Allergic bronchopulmonary aspergillosis in a 56-year-old female with recently diagnosed asthma

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Introduction

- Aspergillus is an environmentally ubiquitous fungus that has mastered the art of survival, proliferating in even the most inhospitable of domains.1,2,3
- This survivability has enabled Aspergillus spp to overcome human immune responses and colonize: a condition known as Aspergillosis.1,2
- Invasive aspergillosis is an opportunistic infection occurring after inhalation of Aspergillus fumigatus fungal spores, resulting in significant morbidity and mortality in the immunocompromised as well as those with underlying pulmonary disorders.1,4,5
- One form of Invasive Aspergillosis that affects asthma and cystic fibrosis patients in particular through an IgE-mediated hypersensitivity reaction is known as allergic bronchopulmonary aspergillosis (ABPA).1,2,3
- ABPA can be separated into three subclassifications: ABPA-S, ABPA-CB, SAFS.2,6

Case Description

- Physical Exam: Gen: Ill-appearing, moderate respiratory distress
- Resp: Accessory muscle use, tripoding, tachypnea, No retractions, no stridor, decreased lung sounds globally, Inspiratory wheezing and rhonchi audible
- Cardiac: Regular rate and rhythm; Tachycardia
- Neuro: Alert & oriented x3; Anxious demeanor

Hospital Course

- Hospital Day 1: Patient started on albuterol, ipratropium, corticosteroids with shown improvement in peak flow. Patient alternated between venti mask and nasal cannula for supplemental oxygen.
- Hospital Day 2: Patient continued to experience cough and chest tightness with frequent desaturations. Physical exam revealed poor air movement bilaterally in lower lobes and inspiratory wheezing in right upper lobe.
- Hospital Day 3 – Repeat CXR order (Table 2.) 7-day course of antibiotics for community acquired pneumonia was started. Sputum culture still NGTD.
- Hospital Day 4 – Duaneb reduced from TID to BID per patient request. Saturations persistently between 92-96% on 6L nasal cannula. CT ordered to rule out PE (Table 2.)
- Hospital Day 5 – Patient experienced persistent hypoxia with non-productive cough and significantly worsened shortness of breath. Guainfenesin, Chest PT, Acepella, and Metanet were added to treatment regimen.
- Hospital Day 6 – Patient continued to improve decreasing supplemental oxygen demand from 6L to 4L nasal cannula with o2 sat of 97%. Steroid tapered from BID to QD. Repeat COVID negative. Mucosyst added to treatment regimen.
- Hospital Day 7 – Supplemental O2 weaned to 2L with 90% saturation on room air. Peak flow improved to 250 liters/min. Lower respiratory growth went down.
- Hospital Day 8 – Pt removed from supplemental oxygen with saturation of 93% on room air. Speciation revealed 2+ Aspergillus fumigatus
- Hospital Day 9 – Pt is discharged with pulmonary follow up outpatient.

Discussion

- The global burden of ABPA is approximately 4.5 million.
- Many patients go undiagnosed due to extreme variance in patient presentation.4
- To date there is no universally accepted diagnostic criteria for ABPA.2,5
- The main goals of treatment include: Controlling asthma or cystic fibrosis symptoms, Preventing and/or treating pulmonary exacerbation, Remitting pulmonary inflammation, and Reducing progression of pulmonary disease.6,7,8
- Corticosteroids remain the universally recommended initial treatment, but the course of treatment is individualized.
- Itraconazole and Voriconazole can be used to reduce fungal load, dampening the inflammatory reaction.2,8,9
- The use of monoclonal antibodies remains controversial but has been reported to show positive outcomes in patients with ABPA.10
- Treatment monitoring is recommended to be conducted bimonthly using serum IgE concentrations.8
- When left untreated, sequelae include: Bronchiectasis, Severe persistent asthma, Pulmonary fibrosis, Eventual loss of pulmonary function.6,7
- Research is currently being conducted on potential diagnostic biomarkers to hasten diagnosis and streamline treatment.2

Conclusion

- Due to scarcity in publication and notoriety, ABPA is rarely included among a clinician’s differential when treating acute asthma or cystic fibrosis exacerbation.
- Delay in diagnosis has been linked to a number of lasting pulmonary sequelae in patients with ABPA.
- Corticosteroids remain the most widely used initial treatment for ABPA.
- Itraconazole, Voriconazole, and off-label Omalizumab have also shown improved patient outcomes.
- There is currently no standardized diagnostic criteria or treatment protocol for ABPA.

Table 1. Variations among published diagnostic criteria 6

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Abnormal CT or MRI findings</th>
<th>BAL</th>
<th>Bronchoscopy</th>
<th>Sputum Culture</th>
<th>Skin Test</th>
<th>Positive Aspergillus serology</th>
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<tbody>
<tr>
<td>1</td>
<td>Bilateral lower lobe pneumonia</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>No pulmonary embolism</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>3</td>
<td>Osseous destruction of the lung, with or without evidence of bony destruction</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Post-obstructive atelectasis and bronchial obstruction</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Reduced lung function tests</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Increased airway responsiveness, as measured by methacholine challenge test</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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Table 2. Inpatient Diagnostic Testing

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
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<tbody>
<tr>
<td>CTX</td>
<td>CTX w/ IV Contrast</td>
</tr>
<tr>
<td></td>
<td>- No pulmonary emboli</td>
</tr>
<tr>
<td></td>
<td>- Osseous destruction of the lung, with or without evidence of bony destruction</td>
</tr>
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</tbody>
</table>

Fig 1. Bronchiectasis on computed tomography 6

Fig 2. Patient Chest X-Ray

References