

The Differential Diagnosis of Pulmonary Blastomycosis in Wisconsin

**A Wisconsin Network for Health
Research (WiNHR) Study**

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Blastomycosis

- An uncommon but serious fungal infection that primarily affects the lungs and skin
- May present with variable symptoms, ranging from no symptoms, mild-severe respiratory problems to progressive illness involving multiple organ systems or acute fulminating pulmonary infection

Context

- Even in highly endemic areas significant delay may occur between onset of pulmonary symptoms and diagnosis/Tx
- May mimic a variety of pulmonary diseases
- Clinician awareness of the protean presentations of this disease may reduce diagnostic delay/suffering/death

Purpose

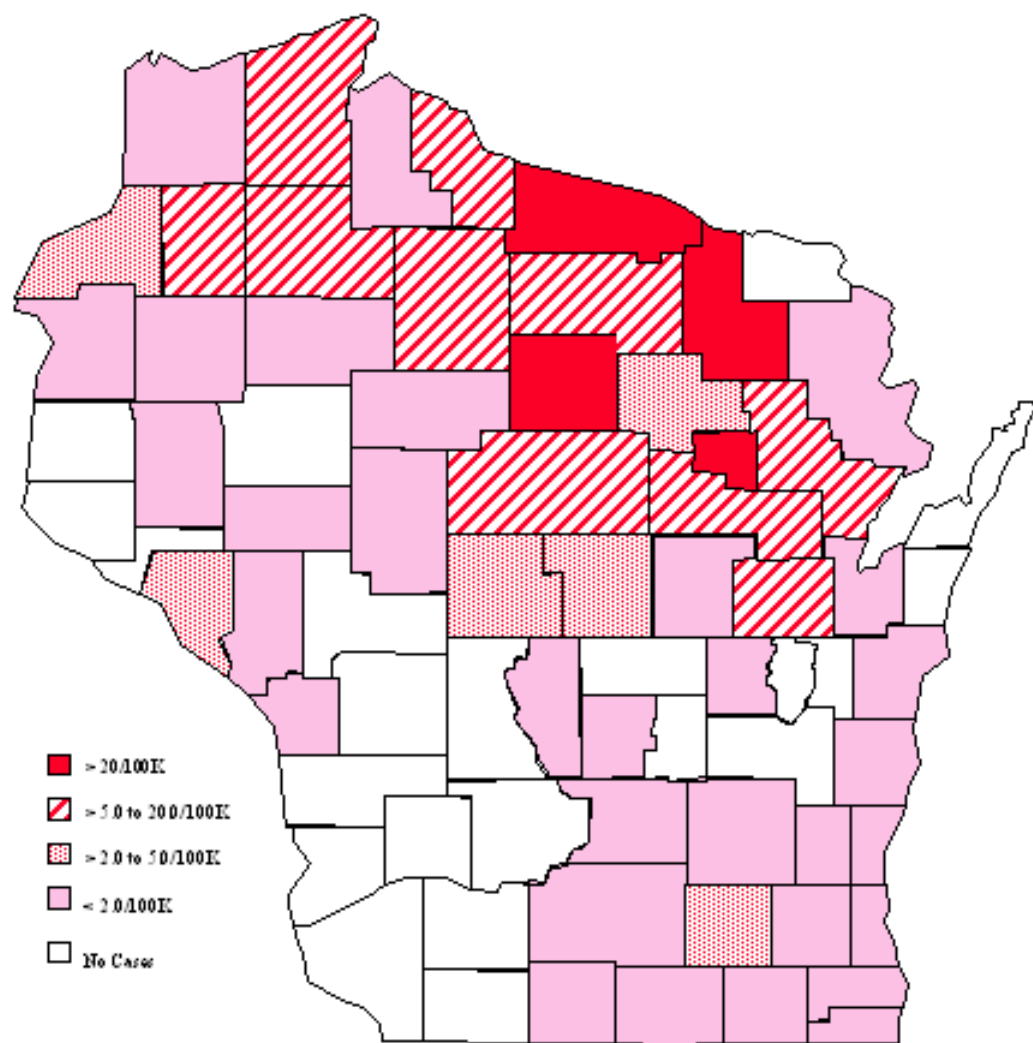
- Education!
- To determine the frequency of diagnosis of blastomycosis cases by WI primary care clinicians, given actual vignettes
- Develop a differential diagnosis such that when clinicians entertain a diagnosis on this list, blastomycosis is also considered

