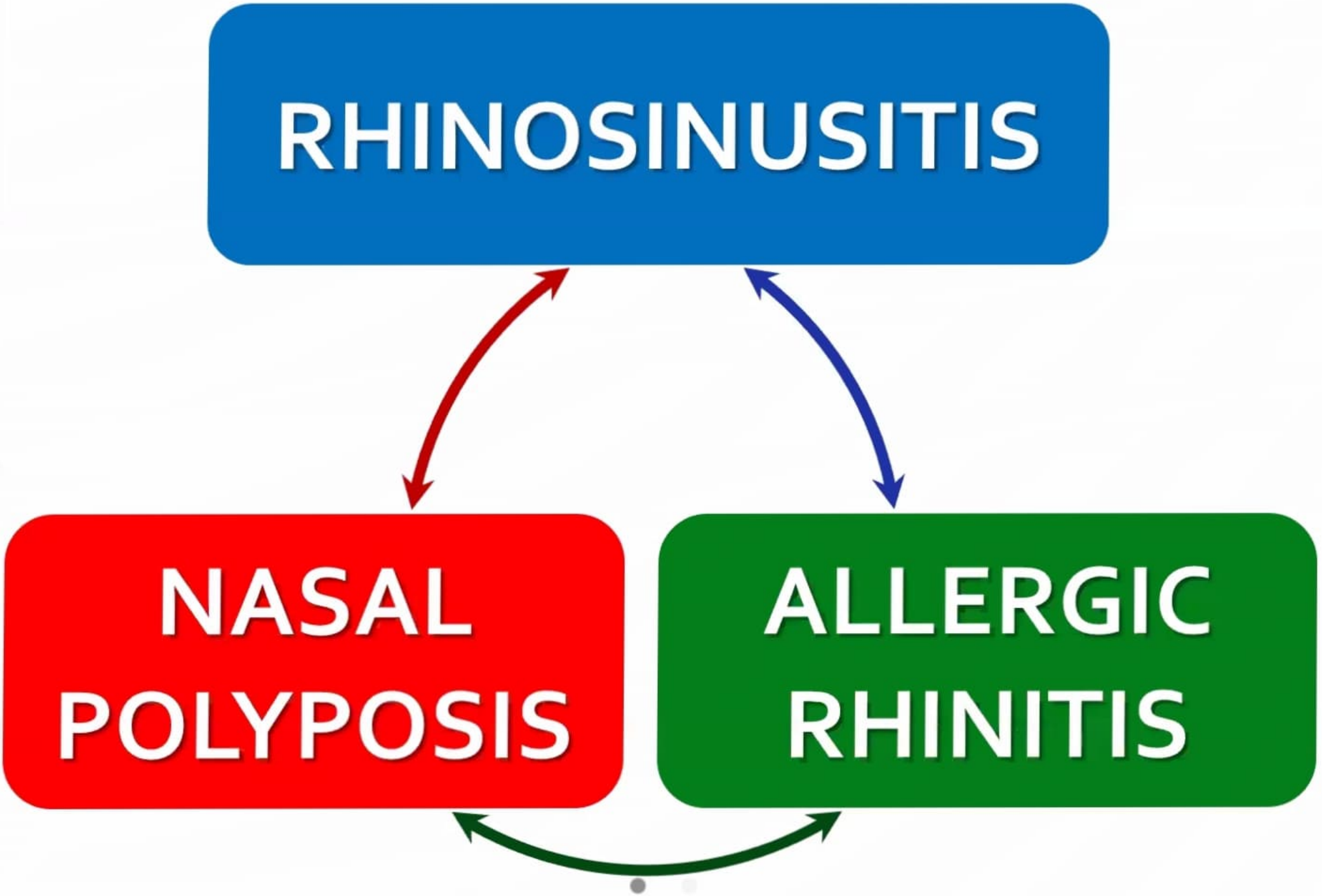
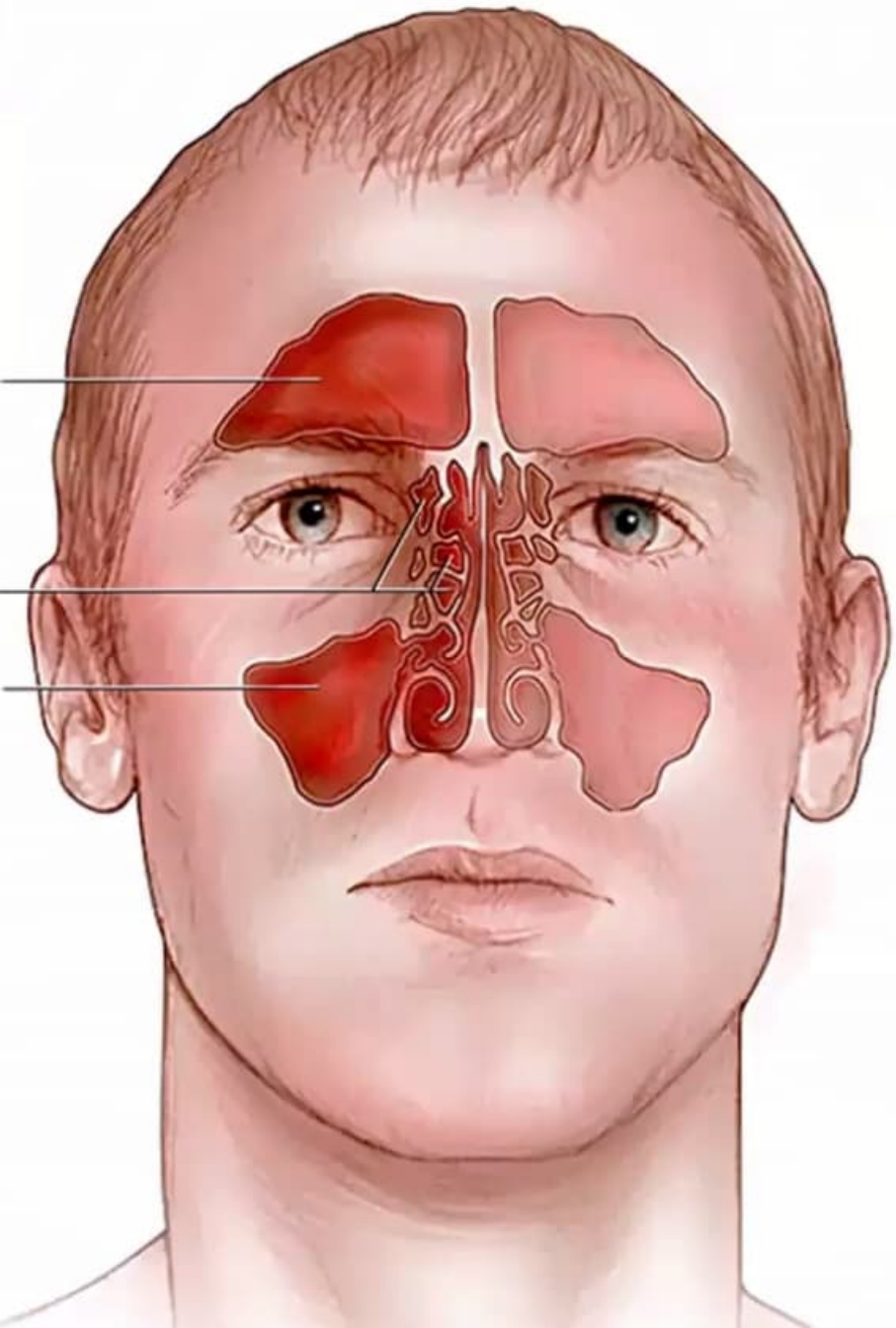
RHINOSINUSITIS


