

North American blastomycosis in Central Canada

A review of 36 cases

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Summary: Experience with 36 cases of North American blastomycosis in Central Canada is reported. Symptoms referable to the respiratory tract predominated, but no uniform clinical pattern for the disease process was evident. Cutaneous and genitourinary tract involvement was present in only a small proportion of patients. The majority of the patients resided in rural areas or were associated with some form of outdoor occupation or activity. No characteristic radiologic appearance could be identified in this series. Amphotericin B administered intravenously is the treatment of choice for this condition. North American blastomycosis is more widespread on this continent than has been previously demonstrated.

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North American blastomycosis is usually considered to be a rare disease. A recent compilation of human cases indicates a geographic distribution almost entirely within the United States from Wisconsin to the Gulf of Mexico and east of the Mississippi River.¹ Recent studies have pointed out other previously unrecognized and widely separated areas of endemic blastomycosis.²⁻⁴

To date only 120 cases have been reported from Canada and once again the origin of the cases has been almost entirely from Eastern Canada, only six being from west of the Manitoba-Ontario border.⁵⁻⁹ However, since 1960, 31 cases of proven North American blastomycosis have been discovered in the teaching hospitals of the Faculty of Medicine of the University of Manitoba. This paper reviews the clinical and radiological features and results of therapy in these 31 cases as well as in the five patients in whom North American blastomycosis was diagnosed prior to 1960.

Clinical and roentgenologic features

The age, sex and racial distribution of the 36 patients are outlined in Table I. Twenty-seven patients were white Caucasian and nine were North American Native Indian. There were 32 males and four females, with a mean age of 46.3 years (range 6 to 72 years).

Geographic distribution

Two-thirds of the patients lived in rural areas (Fig. 1). Twenty-six patients (72%) were residents of the Province of Manitoba, one patient was from North Dakota, just south of the Manitoba border, and nine patients (25%) resided within 75 miles of the eastern Manitoba border in the south-western part of Ontario. It should be noted that four patients were from areas north of the 52nd parallel, the most northern point being Norway House, Manitoba, at a latitude of 54°.

Occupation

The occupations of the patients at the time of diagnosis and their site of residence are set forth in Table II. If the students are excluded from consideration, some form of outdoor occupation or activity was judged to be present in approximately 60% of the patients.

Symptomatology

The symptomatology which led to medical consultation is analysed in Table III. Symptoms referable to the respiratory system were present in 28 patients or almost 80% of the group. The most frequent respiratory complaint was cough, which was present in 25 patients (69%). This was followed in frequency by sputum production (47%), hemoptysis (25%), chest pain (22%) and dyspnea (11%). Constitutional or systemic complaints were associated with the respiratory symptoms in 11 of the 28 patients. Five patients had only systemic complaints and three individuals were asymptomatic; in the latter the lesion was discovered on a routine chest x-ray.

Roentgenologic features

Chest roentgenograms from 30 patients were available for review. In one the radiograph showed no abnormality although blastomyces were seen in the lung at autopsy. The findings in the other patients could be classified into four groups (Table IV). Ill-defined patchy areas of consolidation ranging in size from minimal to extensive bilateral involvement were demonstrated in 13 patients. An example of this type of lesion is shown in Fig. 2. Hilar adenopathy was present in one of these patients while two had pleural effusions, one of which was moderately large. In nine patients there were mass-like lesions ranging from 2.0 to 6.0 cm. in diameter. The margins of the mass were sharply defined in two and were indistinct in the remainder. Linear segmental zones of increased density which were suggestive of a combined interstitial and distal air space consolidation were present in six patients. Apical cavitation indistinguishable from pulmonary tuberculosis was seen in one patient. In the majority the infiltrate cleared completely in response to therapy but residual scarring with linear strands of increased density persisted in one patient.

Diagnosis

The diagnosis was established by demonstrating the organism on smear and/or culture of resected or biopsy material in 17 cases; of fluid aspirated from fluctuant lesions in six cases; or of sputum or bronchial washings obtained at bronchoscopy in seven. In six patients the

diagnosis was established at postmortem examination.

The intradermal blastomycin (0.1 ml.) skin test was negative in all of the 22 patients tested. The complement fixation test for the mycelial growth phase of blastomycosis was assessed in 22 patients and was greater than 1:8 in only one patient.

