Co-morbidities of Asthma - Allergic Rhinitis, Rhinosinusitis, OME, OSA

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Introduction

- Asthma and allergic rhinitis (AR) are global health problems that cause major illness and disability worldwide.
- WHO estimates 300 million worldwide have asthma and 400 million people worldwide have AR.
- Impairment of quality of life is seen in both adults and children with asthma and AR and asthma.
- Patients have several co-morbidities - sleep disorders, emotional problems, impairment in activities and social functioning.
- The economic impact direct and indirect costs are substantial.
Co-morbidities of Asthma

Modified from Spector SL. JACI. 1997;99:S773-S780.

Comorbidities

- Allergic Rhinitis
- Sinusitis
- Otitis media with effusion
- Sleep disorders
Asthma and AR
Allergic Rhinitis Is a Risk Factor for Asthma

23-year follow-up of college freshmen undergoing allergy testing; data based on 738 individuals (69% male) with average age of 40 years. Adapted from Settipane RJ et al Allergy Proc 1994;15:21-25.

Allergic rhinitis increased the risk of asthma ~3-fold
Physician diagnosed allergic rhinitis in children

- By 6 years of age 42%
  - Began in first year 77%
  - Began after first year 57%
  - Prick skin test positive * 20%

Development of asthma by 6 years

- When rhinitis began in first year 23% (p<.005)
- When rhinitis began after first year 13%

When rhinitis began in the 1st year of life, the development of asthma was twice as high as when it started after the 1st year

Prevalence of Asthma in Adults and Children With AR

More children than adults with AR have been diagnosed with asthma or had asthma symptoms in the past 12 months.
Early-phase response

Late-phase response

Bronchial biopsies in patients with SAR

Chakir et al, Allergy Clin Immunol 2000
Eosinophilic inflammation in submucosa

Chanez et al, Am J Respir Crit Care Med 1999
**Bronchial Allergen Challenge Produced Nasal Inflammation**

- **Blood** (N = 16)
  - **Eosinophils (10^6 Cells/mm^2)**
  - T0 = before challenge; T24 = 24-hr postchallenge.
  - *P < .05 vs control (T0); †P < .01 vs allergic patients (T0).

- **Bronchial Subepithelium** (N = 16)
  - Eosinophils (No. Cells/mm^2)
  - T0 = before challenge; T24 = 24-hr postchallenge.
  - *P < .05 vs control (T0); †P < .01 vs allergic patients (T0).

- **Nasal Lamina Propria** (N = 16)
  - Eosinophils (No. Cells/mm^2)

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Impact of AR on Asthma in Child’s Quality of Life

The co-existence of AR with asthma grossly worsened the QOL

Increased Risk of Hospitalization for Asthma in AR Patients

Patients with AR and asthma had an increased risk of hospitalization

Retrospective cohort study of costs over a period of up to one year incurred by patients 12 to 60 years of age with both allergic rhinitis and asthma.
Asthma, AR and Sinusitis
Subjects ≤25 years of age (n=35)

Acute Rhinosinusitis Is More Common in Patients With AR

- AR (n=54): 57%
- Controls (n=82): 29%

P<0.001

Patients with Acute Rhinosinusitis (%)

In a study comparing the prevalence of sinusitis in patients with perennial allergic rhinitis (PAR) versus normal controls, Berrettini et al. found a prevalence of 67.5% in 40 patients with PAR versus 33.4% in 30 nonallergic controls. This difference was statistically significant.

Sinusitis - defined by sinus CT scan or rhinoscopy. Thirty-six of the 40 patients with PAR also had positive endoscopic findings.
Increased Risk and Duration of Respiratory Infections in Children with AR


Upper Respiratory Infections in Children
5.1 in asthmatic children  vs  3.8 in controls
Complications of Acute Rhinosinusitis

- Orbital cellulitis (ethmoid)
- Meningitis
- Subdural/epidural empyema (frontal)
- Brain abscess (frontal)
- Cavernous sinus thrombosis (sphenoid)
- Osteomyelitis (frontal)
- Asthma exacerbation
Upper Respiratory Infections in Children

- 5.1 in asthmatic children vs
- 3.8 in controls

Prevalence of Abnormal Sinus X-rays in Asthmatics and Nonasthmatics

- **Asthmatic/Atopic Children**
  - National Jewish Hospital: 73
  - Chobat: 41
  - Rachelefsky: 53