RHINOSINUSITIS
NASAL POLYPOSIS
ALLERGIC RHINITIS

Rhinosinusitis



- Inflammation of the nose and paranasal sinuses characterized by;
  - Nasal Congestion
  - Nasal discharge
  - facial pain/pressure
  - reduction or loss of smell

Classification (EPOS 2020)

- Acute Rhinosinusitis
- Recurrent Acute Rhinosinusitis
- Chronic Rhinosinusitis
  - Primary CRS
  - Secondary CRS

Clinical definition in adults

- ≥2 of the following
- Nasal obstruction/ congestion/ blockage
- Anterior rhinorrhea/ posterior nasal discharge
- ±facial pain/pressure
- ± reduction or loss of smell
- And either endoscopic signs of
  - Nasal polyps
  - Mucopurulent discharge from middle meatus
  - Oedema/ mucosal obstruction in middle meatus
- And CT changes
  - Mucosal changes within osteomeatal complex and sinuses

Clinical definition in children

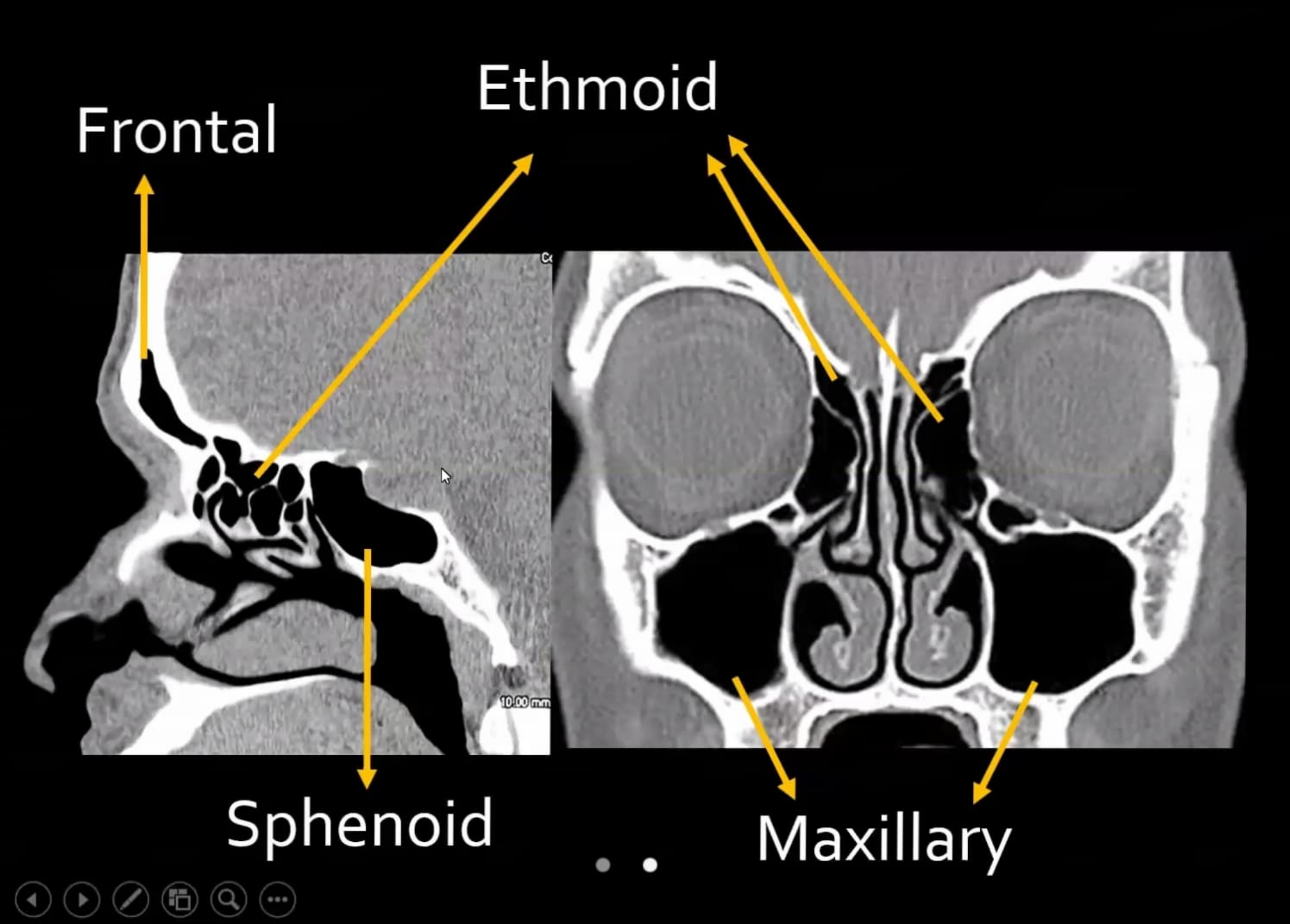
- ≥2 of the following
- Nasal obstruction/ congestion/ blockage
- Anterior rhinorrhea/ posterior nasal discharge
- ± facial pain/pressure
- ± cough
- And either endoscopic signs of
  - Nasal polyps
  - Mucopurulent discharge from middle meatus
  - Oedema/mucosal obstruction in middle meatus
- CT changes
  - Mucosal changes within osteomeatal complex and sinuses

