Asthma in an Aging Population

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Introduction

- Majority of Asthma Clinical Studies
  - Enroll children and young adults
  - Typical age cutoff of 55yo (confounders)
- Evidence-based Medicine
  - Need research to “back up” medical decisions
- Many questions to address…
Questions

- Are there differences between younger and older asthma patients?
  - More severe?
  - Requires different treatment?
  - Biology of disease different?
What is Asthma?

- Lung Disorder
- Symptoms
  - Wheezing
  - Cough
  - Chest tightness
  - Shortness of breath
- Triggered by
  - Allergens
  - Cold Air
  - Exercise
  - Irritants - tobacco smoke, exhaust fumes
  - Respiratory infections
What is Asthma?

- Asthma Symptoms are **REVERSIBLE**!
  - Remove or get away from trigger
  - Use of medication (albuterol inhaler)
Airway Change in Asthma

Normal

Asthma

Symptoms
The Natural History of Asthma

Relapse or Disease Progression

REMlSSION

ASTHMA

New Onset

ASTHMA

Family hx asthma
 Passive smoke exposure
 Atopic disease

Genetic Factors (Atopy)

Viruses

Wheezing

Allergens

New Onset
Other Patterns of Asthma

- Occupational Asthma
  - Work exposure can trigger symptoms

- Late-Onset Asthma
  - Symptoms start at any older age
Decline in Lung Function Is Accelerated in Asthma

Lange et al., NEJM (1998)
Asthma in the Elderly

- Prevalence of asthma is similar in all age groups (5-10%)
- An aging US population
- Increased life expectancy

Elderly with Asthma
The Asthma and Aging Questions

- Is Asthma in the Elderly more severe?
- Is Asthma in the Elderly underdiagnosed?
- Is Asthma in the Elderly undertreated?
- Are there age-related changes in the Biology of Asthma?
Is Asthma More Severe in Elderly?
Minutes in the ER

Age

18-34  175

35-54  200

≥55    320

Banerji et al., JAGS (2006)
Sent Home from the ER

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>18-34</td>
<td>82%</td>
</tr>
<tr>
<td>35-54</td>
<td>76%</td>
</tr>
<tr>
<td>≥55</td>
<td>60%</td>
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Banerji et al., JAGS (2006)
Hospital Admission from ER

Age

18-34  13%
35-54  19%
≥55   38%

Banerji et al., JAGS (2006)
Some Statistics

- For > 65yo, having Asthma results in 2X greater risk of mortality
- The only age group in which asthma mortality is increasing is the elderly (> 65yo)
Summary: Asthma Outcomes

Elderly with Asthma → Poor outcomes
Is Asthma underdiagnosed in Elderly?
Underdiagnosis of Asthma

- Estimates are that only 50% of the elderly with Asthma are diagnosed
Underdiagnosis of Asthma

- A large cohort in the Cardiovascular Health Study examined for Asthma
- 4% reported Asthma
- Another 4% with symptoms consistent with Asthma

Enright et al., Chest (1999)
Why is Asthma Not Diagnosed?

- Patient expectation of age-related decline in respiratory status
  - Adjust lifestyle
  - Don’t mention to physician
- Patient inability to perceive a decrease in lung function
- Physician perception that asthma is a disease of children and young adults
Physician Approach

- New-onset of asthma-like symptoms
- Must rule-out life-threatening possibilities
Other Causes of Asthma-like Symptoms

- Cancer
- Pulmonary Embolism
- Heart Disease or Congestive Heart Failure
- Chronic Obstructive Pulmonary Disease (COPD)
- Bronchiectasis
- Vocal Cord Dysfunction
- Gastro-esophageal Reflux
Physician Approach

- New-onset of asthma-like symptoms
- Must rule-out life-threatening possibilities
- If life-threatening cause not identified
  - Less urgency to identify the true cause
Is Asthma undertreated in Elderly?
Undertreatment of Asthma

- A large cohort in the Cardiovascular Health Study examined for Asthma
- 39% of those with definite diagnosis were taking NO regular Asthma medications

Enright et al., Chest (1999)
Tennessee Medicaid Study

- Examined asthma patients in ER or admitted to hospital
- 81% of older asthma patients classified as persistent asthma
- Only 20-30% of these patients were taking inhaled corticosteroid “controller” medicine.

Hartert et al., Ann Allergy Asthma Immunol (2002)
Do we know how to treat Asthma in the Elderly effectively?

  - Recognized lack of specific clinical data on asthma treatment in elderly
  - Advocated for more research
  - In 14 years, no significant progress
Treatment Options

- Not straightforward in the elderly
- Little evidence base
- NAEPP 3, 2007
  - Does provide Age-stratification for recs
    - 0-4yo, 5-11yo, =>12yo
  - Use younger adult guidelines
- Keep in mind…
  - Side Effects
  - Co-morbidities and associated polypharmacy
Some hope?

- TENOR (The Epidemiology and Natural History of Asthma: Outcomes and Treatment Regimens)
- Comparison of older (>65yo) vs younger
  - Similar medication use
  - Worse lung function
  - Less healthcare utilization (office and ER)
  - Less corticosteroid bursts
  - Better quality of life scores
- These patients were all being treated by allergists and pulmonologists!
- Thus, diagnosis and treatment can lead to improved outcomes

Slavin et al., Ann All Asthma Imm (2006)
Are there age-related changes in the Biology of Asthma?
Airway Change in Asthma

Normal

Asthma

Inflammation
Inflammation

- Cells
  - Lymphocytes
    - B and T
  - Macrophage
  - Neutrophil
  - Eosinophil
  - Mast cell

- Mediators
  - Cytokines
  - Leukotrienes
My Research Interest

Is the Airway Inflammation of Asthma the same in younger and older patients?
Sputum Cell Distribution

Mathur et al., Chest (2008)
Sputum Analysis in Elderly

Nyenhuis et al., JACI (2010)
Summary on Airway Biology

- There are age-related changes in:
  - Composition of cells in airway
  - Functional activity of immune cells
  - Levels of mediators in the airway
An Unanswered Question

What are the clinical consequence(s) for the age-related changes in airway inflammation?
Take Home Message

Asthma in the Elderly

- Understudied
- Underdiagnosed
- Undertreated

Age-related changes in Inflammation associated with Asthma

- Impacts severity?
- Impacts treatment?
Do you have Asthma symptoms?

- Shortness of breath, Cough, Wheezing, Chest Tightness
- Talk to your primary care provider
- Decide together whether referral to an asthma specialist is indicated
Do you have Asthma?

- UW Asthma Research Program
  - Many ongoing studies
  - All ages
  - Come by the booth for more information and to sign up for potential involvement