- **Asthmatic Adults**
  - Gottlieb: 26
  - Weille: 72
  - National Jewish Hospital: 58

- **Nonasthmatic Children**
  - Kovatch: 7

- **Nonasthmatic Adults**
  - Fascenelli: 26

Incidence (%)
Chronic Sinusitis

- 50% with chronic sinusitis have OME

- 53% have abnormal sinus radiographs
  - 27% near total opacification

Influx of Eosinophils into the Maxillary Sinuses After Nasal Allergen Challenge

**Graph: Influx of Eosinophils Over Time**

- **Y-axis:** Total Eosinophils
- **X-axis:** Time (hrs)
- **Legend:**
  - Red: Ipsilateral
  - Green: Contralateral
- **Statistical Note:** *p<0.05 vs Dil
- **Sample Size:** N=15

*Influx of Eosinophils into the Maxillary Sinuses After Nasal Allergen Challenge*
Nasal and Sinus Reflexes

Central Nervous System

Right Maxillary Sinus

Left Maxillary Sinus

Right Nostril

Left Nostril

Efferent Pathways
Afferent Pathways
Axon Reflexes
AR and Otitis Media with Effusion
Nasal Allergy and Chronic OME in various Paediatric populations

17% Allergic Rhinitis
1.9% OME + Allergic Rhinitis
6% OME
21% OME
50% Allergic Rhinitis

School Children
Allergic Rhinitis Children
Chronic OME Children

OME = Otitis Media with Effusion.
Eustachian Tube Obstruction: Ragweed Pollen Season

Asthma and OME

Eosinophils

T-lymphocytes

CD3$^+$ cells in MEE

Atopic

NonAtopic

Same trend for IL-4 and IL-5

Asthma and OME

Similar allergic inflammation in the middle ear and the airways
Sinusitis, Asthma and OME in house dust mite AR patients

% of total HDM - AR patients

Pawankar R et al.
Chronic allergic respiratory syndrome

Modified from Stokes JR and Casale T. AR, asthma and OSA- the link. In- Allergy Frontiers Epigenetics to Future Perspective. Eds- Pawankar. Holgate Rosenwasser
Asthma is rarely found in isolation and needs to be considered in the context of systemic allergic disease associated with numerous comorbid disorders.

Upper airway co-morbidities of asthma include AR, sinusitis, and OME (with consequent disordered sleep/behavioral effects).

Treating the underlying inflammation is key to relieving symptoms & reducing consequences/co-morbidities in patients with asthma.
We look forward to welcoming you to the 2011 World Allergy Congress

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Advances in Allergy, Asthma & Clinical Immunology: Towards Optimal Patient Care
28 April – 1 May 2011
Grand Hyatt, Dubai - UAE

www.MEAAAIC.org

Objectives
- To Provide Insights into the Fundamentals of Allergy, Asthma & Clinical Immunological Diseases
- To Highlight the most Recent Advances and Developments in Allergy, Asthma & Clinical Immunological Diseases Leading to Optimal Patient Care

Key Reasons to Attend MEAAAIC
- Attend State of the Art Lectures by the "Who’s Who" in the field of Allergy, Asthma and Clinical Immunology
- Participate in Practical, Clinic-Friendly Workshops on Asthma, Anaphylaxis, Spirometry, Rhinoscopy, Bronchoscopy, Immunotherapy, Sleep Apnea & more
- Network with Others in your field/area of interest
- Receive CME Credits
- Present your own Original Work to Key International Opinion Leaders

Topics
- Immunotherapy - Subcutaneous & Sublingual
- Allergic Rhinitis - Mechanisms, Quality of Life & Evidence Based Treatment
- Asthma - Phenotypes, Endotypes, Severe Asthma & Evidence Based Treatment
- Allergy Testing - Skin vs Serum IgE
- Atopic Dermatitis & Urticaria
- Immune Deficiency
- Food Allergy
- Anaphylaxis
- Rhinosinusitis and Rhinoconjunctivitis
- Asthma vs COPD
- Sleep Apnoea

Who Should Attend
Delegates from the Middle East - Asia region and beyond. Clinicians, researchers, and other allied health professionals with interests in:
- Asthma
- Allergy
- Clinical Immunology
- Paediatrics
- Pulmonology
- Ophthalmology
- Dermatology
- ENT

International & Regional Faculty to be Announced Shortly

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