Recurrent acute rhinosinusitis

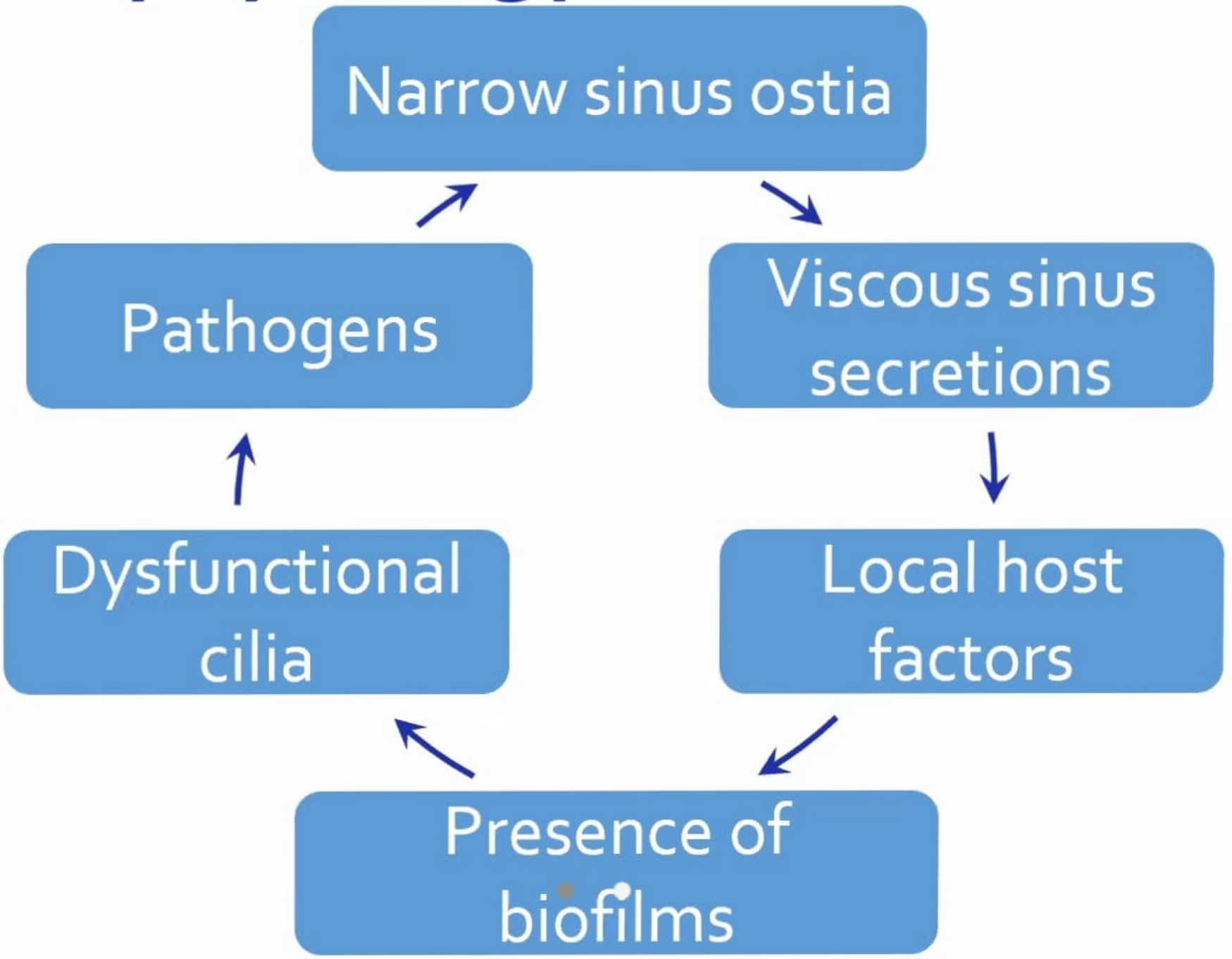
- RARS ≥ **4 episodes/year** with symptom free intervals in between

Recurrent acute rhinosinusitis

- Chronic rhinosinusitis with or without nasal polyps in adults
  - ± facial pain/ pressure
  - ± reduction or loss of smell
  - For ≥ **12 weeks**


Frontal
Ethmoid
Sphenoid
Maxillary
10.00 mm

Pathophysiology



General Predispositions

General factors

- Viral infection
- Nasal packing
- Intubation, NGT
- Dental issues
- Allergies
- Anatomical variants
- Systemic disease - DM, ISS, CF
- Smoking

Pediatric factors

- Day care
- Nasal obstruction
- Passive smoking
- Tonsillitis
- Otitis media
- Mucociliary dysfunction

General Predispositions

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Pediatric factors

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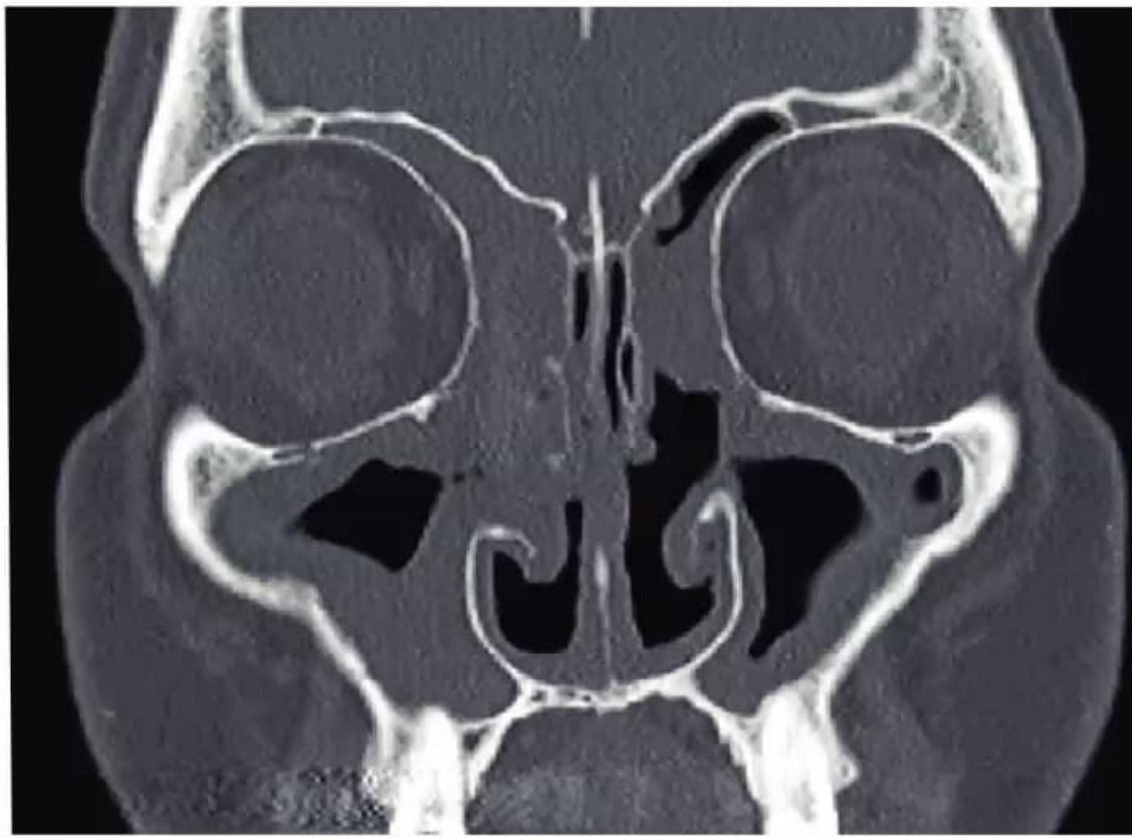
- Passive smoking
- Tonsillitis
- Otitis media
- Mucociliary dysfunction

