

### Case report

A 26-year-old homosexual man with insulin-dependent diabetes mellitus presented with fever and chills, a 3-month history of sputum-producing cough, night sweats and weight loss of 6 kg. Unprotected sexual contact with a man known to be HIV positive had occurred repeatedly over the preceding 4 years.

Pneumonia was diagnosed as the likely source of the fever. Chest radiography showed fine miliary densities throughout both lungs and a cavitory lesion at the base of the right lung (Fig. 1). The partial pressure of oxygen with the patient breathing room air was 52 mm Hg (87% arterial oxygen saturation).

The leukocyte count was  $9.0 \times 10^9/L$ . The T4:T8 (helper:suppressor) lymphocyte ratio was 0.22 (normally 1.17 to 2.13). The T4 lymphocyte count was 247 (normally 546 to 1276)  $\times 10^9/L$  and the T8 lymphocyte count 1143 (normally 406 to 720)  $\times 10^9/L$ . The proportion of T4 lymphocytes was 16% (normally 44% to 62%). The results of enzyme-linked immunosorbent assay and indirect immunofluorescence assay for HIV antibody were positive.

Papanicolaou and methenamine-silver nitrate stains of bronchial washings and bronchoalveolar lavage fluid revealed numerous fungal elements resembling *Blastomyces dermatitidis* in yeast and mycelial forms (Fig. 2). Cultures of the washings and the fluid yielded *B. dermatitidis*. No viral, bacterial,

mycobacterial, fungal or protozoan organism was identified in cultures of lung tissue, sinus aspirate, cerebrospinal fluid, bone marrow, blood or urine.

The patient was given amphotericin B, 30 mg/d. Within 72 hours the fever abated, and the blood gas values and radiography findings were much improved; he received a total of 1 g of amphotericin B.

One month after presentation the patient was started on oral maintenance therapy with ketoconazole, 800 mg/d, and has since been given zidovudine (AZT). Follow-up at 3 months showed complete resolution of the disease clinically and radiologically.

### Comments

Fungal infections are among the numerous opportunistic infections that affect patients with AIDS

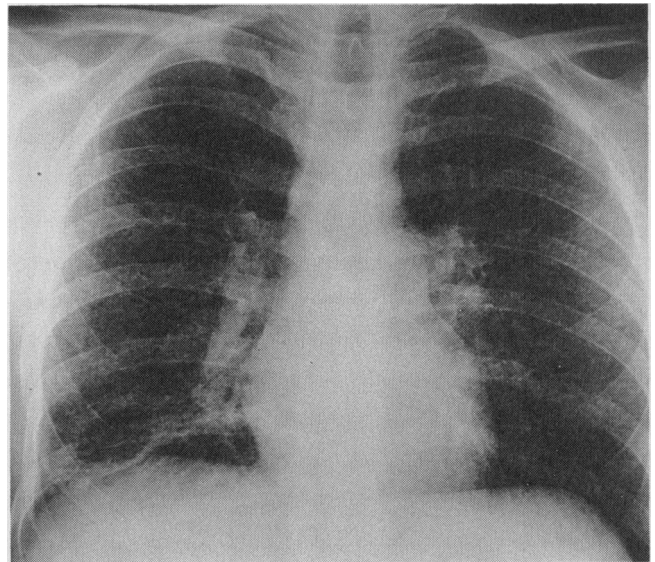


Fig. 1: Diffuse miliary pattern in both lungs and cavitory lesion at base of right lung in patient with human immunodeficiency virus infection.

