

# **ALLERGIC RHINOSINUSITIS AND NASAL POLYPOSIS**

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Final yr PG

- DEFINITION
- PREVALANCE
- AETIOLOGY
- PATHOPHYSIOLOGY
- CLINICAL PRESENTATION
- DIAGNOSIS

# DEFINITION

- ALLERGIC RHINITIS
  - Symptomatic disorder of nose induced after allergen exposure by an IgE mediated inflammation
- Symptoms of allergic rhinitis( 2 or more )
  - Rhinorrhoea
  - Sneezing
  - Nasal Itching
  - Nasal Obstruction
  - Post nasal drip

## ARIA guidelines \*

- Intermittent symptoms
  - < 4 days / week
  - Or < 4 weeks
- Persistent symptoms
  - > 4 days / week and
  - > 4 weeks

• \*Allergic Rhinitis & its impact on asthma, revised - April 2008  
European journal of allergy & immunology, vol 63, supplement 86, 2008

- Mild symptoms
  - Normal sleep
  - Normal daily activities
  - Normal work & school
  - Symptoms not troublesome
- Moderate- severe symptoms
  - Abnormal sleep
  - Impairment of day to day work
  - Problems at school / work
  - Troublesome symptoms

# PREVALANCE

- Worldwide 0.8 – 39.7 %
- M > F (14.3 % : 12.6 %)
- Peak: Young Adulthood
  - 13 – 14 yrs ( 1.4 – 39.7 % )
- INCIDENCE: Higher if parents allergic
  - 29% & 47%

# AETIOLOGY

- ATOPY
  - Exaggerated IgE response
  - Multifactorial inheritance
    - Genes - 5q chromosome - IL4, IL13
      - Chromosome 11q – (Japanese) , 12q
- Environment - ALLERGENS

- Allergens – glycoprotein
  - major / minor
- Seasonal
  - Pollens, outdoor molds
- Perennial
  - Indoor allergen – cockroach, dust mites, molds, pets
- Episodic
- occupational

# SEASONAL ALLERGIC RHINITIS

- Most commonly due to grass pollens
- Pollen counts increase by
  - Warm
  - Dry
  - Clear conditions
- Size of pollen – 10-100 microns
- Counts  $> 50$  / cubic meter
- Priming of nasal mucosa



# PERENNIAL ALLERGIC RHINITIS

- Commonest : house dust mite
- Optimal condition:
  - 15-20 degree centigrade
  - 60-70 % relative humidity
- 100 mites / gm of dust – sensitize pts - asthma



# OCCUPATIONAL ALLERGENS

- Indoor & outdoor allergens
- Clue to occupational allergens
  - Work related symptoms
  - Improvement during periods away from work
- Biological allergens
  - Flour mills
  - Lab animals
  - Laundry - washing powder : enzymes (Bacillus subtilis)

# FOOD & DRUG ALLERGENS

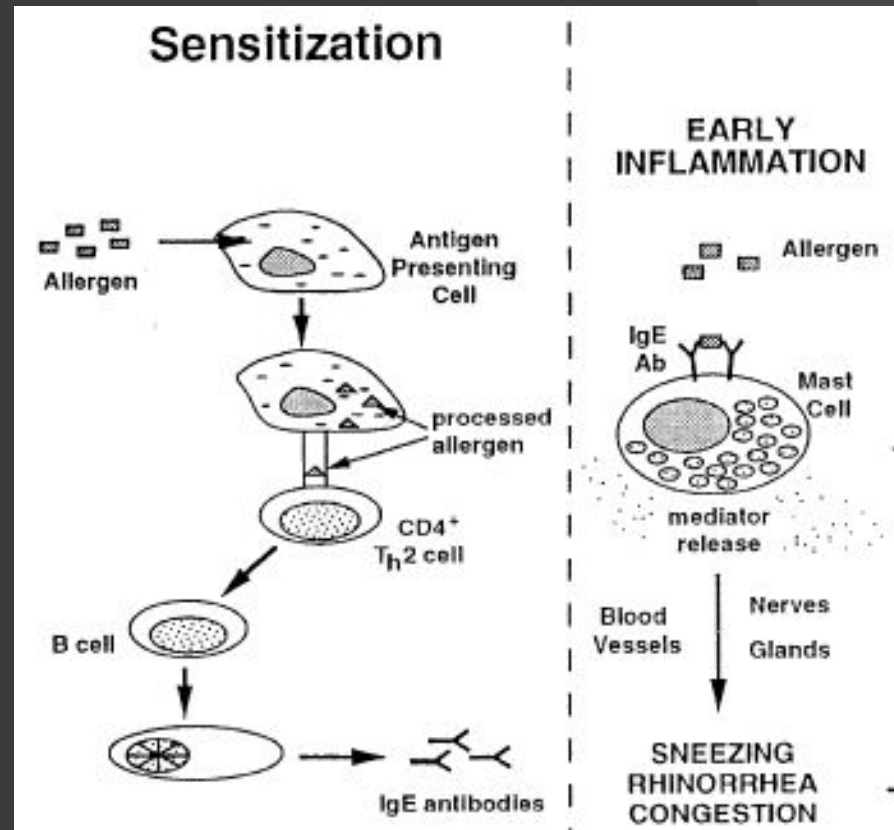
- 50 % infants on cows milk - rhinitis
- Alcohol provoke nasal congestion of AR
- Aspirin & NSAIDS:
  - Severe & prolonged effects
  - Nasal polyposis
  - Late onset asthma
- Antihypertensive , OCP's
  - Predominant nasal obstruction & rhinorrhoea