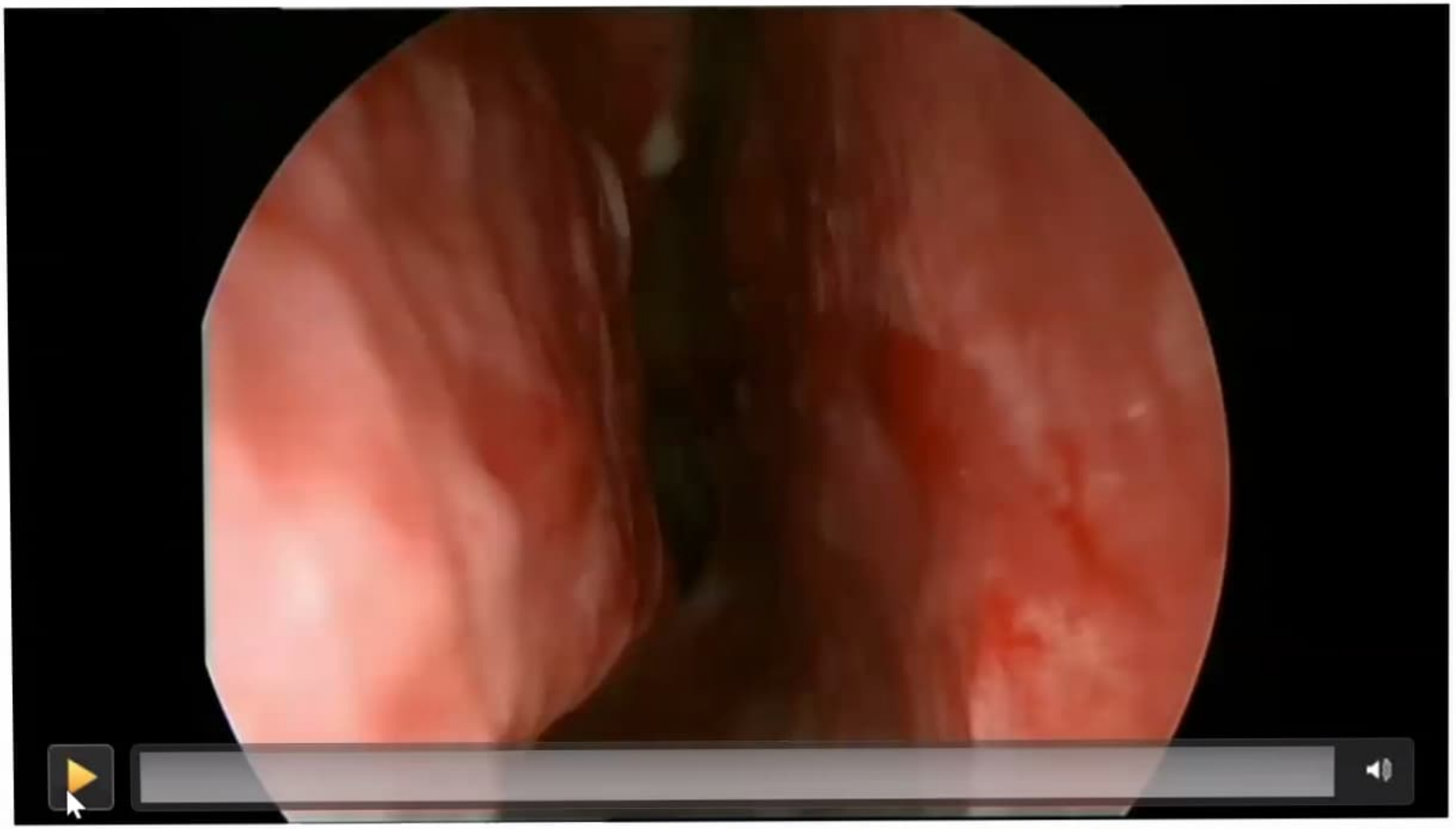
Acute viral rhinosinusitis

- Rhinoviruses, coronaviruses, and influenza viruses
- 7-10 days
- Scratchy throat, discoloured nasal discharge
- Cough
- Self limiting, **avoid antibiotics**
- Hydration, rest
- Antihistamine + decongestant + analgesic