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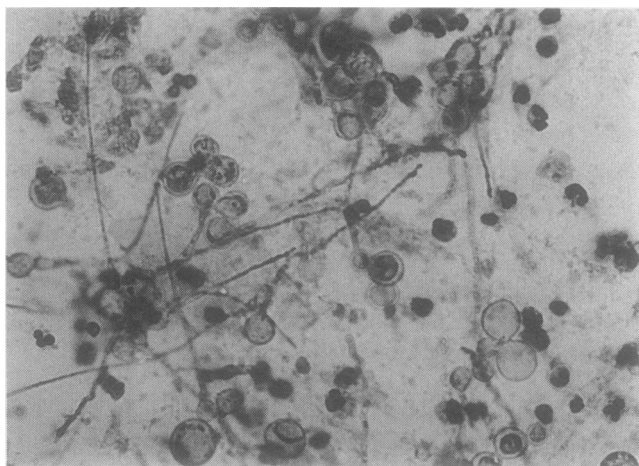
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and are the presenting illness in 3% to 30% of such patients.<sup>1</sup> *B. dermatitidis* infection in patients with HIV infection, however, has only rarely been reported,<sup>2,3</sup> probably because of the organism's isolated habitat.

The incidence and epidemiologic features of blastomycosis are incompletely understood because there is no sensitive skin test and because the isolation of *B. dermatitidis* from the natural environment is difficult. Blastomycosis has been reported worldwide.<sup>4</sup> Endemic areas in Canada include Manitoba, Quebec and Ontario,<sup>4</sup> especially areas bordering the Great Lakes. It is believed that the disease is acquired through exposure to the organism along riverbanks and lakeshores, in soils enriched by bird droppings. There appears to be an association of the disease with outdoor occupations and recreation.<sup>4</sup> The patient we have described did not work outdoors but had a history of exposure in an endemic area in southern Manitoba.

*B. dermatitidis* causes neutrophil-mediated supuration and cell-mediated granuloma formation in tissue. Although granulocytes have been shown to phagocytose the organism, the intracellular killing effect is poor;<sup>5</sup> this may be a factor in the dissemination of the disease. Delayed hypersensitivity and granuloma formation, both of which are T-cell functions, undoubtedly play a major role in the control of the infection.<sup>6</sup>

Patients with AIDS have defects in virtually every arm of the immune system, including the B-cell response, monocyte and granulocyte chemotaxis, and cell-mediated immunity. Invasive fungal infections are common when these functions are suppressed.<sup>6</sup> Opportunistic infections with *Coccidioides immitis*, *Cryptococcus neoformans* and *Histoplasma capsulatum* have been widely reported in AIDS patients.<sup>1</sup> Like these opportunistic fungal infections blastomycosis may represent reactivation of



**Fig. 2: Yeast and mycelial forms of *Blastomyces dermatitidis* in bronchial washings (Papanicolaou stain; original magnification  $\times 40$ , reduced by about 25%).**

latent disease. In retrospect the cavitory lesion at the base of the right lung was apparent on a radiograph taken 3 months before the patient's presentation.

Underlying diseases such as diabetes mellitus can be associated with impaired host-tissue reaction and massive multiplication of *B. dermatitidis* in tissue.<sup>6</sup> Admittedly we cannot rule out that the patient's diabetes played a role in the development of the blastomycosis, even though he maintained good euglycemic control.

Although the T4 lymphocyte count was only moderately reduced the proportion of T4 cells was 16%. Murray and associates<sup>7</sup> suggested that there is little correlation between the degree of reduction in the T4 cell count and the development of opportunistic infections. Also, a proportion of T4 cells of less than 22% may be a risk factor for opportunistic infections regardless of the absolute T4 count.<sup>8</sup>

Given the immune response to *B. dermatitidis*, the nature of the immune defects associated with AIDS and the increasingly frequent occurrence of other mycotic infections with pathogenetic features similar to those of blastomycosis the most likely explanation for the paucity of reported cases of blastomycosis is that patients with HIV infection in endemic regions do not commonly encounter the natural habitat of *B. dermatitidis*. We propose that blastomycosis be considered in the differential diagnosis of pulmonary infections in patients with HIV infection who have been in endemic regions. Blastomycosis, like the many other opportunistic infections, may become more commonly recognized in AIDS patients.

## References

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