# PATHOPHYSIOLOGY

- Gell and Coombs type I immediate (anaphylactic) hypersensitivity
- 4 phases
  - Sensitization
  - Early response
  - Late phase reaction
  - Systemic activation

# SENSITIZATION

- IgE
  - Unique to allergic ds
  - Binds reversibly with high affinity receptors
  - Sensitization
  - Involve IL-4, IL-13 & CD-40
  - Early response



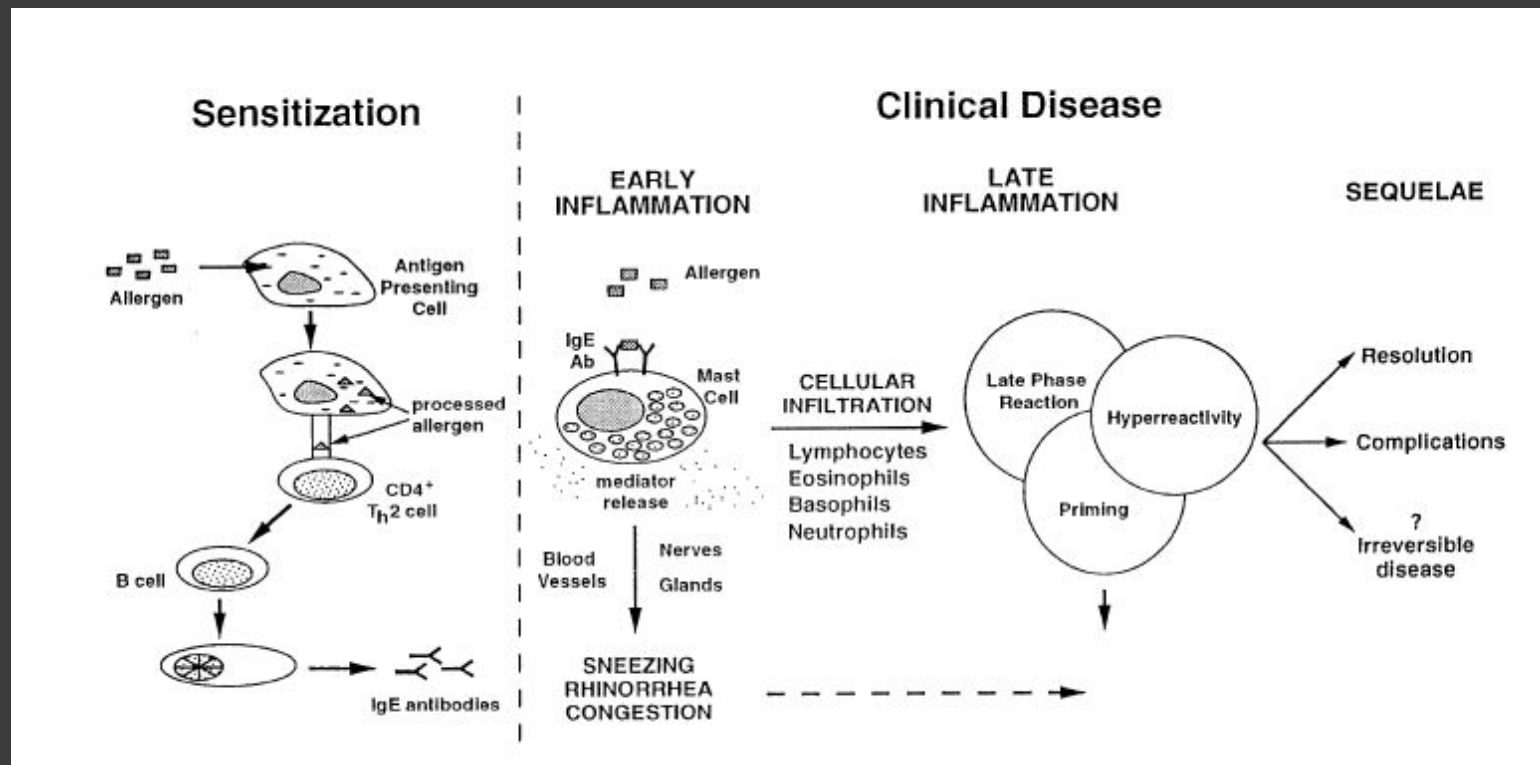
# EARLY RESPONSE

- Preformed mediators - Mast cells
  - Stored in granules of cytoplasm
  - Histamine, tryptase, heparin, chondroitin SO<sub>4</sub>
- Newly formed mediators
  - Cell memb phospholipids
  - PG & LTs
  - PAF
  - Kinins

# Late Response

- Late response 6-12 hrs later , Resolve in 24 hrs
- Priming effect
- Characteristic cellular inflammation
  - Eosinophils, endothelial cells, epithelial cells,
- Increase inflammatory mediators
- Recurrence of allergic symptoms