Acute Bacterial Rhinosinusitis

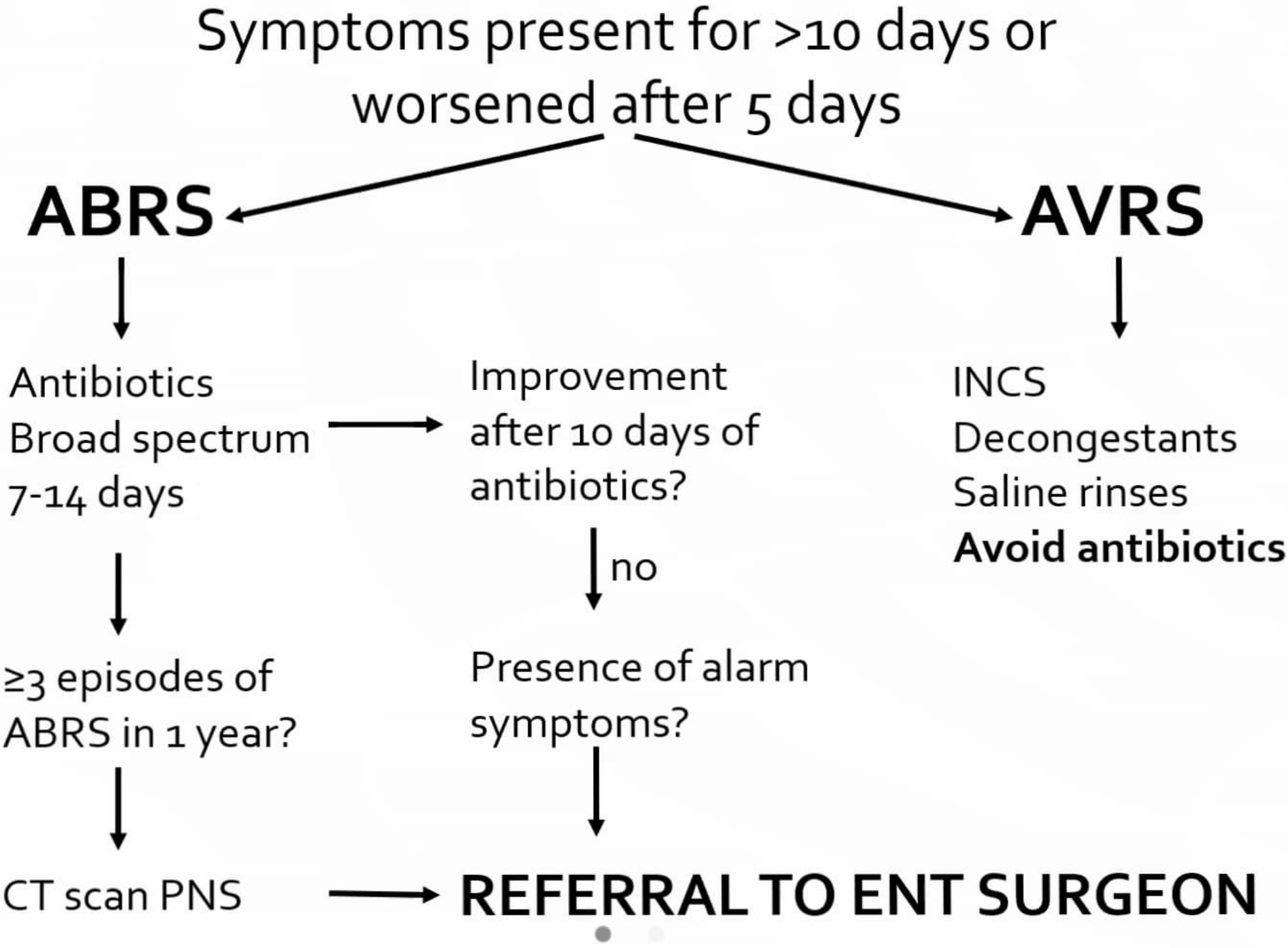
- Rhinorrhea
- Facial pain, headache
- Fever >38°C
- Raised ESR /CRP
- Double sickening
- Unilateral disease
- Raised ESR/CRP

