Work Related Asthma: Recognition and Diagnosis

June 19, 2014

Featured Speakers

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Disclosure Statements

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No commercial funding has been accepted for this activity.

Evaluations

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Thank You to Our Sponsors:

- University at Albany School of Public Health
- NYS Department of Health
  - Bureau of Occupational Health and Injury Prevention
28 Yr. Old Male, Chest Congestion

- < 10 pack years smoking
- 3 yrs of symptoms – increasing frequency
- First ER visit - 1 year prior to visit
- Occurs at work; respirator used regularly
- Relief – outside air; albuterol; layoff
- 5 years in current job – enzyme/dust exposure

Work-Related Asthma Indicators

- Occurs at work
- Relief from layoff
- 5 years in current job – enzyme/dust exposure

Work-Related Asthma

- > 25% of Adult Asthma
- 10 –15% of adult asthma begins in the workplace
- 10% - 20% of adult asthma worsens in the workplace
- Some authorities argue 50% greater

Impact

- More:
  - days with symptoms
  - medical care
  - medication expenses
- Continued exposure → worse outcome
- Removal → loss of income
- Mood disorders, lower quality of life
- Risk to co-workers

Work-Related Asthma (WRA)

- Occupational Asthma (OA)
  - New onset asthma due to sensitization to a component of the work environment
  - New asthma due to irritant injury to airways
    - Acute onset – RADS
    - Chronic exposure
- Work-Exacerbated Asthma (WEA)

Diagram:

- WRA
  - OA
    - Sensitizer Induced Asthma: 70%
  - WEA: 19%
    - Irritant Induced Asthma: 11%
Work Exacerbated Asthma - Criteria

1) Pre-existing or concurrent asthma
2) Exacerbation of asthma was temporally associated with work
3) Conditions exist at work that can exacerbate asthma.
4) Asthma caused by work (i.e., occupational asthma) is unlikely

Work Exacerbated Asthma - Stimuli

- Cleaning products, bleaches, ammonia
- Cigarette smoke, welding fumes, paints, solvents, cold air
- Chemicals, glutaraldehyde, calcium oxide, acids
- Mineral / inorganic dust; organic dust
- Indoor air pollutants, mold, perfumes

WEA: High-Risk Jobs

- Lab technicians, medical technicians
- Firefighters, welders
- Cleaners, bleachers, hairdressers
- Cabinet makers, carpenters
- Waste handlers, farmers
- Bakers, spray painters, teachers

Mechanisms of OA

- Majority: IgE mediated responses to HMW antigens (bacteria, plant, animal) ± 2 yrs
- Minority: uncharacterized immunologic response to LMW allergens (metals, chemicals) ± 2+ yrs
- Asthma without latency: unknown mechanism

Reactive Airway Dysfunction Syndrome (RADS)

- 36 yr. old marathon runner
- No h/o prior asthma
- Aluminum smelter - inhaled toxic fumes on job
- ER for SOB/wheeze
- Persistent cough, wheeze and exertional limitation thereafter
**RADS**
- High concentration inhaled gases
- Prompt (0-12 hrs) onset of asthma symptoms
- Pulmonary function + obstruction
- Challenge positive
- Long term non-specific airway hyper-reactivity

**Irritant-induced Asthma**
- Immediate onset (RADS)
- Delayed onset – high rates of asthma in cleaners, hotel maids, etc.

**SUSPECT**
- When should the health professional pursue WRR further?
  - Any adult with difficult asthma

**Hints for Occupational Asthma**
- Wheezing/shortness of breath that improves on days away from work or holiday (early in course)
- A workplace substance is aerosolized or vaporized

**Most Frequently Reported Specific Causes**
- Diisocyanates
- Aldehydes
- Seafoods
- Wood dust
- Natural rubber latex
- Enzymes
- Anhydrides

**Hints for Occupational Asthma**
- Recurrence of symptoms on re-exposure
- Delayed asthmatic or dual asthmatic responses common
Main Risk Factors

- Exposure to an agent at work
  - Agent
  - Extent of exposure
- Atopy
  - Selected agents – esp HMW

Main Risk Factors

- Genetic polymorphisms
  - HLA
  - Respiratory anti-oxidants
- Cigarette smoking
  - Increased rate of sensitization
  - Increased rate of occupational asthma

Key Questions

1. Is it asthma?
2. Are there asthmagens in the workplace?
3. Can a relationship with work exposure be demonstrated?

Key Questions

1. Is it asthma?
   - history
   - spirometry – pre & post
   - non-specific challenge - methacholine

History

- Improvement of symptoms at weekends and on vacations – high sensitivity
- Wheezing at work – more specific
- Rhino – ocular symptoms sensitive for high MW occupational asthma

Methacholine Challenge

![Methacholine Challenge Graph](image)

Data Table:

| % FEV1 | %
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Increasing Dose
2. Are there asthmagens in the workplace?
- Detailed description of work
- use of ventilation
- use of respiratory protection
- MSDS – check asthma websites
- IH assessment

3. Can a relationship with work exposure be demonstrated?
   Relationship to work:
   - specific challenge
   - sputum eosinophilia
   - peak flows
   - symptom diary
   - non-specific challenge after a month

Over 250 agents reported to date:

Commercial Allergy Tests Available for:
- Flours, yeast, alpha-amylase, papain, natural rubber latex
- Guinea pig, mouse, rat, farm animals, penicillins, wood dusts
- Formaldehyde, diisocyanates, trimellitic anhydride, chloramine T

Peak Flow Meters - QID
- > 70% compliance
- Sensitive (80%) and specific (90%)
- Peak flows fall at work or after work
- Peak flows are higher on weekends or when away from work

Diagnosis Summary
1) Confirm asthma vs. asthma mimics
2) Appropriate exposures at work
3) Work relationship
### Differential Diagnosis
- Non-occupational asthma
- Industrial bronchitis
- Airway irritation without asthma
- Hypersensitivity pneumonitis
- Bronchiolitis obliterans
- Eosinophilic bronchitis
- Metal or polymer fume fever
- Vocal cord dysfunction

### Treatment / Prevention
- Routine asthma Rx - inhaled corticosteroid
- Periodic surveillance if remain on job
- Workplace interventions - change materials, isolate, ventilate, PPE

### Treatment / Prevention
- Administrative - change job assignment
- Leave work -> increased chance of resolution & increased chance of economic hardship
- Disability, WC, vocational rehabilitation
- Check co-workers

### Outcome
- Disease-related reduction of earnings was similar in WEA (59%) and OA (62%)
- Statistically significant lower scores for overall function
  - mood disturbance
  - social disruption – loss of employment
  - health concerns

### Physicians’ History
- VA physicians history vs. patient questionnaire
- 197 patients with newly-diagnosed asthma
- 75% recorded job title
- 21% - any evidence of inquiry on potentially significant respiratory exposures at work
Physicians’ History

- 4% detailed history of work exposures
- 2% diagnosed with WRA
- 0.5% requested MSDS

The NYS Department of Health Occupational Clinic Network

http://www.health.ny.gov/environmental/workplace/clinic.htm

NYS Occupational Clinic Network

- Western Region
- Finger Lakes Region
- Central Region
- Long Island Region
- Adirondack Region
- NYC Region
- So. Tier Region
- Agricultural Clinic
- Mid-Hudson/Eastern Region
- Lower Hudson Valley Region

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Thank you!