- Predominantly nasal obstruction
- Basophils in nasal secretions
- Mast cells in epithelium & lamina propria

# Late Response



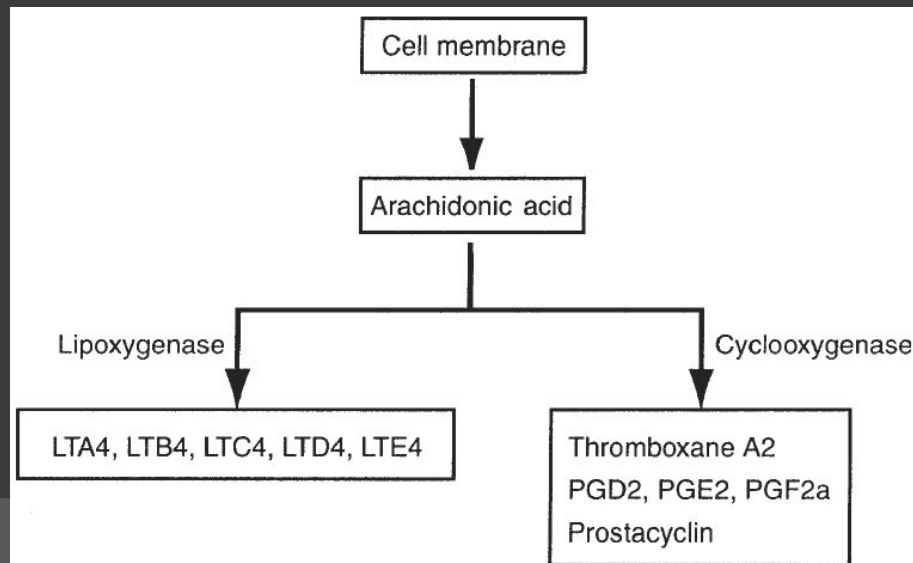


# Allergic mediators

- Histamine
  - Major mediator of early response
  - Amino acid histidine
  - Preformed
  - Effects:
    - Vasodilatation
    - Increase permeability
    - Bronchoconstriction
    - Increase mucous secretion

# Allergic mediators

- Leukotrienes:
  - Late phase mediator
  - Eosinophils, mast cells
  - More potent & longer bronchoconstriction
  - Increase permeability
- Prostaglandin D
  - Early response
  - Mast cells
  - Bronchoconstriction
  - Elevated levels of PG-D in nasal lavage & BAL after allergen challenge



# SYSTEMIC ACTIVATION

- Upregulation of production and release of eosinophil and basophil precursors from the bone marrow in response to allergen contact in nose or lung.