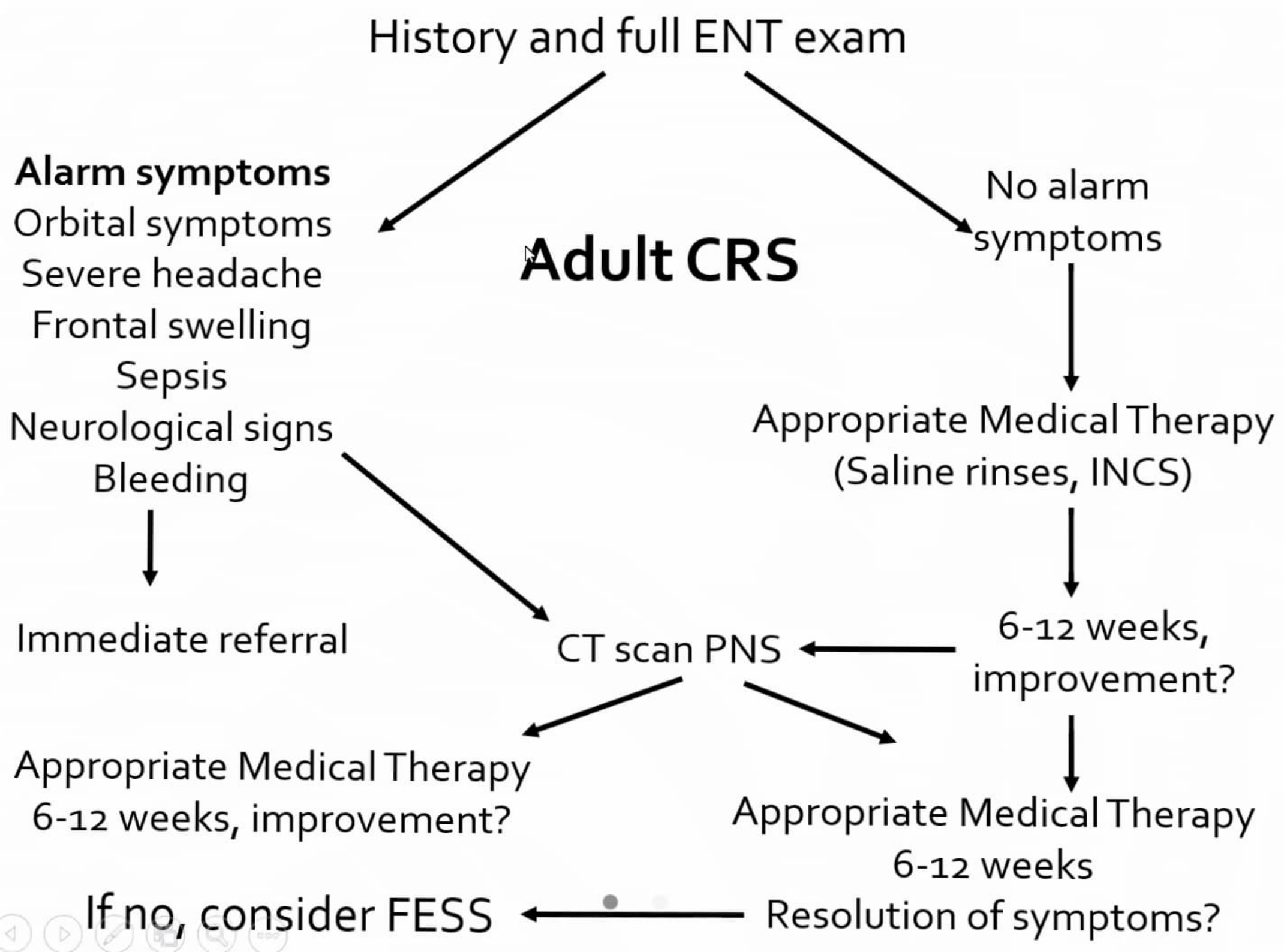




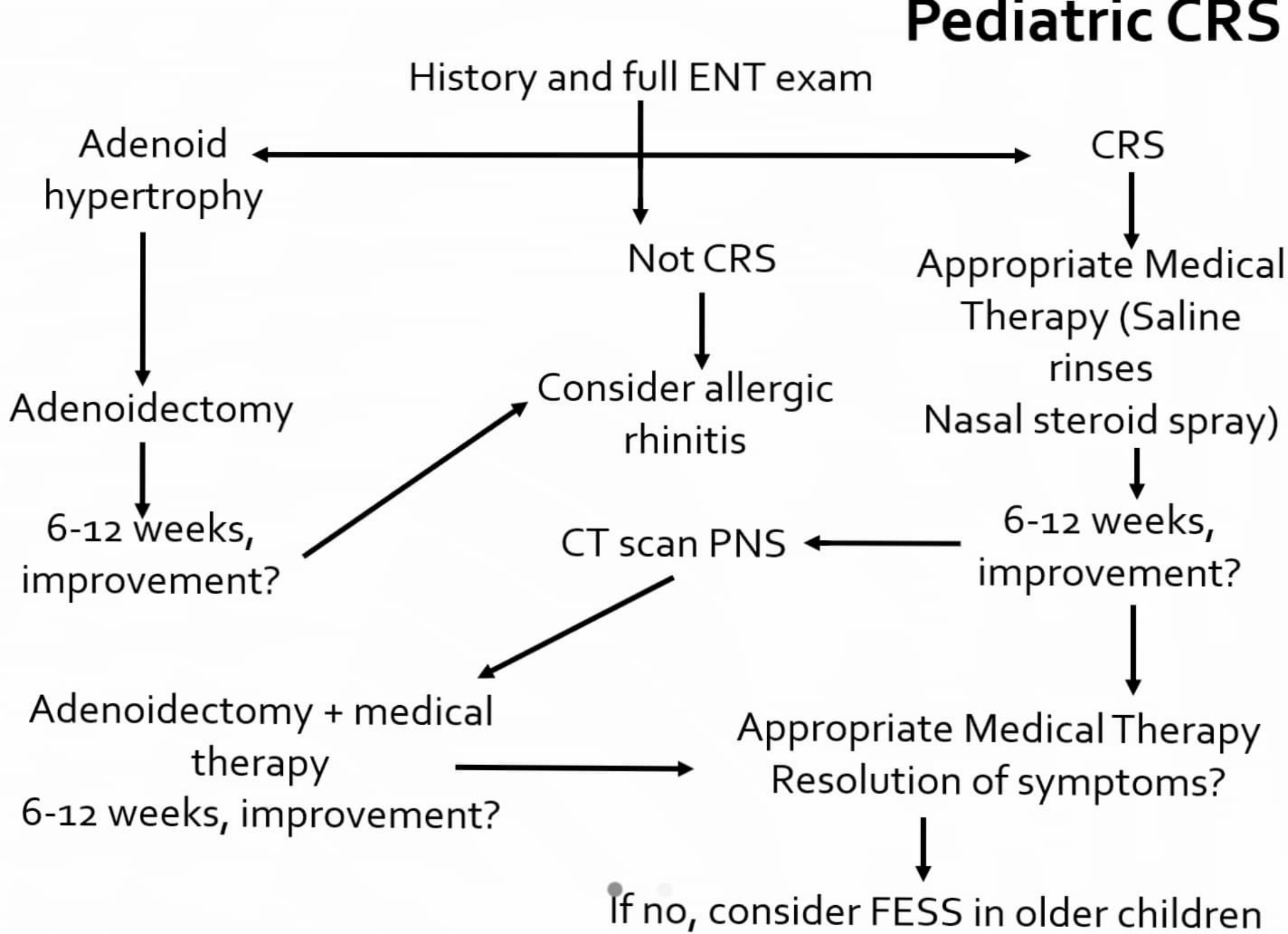
Complications of rhinosinusitis

- Orbital cellulitis.
- Subperiosteal abscess.
- Orbital abscess.
- Mastoiditis.
- Frontal or maxillary osteomyelitis.
- Subdural abscess.
- Cavernous sinus thrombosis.
- Brain abscess.
- Meningitis


Symptoms present for >10 days or worsened after 5 days
ABRS
AVRS
Antibiotics
Broad spectrum
7-14 days
Improvement after 10 days of antibiotics?
no
INCS
Decongestants
Saline rinses
Avoid antibiotics
≥3 episodes of ABRS in 1 year?
Presence of alarm symptoms?
CT scan PNS
REFERRAL TO ENT SURGEON


History and full ENT exam
Alarm symptoms
Orbital symptoms
Severe headache
Frontal swelling
Sepsis
Neurological signs
Bleeding
Adult CRS
No alarm symptoms
Appropriate Medical Therapy
(Saline rinses, INCS)
6-12 weeks, improvement?
Immediate referral
CT scan PNS
Appropriate Medical Therapy
6-12 weeks, improvement?
Appropriate Medical Therapy
6-12 weeks
Resolution of symptoms?
If no, consider FESS

Pediatric CRS



Surgery

- Patients who fail maximum medical therapy for three months or who have complications may benefit from surgery
- Adenoids are a major contributor to paediatric CRS
- Adenoidectomy recommended initially for children 6 years of age
- ESS and adenoidectomy for children >6yrs (asthmatic, high CT score)

Allergic rhinitis

- Aberrant, exaggerated immune response to an allergen
- Type I hypersensitivity reaction
- Mediated by IgE antibodies
- Triggered by allergen

- At least **2** symptoms occurring for at least **1** hour a day for at least **2** weeks in a year

Seasonal – 20%

Perennial – 40%

Itching

Sneezing

Rhinorrhea

Nasal congestion

Perennial with Seasonal exacerbations – 40%

ARIA Classification
(In Untreated Patients)