Organ involvement

The organ involvement in the cases is shown in Table V. The lung was affected in 31 patients (86%) and was apparently the sole organ involved in 20 of these (56%). The skin was involved in 22% of the patients, the most common presentation being an ulcer on the lower extremities. Bone involvement was documented in 16% of the cases while the liver, central nervous system, lymph nodes, spleen, kidney, bone marrow and prostate were clearly affected in decreasing numbers. There was no apparent correlation between the type of organ involved and the age, occupation or site of residence.

Therapy

The mode of therapy utilized in the 30 patients in whom the diagnosis was made during life is shown in Table VI. Twenty-one patients received a course of amphotericin B; in 14 of these amphotericin B was the sole form of therapy, and in seven resection of a pulmonary lesion was performed as well. Ten milligrams was given intravenously initially, and the dose was increased by daily 10 mg. increments until 50 mg. per day was attained. The daily dose and the total cumulative dose were adjusted to the tolerance of the individual patient. In all but one patient the total dose received was between 1.0 and 3.5 g.

In five patients resection of a pulmonary or skin lesion was the sole form of therapy. Surgical excision, radiotherapy, courses of saturated solution of potassium iodide given orally or copper sulfate soaks constituted the sole form of therapy in four patients whose disease was diagnosed during life prior to 1960.

The results of treatment are given in Table VI. Clinical, bacteriological and radiological improvement was considered to have occurred in 82% (25) of the treated patients. Three of the patients who received amphotericin B as the sole form of therapy were considered to be treatment failures. One of these, who had extensive pulmonary and systemic involvement, died after having received only 45 mg. of amphotericin. Another, who had an isolated pulmonary lesion, suffered a clinical relapse (skin ulcer)

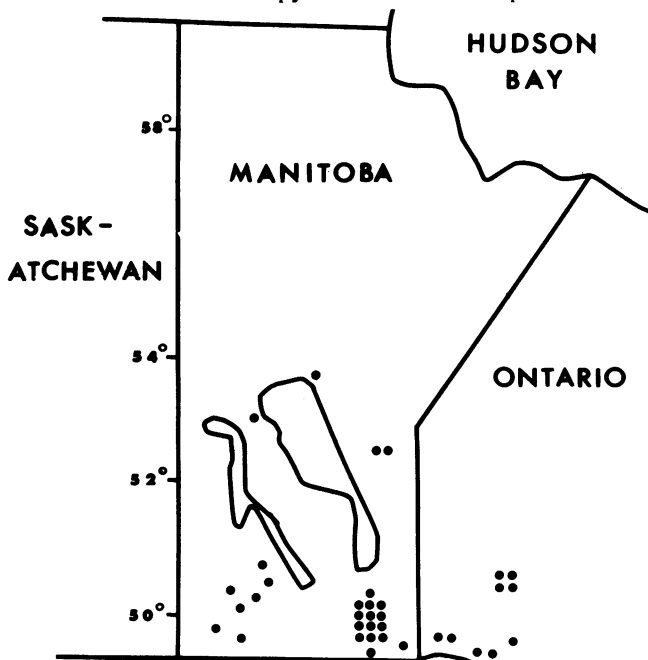


FIG. 1—Geographical distribution of 36 cases of Blastomycosis.

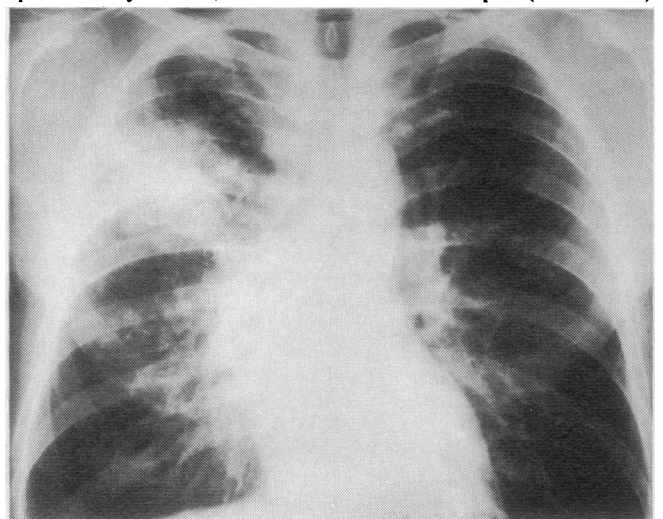


FIG. 2—P.A. view of chest demonstrating consolidation in the right upper lobe and in the superior segment of the right lower lobe.