- Pathology of polyp
- Definition: nonneoplastic distended protruded edematous mucus membrane lined by pseudo stratified ciliated columnar epithelium.
- Pathogenesis : as a sequelae to persistent inflammation in nasal mucosa due to chemical mediators in allergic reaction and Bernoulli effect there is extravasation of intravascular compartment into interstitial compartment will lead to persistent edema and polyposis.

# CLINICAL PRESENTATION

- HISTORY:
  - Symptoms of AR
  - Ocular symptoms
  - Secondary symptoms:  
ear/ larynx
  - Symptoms of asthma
  - Associated diseases
- H / o allergy
  - Seasonal
  - Perennial
  - Occupational
  - Pets
  - Food
  - Drugs
  - Family h/o atopic diseases
  - Treatment history

- EXAMINATION:

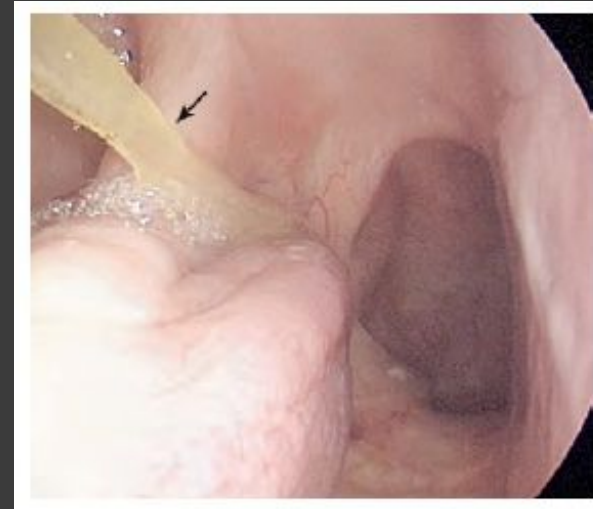
- ‘Allergic facies’
  - More common in children
  - Mouth breathing
  - Allergic shiners
  - Allergic salute



Fig. 3.11 a A nasal salute in allergic rhinitis and b the crease over the bridge of the nose that it creates by repeated rubbing of the nose.

- EXAMINATION:

- Nose
- External nose
- Decongestion of nose
- Rhinoscopy
  - Nasal Endoscopy
- Nasal polyp
- Osteomeatal unit
  - Ocular examination
  - Respiratory system
  - Skin



# DIFFERENTIAL DIAGNOSIS

**Table 2. Alternative Diagnoses with Typical Characteristics**

Alternative Diagnosis	Typical Characteristics
Acute rhinosinusitis	Facial pressure or pain, purulent nasal discharge; maxillary toothache; failure to respond to decongestants; fever or cough may be present; may follow an allergy flare-up or a viral URI
Chronic rhinosinusitis	Facial pressure or pain, purulent discharge; fever often absent; may be present in addition to allergic rhinitis; symptoms may wax and wane over time; chronic hyposmia.
Viral URI	Self-limited course with symptoms (clear rhinorrhea, cough, ache) usually resolving within 3-7 days
Septal deviation	Nasal obstruction is often constant and unilateral; deflection can often be seen on examination
Rhinitis medicamentosa	Also called “rebound rhinitis;” caused by overuse of topical decongestants; diagnosis is easily made by history; may mask another underlying condition such as septal deviation or allergic rhinitis.
Vasomotor rhinitis	Clear rhinorrhea, nasal obstruction, often depends on position ( <i>e.g.</i> , supine), may be episodic. Pregnancy may exacerbate symptoms
Atrophic rhinitis	Also call “ozena;” caused by over-resection of turbinate tissue or poor mucus production, resulting in nasal dryness and crusting; foul odor may be present; rarely secondary to klebsiella ozaenae infection
Gastroesophageal reflux	Under-recognized cause of post-nasal drip, cough, and globus sensation; hoarseness or frequent throat clearing may also be present



# INVESTIGATIONS

# SKIN PRICK TEST

- Uses:
  - Dx of atopy
  - Supportive evidence for clinical history
  - Provide illustration to patient
- Positive control
- Negative control
- Positive result