Intermittent

< 4 days per week

Or

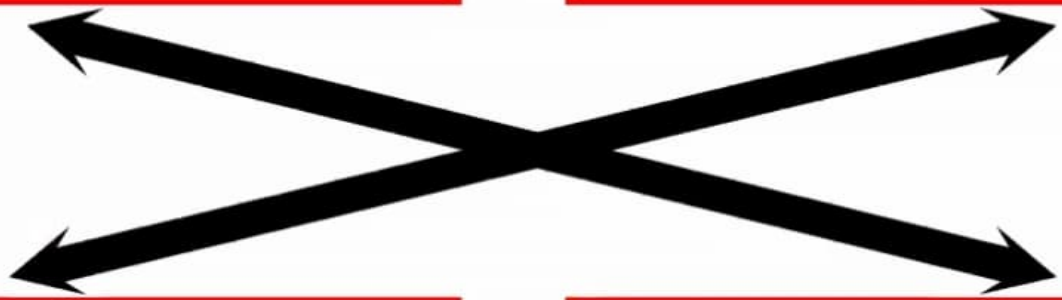
< 4 weeks

Persistent

≥ 4 days per week

And

≥ 4 weeks



Mild

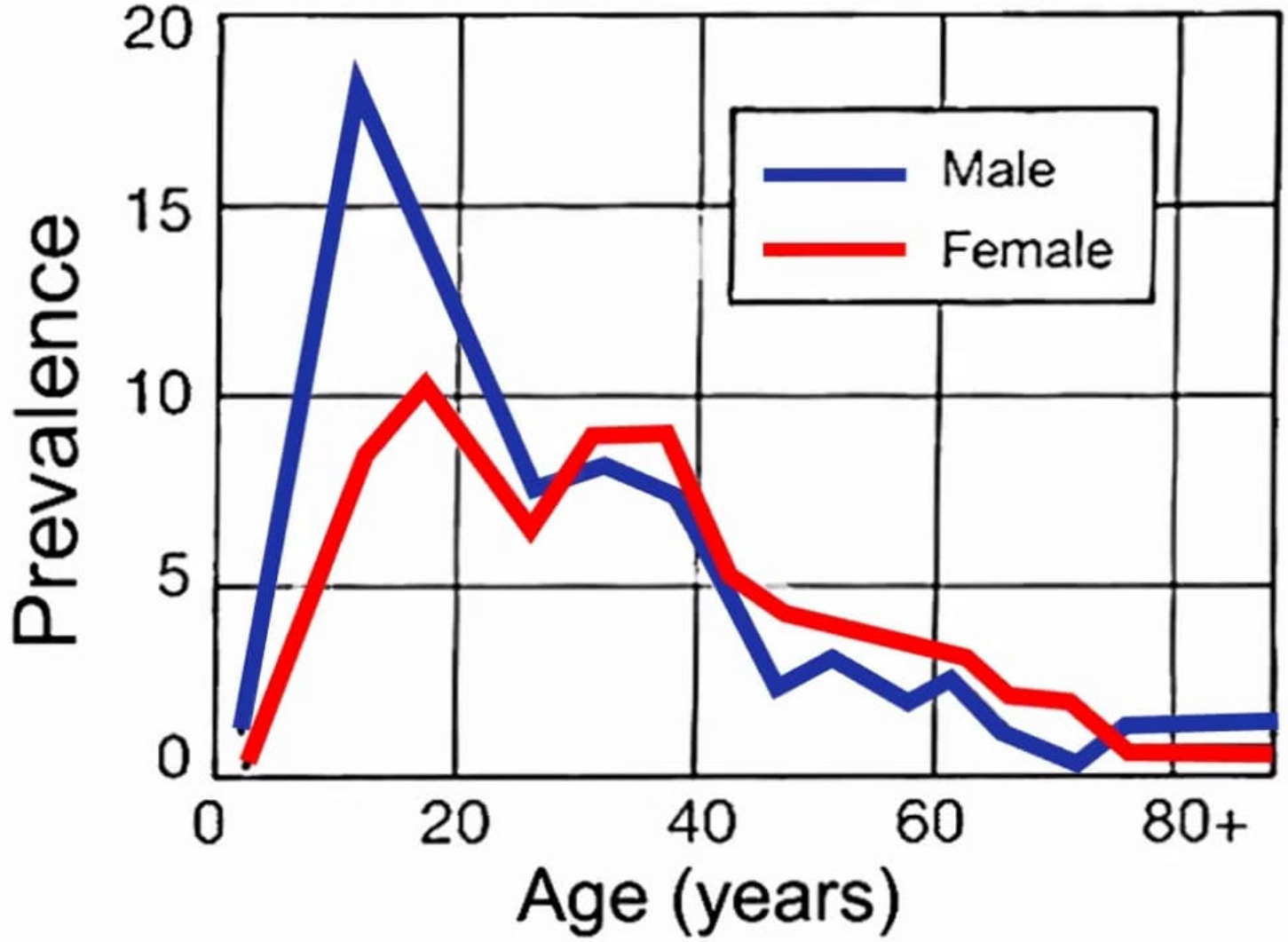
- Normal sleep
- Normal work, school
- Normal dailyactivity
- No troublesome symptoms

Moderate to severe

- Disturbed sleep
- Impaired daily activities or sports
- Problems at work/school
- Troublesome symptoms

ALLERGENS!

- **Ingested**
  - Eggs
  - Poultry
  - Milk
  - Nuts
- **Inhaled**
  - Dust Mite droppings
  - Pollen
  - Animal Dander
  - Fungal Spores
  - Wood
  - Cockroach
- **Perennial**
  - Dust Mites
  - Pets
  - Cockroaches
  - Mice
- **Seasonal**
  - Pollen