has been suggested that blastomycosis is more prevalent among individuals employed in outdoor work or work involving close contact with the soil.^{9, 11, 12} This would appear to be true in the present series, for the number of cases was about one and one-half times greater in individuals employed in outdoor jobs or in recreation than in others without such a background. Recent reports have commented upon the apparent high incidence of blastomycosis in dogs in areas endemic for the disease^{13, 14} but there is no evidence that the infection is transmitted from animal to animal or from man to man. An analysis of our cases shows no association between human and canine cases. A review of blastomycosis in animals in Manitoba revealed only four cases, all of which were among the canine population.^{15, 16}

Previous reports have suggested that the incidence of North American blastomycosis is disproportionately high in the Negro population.^{11, 14, 17, 18} The data presented in this paper suggest that the incidence may also be high in the North American Indian population, at least in Central Canada. The teaching hospitals in Manitoba serve a population of about one million residents, and although only 3.5% of these are of native extraction, 23% of the patients reported in this study were Indians.

The ratio of male to female patients was 8:1. This is in agreement with the reported marked prevalence of the disease in males, ratios of male to female patients having ranged from 6:1²¹ to 15:1.¹⁸ The apparent association of the disease with an outdoor occupation may account, in part, for the high incidence of blastomycosis among males as well as among the native population.

The incidence of blastomycosis of the various organs has been described previously.^{12, 19, 20} Although it has been claimed that the lungs are involved in 95% of cases,²¹ in most reported series skin and lung are equally affected. In the present series there was pulmonary involvement in 85% of cases. The cutaneous involvement (23%) and genitourinary tract involvement (5%) of cases is in agreement with what is reported in other series¹⁹ but the evidence of bone involvement (16%) is lower than the 30% reported.

A variety of pulmonary roentgenographic manifestations including nodular fibrotic, reticulonodular, pneumonic, and miliary lesions have been described.¹⁹ Most authors consider cavities to be rare but it has been claimed that they occur in approximately 25% of the patients with pulmonary lesions.¹⁹ Apical cavitation was present in one patient in the present series. Although dense fibrous pleura has been described in this disease,²² small pleural effusions are seen very rarely¹⁸ and a moderately large pleural effusion, as occurred in one of our patients, has not been described previously.

This series confirms the experience of others that the therapy of choice for North American blastomycosis is amphotericin B. Complete arrest of the disease can be achieved after a total dose of 1.5 to 2.0 g. given intravenously.¹⁹ As exemplified by one of our cases, a relapse following a full course of amphotericin B therapy can be successfully treated by repeating the drug. Only one patient did not respond to amphotericin B. The response to 2-hydroxystilbamidine indicates that this agent is useful for patients who do not respond to amphotericin B or who develop hypersensitivity reactions to it.²³

Confirmation of the diagnosis of blastomycosis is difficult and there are few laboratory tests to aid the physician. As indicated by others the complement fixation and the intradermal skin tests are of little value.^{11, 12, 18, 19}

Therefore, there must be an awareness on the part of the physician of the possibility of blastomycosis infection. Intensive, meticulous examination of bacteriologic and/or pathologic specimens and the application of appropriate specimen handling and staining techniques are essential.

Résumé

La blastomycose nord-américaine au Canada central

Les auteurs rapportent ici leur expérience sur 36 cas de blastomycose nord-américaine au Canada central. Les symptômes pulmonaires prédominaient, mais le tableau clinique de la maladie n'était pas uniforme. La peau et les voies génito-urinaires n'étaient affectées que chez une faible proportion de malades. La majorité d'entre eux étaient soit des ruraux, soit des citadins qui se livraient à une certaine occupation de plein air. Il n'a pas été possible de mettre en évidence des images radiologiques caractéristiques dans cette série de malades. L'amphotéricine B intraveineuse est le traitement par excellence de cette pathologie.

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