# INVESTIGATIONS

- INTRADERMAL TEST
  - Allergen placed intradermally
  - More sensitive
  - More time consuming & painful
  - Risk of anaphylaxis
- Patch test
  - Read > 48 hrs
  - Erythema: 1+
  - Edema or Vesicles involve <50% of patch area: 2+
  - Edema or Vesicles involve >50% of patch area: 3+

## NASAL CYTOLOGY

- Giemsa stain
- >25% Eosinophils on nasal smear suggests allergy
- Neutrophils suggest infection
- **NASAL SWABS**
  - Bacteriology
  - Viral studies

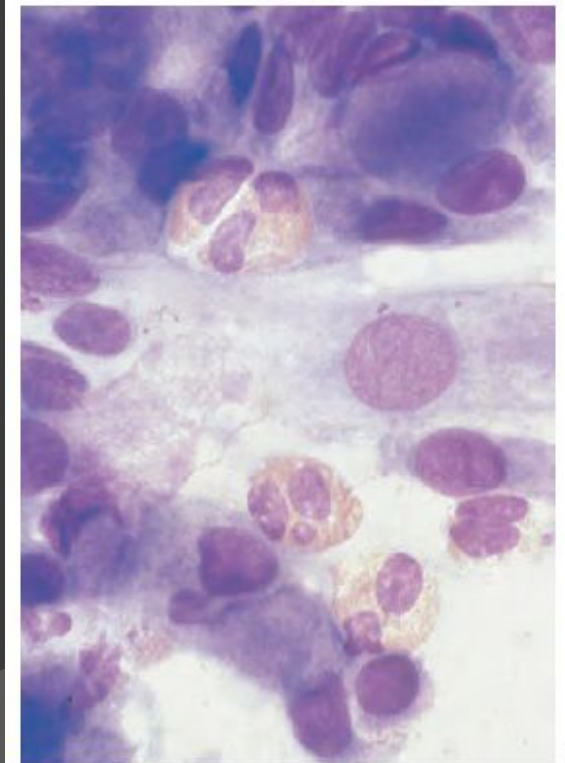
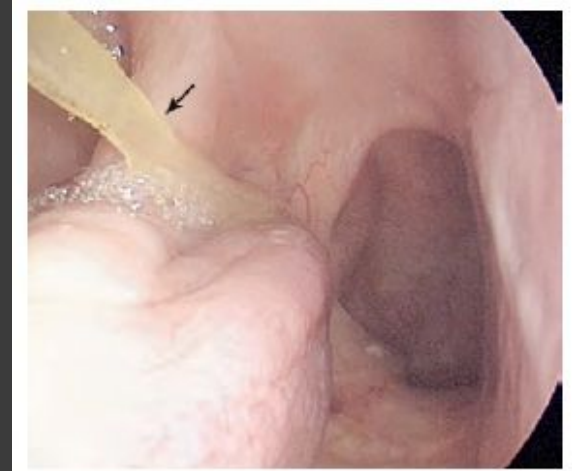


Fig. 3.10 a Yellow stained mucus due to eosinophilia (arrow).  
b A cytological smear showing eosinophils.

# Nasal allergen challenge test

- Gold standard
- Allergen introduced into nose
  - Reaction measured Vs placebo
- Prior to immunotherapy – occupational rhinitis
- Collect nasal secretions
  - Measure mediators, cytokines, eosinophils

# Specific IgE tests

- Radio-Allergo-Sorbent Test (RAST)
  - Sr reacts with series of known allergens
  - Radiolabelled anti-IgE identifies Ag-IgE complexes
- ELISA
  - Fluorescing agents: Markers of Ag-IgE complexes
  - Colour reaction → Optical densitometry

# Specific IgE tests

## ADVANTAGE

- Highly specific
- No risk of anaphylaxis
- No effect from skin conditions
- No effect from medications

## DISADVANTAGE

- Less sensitive
- Requires up to 1–2 weeks for results
- More expensive

# Other investigations

- X-ray PNS
- CT scan of PNS
- Spirometry



# SURGICAL MANAGEMENT

- Correction of anatomic variations : DNS
- Submucosal diathermy: hypertrophied turbinates
- Polypectomy
- FESS
- If associated with fungal sinusitis: antifungals following surgery must be done with liver function monitoring.

THANK YOU