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
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
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

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Home* / Visited +</th>
<th>% listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>M</td>
<td>Fox Valley*/Washburn+</td>
<td>50%</td>
</tr>
<tr>
<td>31</td>
<td>M</td>
<td>Manitowoc*/Northern WI+</td>
<td>43%</td>
</tr>
<tr>
<td>31</td>
<td>M</td>
<td>Kewaunee*</td>
<td>14%</td>
</tr>
<tr>
<td>54</td>
<td>F</td>
<td>Racine*</td>
<td>12%</td>
</tr>
<tr>
<td>48</td>
<td>M</td>
<td>Kenosha*</td>
<td>10%</td>
</tr>
<tr>
<td>56</td>
<td>M</td>
<td>Milwaukee*</td>
<td>8%</td>
</tr>
<tr>
<td>29</td>
<td>M</td>
<td>Milwaukee*</td>
<td>8%</td>
</tr>
<tr>
<td>47</td>
<td>M</td>
<td>Milwaukee*</td>
<td>0%</td>
</tr>
</tbody>
</table>
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…

BLASTOMYCOYSIS