Methods

- Eight actual pulmonary blastomycosis cases were obtained from case files. From these, two vignettes were randomly selected on a rotating basis and mailed to primary care physicians in the Wisconsin Network for Health Research (N=1064). Respondents were asked to list the three most likely diagnoses for each case

Analysis

- Counties of respondent practice locations and case vignette residence (placed into five categories based on blasto incidence rates as published for 1999-2003 by the WI Div Public Health); and gender, specialty and years in practice of the respondent were compared to main outcome: blastomycosis listed in top three diagnoses
- Chi-square tests used for categorical variables; multivariate analysis by logistic regression



Results

- Response rate: 114 (11%) – 227 vignettes
- Respondent practice locations represented 30/72 Wisconsin counties, were 66% male, and included 147 (65%) Family Medicine, 63 (28%) General Internal medicine, 9 (4%) Med/Peds. 13% respondents had been in practice less than 5 years, 11% 5-10, 31% 11-20 and 46% 21 years or more.

Results

- Blastomycosis was listed as the most likely diagnosis on 37/227 (16%) of case vignettes, and one of the three most likely diagnoses on 43/227 (19%)

Blasto Vignette Results

Age	Gender	Home* /Visited +	% listed
42	M	Fox Valley*/Washburn+	50%
31	M	Manitowoc*/Northern WI+	43%
31	M	Kewaunee*	14%
54	F	Racine*	12%
48	M	Kenosha*	10%
56	M	Milwaukee*	8%
29	M	Milwaukee*	8%
47	M	Milwaukee*	0%

Results

- Vignettes with patient residence or exposure to one of the 20/72 counties with higher incidence rates of blastomycosis more commonly included blastomycosis as one of the three most likely diagnoses (46% vs. 9%; $p < 0.001$)
- Physicians with practice locations in the higher incidence counties listed blastomycosis more commonly as a top three diagnosis than did those from other counties (44% vs. 15%; $p < 0.001$)

Results

- Physician years in practice > 20 associated with blastomycosis diagnosis on univariate analysis ($p < 0.05$)
- In multivariate analysis with clinician gender, IM vs. FM specialty, practice > 20 years and practice location in higher incidence county as predictors, the latter was significantly associated with blastomycosis diagnosis ($p < 0.001$), and IM specialty was borderline significant ($p = 0.042$)

Results

- When “blastomycosis” and “fungal pneumonia” are combined, these diagnoses were listed in the top three suggested diagnoses on 78/227 (34%) of case vignettes, and associations with high-incidence case and respondent county of exposure or practice, respectively, remained similar to blastomycosis alone (IM specialty no longer significant)

Differential Dx of Pulmonary Blastomycosis (N=657)

- PNEUMONIA (186) -Viral etiology listed (4)
- CANCER (108)
- NON-INFECTIOUS PULMONARY (83)
 - -Sarcoidosis (28)
 - -Hypersensitivity/autoimmune (11)
- TUBERCULOSIS/MYCOBACTERIA (78)
- BLASTOMYCOSIS (42)
- OTHER SPECIFIC FUNGAL/FUNGAL-LIKE (42)
 - -Aspergillosis (15)
 - -Histoplasmosis (11)
 - -*Pneumocystis* (6)
- “FUNGAL DISEASE” (39)
- CARDIAC DISEASE (33) -Congestive heart failure (14)
- COMPLICATION OF SYSTEMIC PROCESS (19) -Sepsis (12)
- TRAUMA/TOXIN (14)
- PULMONARY EMBOLISM (13)

Limitations

- Return %
- Specific case scenarios may have biased differential diagnosis (i.e. history of rheumatoid arthritis and sarcoidosis, respectively, in 2 cases)
- Respondents may have been unwilling to name blastomycosis for both case scenarios, disbelieving that both would be the same

Conclusions

- Further education needed:
- Blastomycosis should be included in the differential diagnoses of Wisconsin patients with a wide variety of pulmonary symptoms suspected to represent infectious or non-infectious pulmonary, cardiac or neoplastic disease even with exposures limited to counties with low incidence rates

Clinicians, when you think of:

- PNEUMONIA
- CANCER
- Sarcoidosis
- Hypersensitivity/autoimmune lung disease
- TUBERCULOSIS/MYCOBACTERIA
- Aspergillosis
- Histoplasmosis
- *Pneumocystis*
- Congestive heart failure
- COMPLICATION OF SYSTEMIC PROCESS/Sepsis
- TRAUMA/TOXINS
- PULMONARY EMBOLISM

Also think of...

BLASTOMYCOSIS

