

Blastomycosis is a Serious Disease, But Let's Not Raise Fears Without Conclusive Data

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Two articles appear in this issue of the *WMJ* concerning *Blastomyces dermatitidis*. Munday et al¹ present a case of acute respiratory distress syndrome from blastomycosis. The article serves as a reminder that pneumonias, including severe and progressive disease that produce ARDS, are not all due to overwhelming bacterial infections. Severe pneumonia and ARDS can be caused by *Blastomyces dermatitidis*. The diagnosis was made using KOH and direct examination of the sputum. In one series of 123 patients, this simple and rapid test is positive in 58% of pulmonary cases and can be life saving because it permits the institution of anti-fungal therapy.² Of course, if the KOH is negative, further work-up is indicated because 97% of pulmonary cases can be diagnosed by more invasive cytological techniques.² In the Munday et al report, there is no epidemiological evidence provided about exposures, hence, one assumes that this information was not available or it was negative. This has been noted

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before in other reports, and it does not rule out *Blastomyces dermatitidis* as a cause of the pneumonia.³ Nevertheless, a careful history about exposure to rotting organic matter that is contaminated with feces from a wide variety of birds and mammals can serve as a clue to infection with *Blastomyces dermatitidis*.³⁻¹³ The lessons to be learned from this case report are: (1) a pneumonia that does not respond to aggressive antibacterial therapy may be caused by other pathogens, (2) a wet mount of sputum with KOH is an important, simple, and rapid diagnostic test, and (3) patients may not give a history of high-risk outdoor activities.

The lessons learned from the second paper presented by Baumgardner and Paretsky are less clear, and their message raises fears unnecessarily.¹⁴ The hypothesis in this paper is that infection with *Blastomyces dermatitidis* can occur due to exposure within the home. The authors state that this hypothesis is supported by 3 lines of evidence: (1) field studies of 2 homes with cultures and on-site interviews, (2) review of an address registry of human and dog infections with *Blastomyces dermatitidis*, and (3) a review of the literature. Unfortunately, due to methodological, sampling, and analytical deficiencies in the work, no conclusions can be

made about the hypothesis.

The case data and registry provide some anecdotal information that home acquisition of *Blastomyces dermatitidis* should be studied, but the investigation lacks scientific rigor. To draw any conclusions about the cases (human, feline, or canine), one must perform a case-control study. Owner interviews are based upon recollections, whereas accepted epidemiological methodology would rely upon matching each case with 3 to 5 other controls (humans or animals) in the area. Recollections of events, no matter how "professional" the people, are subject to recall bias. Where was the animal when it escaped, even those very few times? Who has not taken a walk several hundred yards from their home or stepped out of their car to run into a store along the river or lake? Without the proper case-controls of neighbors and their pets, the stated conclusions are not firmly established. Space does not allow presentation of a complete experimental protocol here, but a few examples of the methods needed to draw conclusions are provided. These would include a standardized questionnaire where patients and controls are asked the same questions about their life activities, assays to document current or past exposure to *Blastomyces dermatitidis* using the most modern techniques

where cross-reactions with *Histoplasma* will not occur,¹⁶⁻¹⁷ and statistical analysis of the data (e.g., Epi-Info or SAS statistical packages).

Environmental culturing is well known to be difficult for *Blastomyces dermatitidis*.^{9,11,13,17,18} However, the samples collected for culturing of *Blastomyces dermatitidis* by the authors would be expected to be negative. Only one instance of recovering *B. dermatitidis* from "soil" has been reported, and this case may have been special as the ground would have been soaked with oil as it was from an oil filtering shed.²⁴ The organism has been cultured from rotting organic material that is often contaminated by fecal matter that may be mixed with soil.^{9,11,13,17,18} While this may sound like a fine point, *Blastomyces dermatitidis* is best recovered from "soil" when it is directly inoculated into animals.¹⁷ Although animal infections improve the recovery rate, it is still frequently unsuccessful. Thus, emphasis about exposed soil in the basement and organic matter under a porch does have relevance because *Blastomyces dermatitidis* thrives in warm and moist conditions in rotting organic matter. However, linking this to the home per se, rather than the pile of rotting matter in the back yard or along bodies of water that are in the neighborhood, is not established by the evidence provided in the paper.

A quick search of the literature uncovers an abundance of information on *Blastomyces dermatitidis* that relates to this report, hence, the assertion that this is a literature review is questionable. When one enters the term "blastomycosis" into a PubMed search, one finds 173 articles concerning *Blastomyces dermatitidis* between 1996 and

May 2000. This includes at least 5 outbreak investigations of *Blastomyces dermatitidis*, which are relevant to, but not discussed, in the current publication.

Finally, this report may raise unnecessary fears. In the introduction of the paper, the term "highly endemic" is used. What does this mean? The highest annual reported disease rate in any county in Wisconsin is 100/100,000. This is 0.1%/year. In contrast, over 90% of residents along the Ohio and Mississippi River Valleys become rapidly sero-convert and 5% develop disease serious enough to be seen by a physician.²⁰ This gives a disease rate that is 45 times higher than the rates for blastomycosis. Because there are not adequate skin or serologic tests for *Blastomyces dermatitidis* infection, obtaining completely comparable data is difficult. One would project that a person would need to live in Vilas County at least 45 years before reaching the same relative risk. In any event, people are not fleeing from Cincinnati, Indianapolis, or St. Louis for fear of catching histoplasmosis, and I think that we should take the same attitude when it comes to *Blastomyces dermatitidis*. Of interest, other authors are laying claim to having the highest prevalence of blastomycosis, e.g., Mississippi River communities in the deep South,² and this has some logic in that the 'growing season' for the *Blastomyces dermatitidis* is much longer in the South. In any event, without definitive controlled studies that show acquisition of *Blastomyces dermatitidis* within the home, one should not alarm people with fears about contagion in the air.

In the future, one hopes that specific immunologic prevalence of infection data can be obtained

for *Blastomyces dermatitidis*. This may be possible by using the WI-1 antigen and testing the patient's lymphocytes for mitogenesis because there is no reliable serologic or skin test.^{15,16,19,22,23}

There is much to learn about the epidemiology of *Blastomyces dermatitidis*, but this will only be accomplished by careful epidemiological studies. Unfortunately, the report by Baumgardner and Paretsky does not answer the question about obtaining blastomycosis in the home, whereas other published studies of outbreaks give us information concerning risk factor for acquisition of blastomycosis.^{4-10,13} Perhaps some cases can be acquired in the home, but this question is certainly not answered by the current investigation.

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