Determinants Of Allergy

Environmental

Genetic

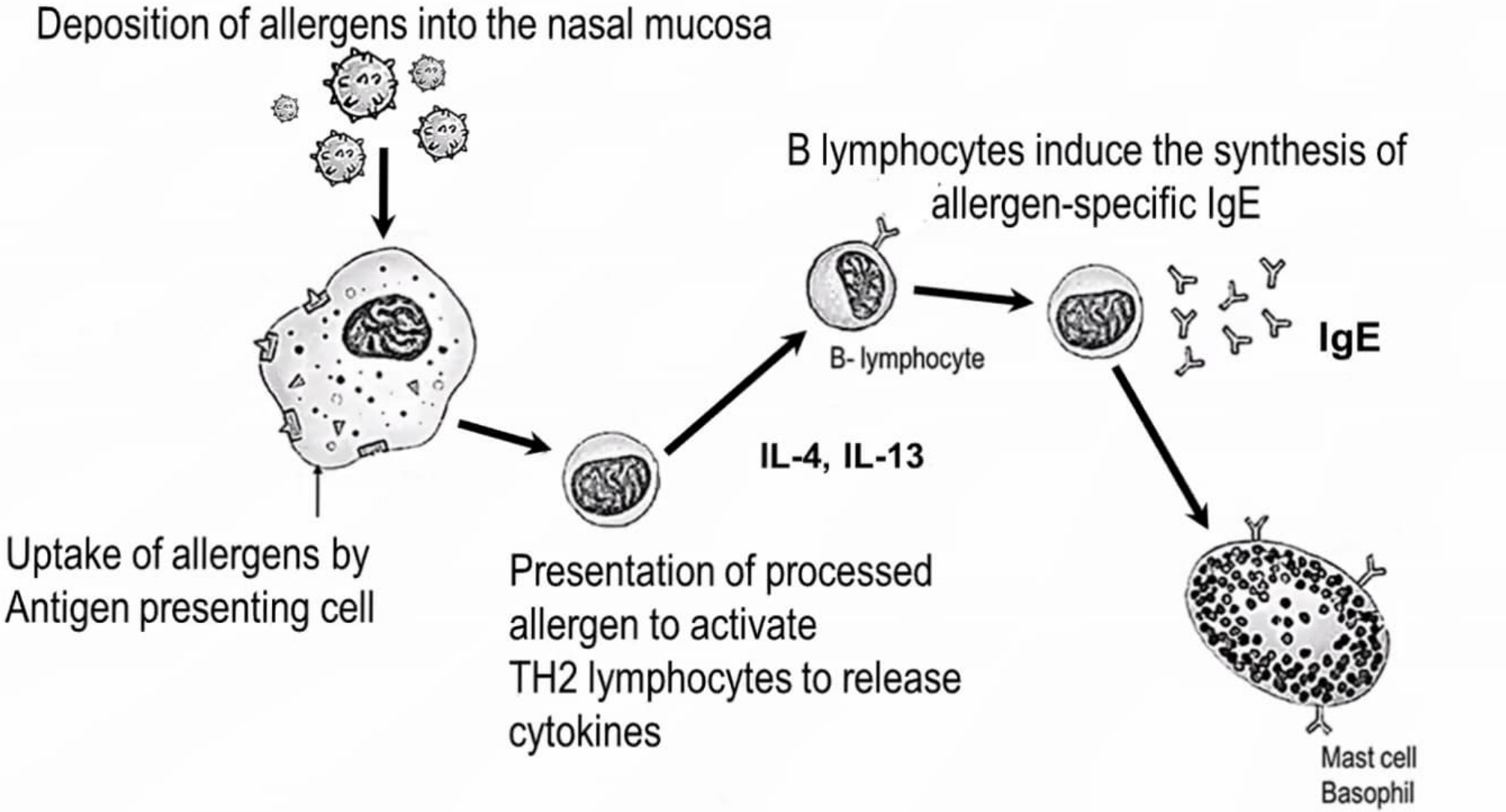
Occupational

Lifestyle related

Risk Factors For Allergic Rhinitis

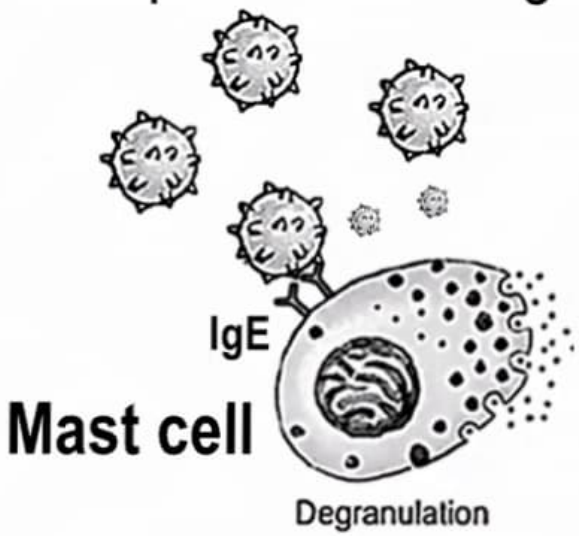
- Atopic family history
- Male gender
- Higher SES
- Firstborns
- Maternal asthma
- Early introduction of infants to formula/food
- Serum total IgE >100iu/l <6 years old
- Reduced microbial exposure in early life
- Exposure to indoor animals and dust mites
- Parental smoking in 1st year of life
- Positive allergy skin tests

Allergic reaction - Sensitization Phase



Reactive Phase

Re-exposure to allergen



EARLY PHASE

Histamines
Leukotrienes
Prostaglandins
Kinins

Histamine stimulation of H1 & H2 receptors

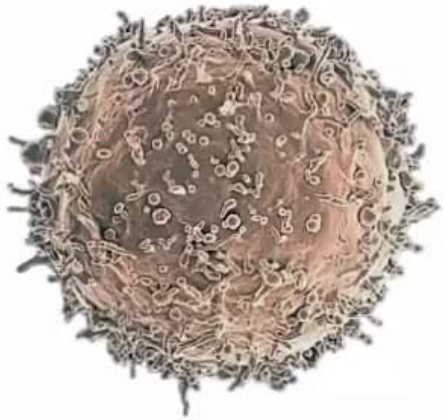
Itching, Sneezing,
Oedema, Rhinorrhea

LATE PHASE

Prostaglandins
Cytokines

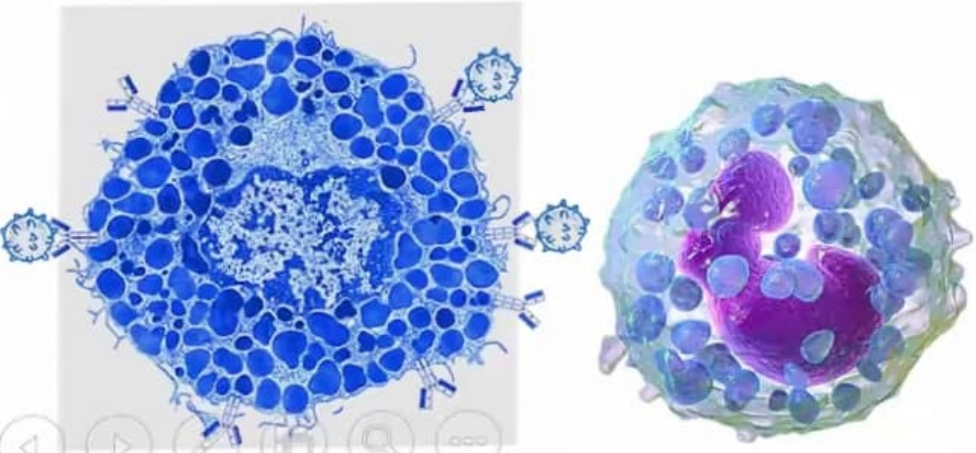
Inflammatory cells

Reactive Phase



Early Reactive Phase

- Occurs within seconds or minutes of exposure
- Allergen contacts IgE on mast cell surface
- Release of mediators
- Rhinorrhea, itch, congestion and sneezing



Late Reactive phase

- 50% of patients progress to late phase
- Occurs 3-8 hours later
- Mediators released from mast cells and T cells
- Eosinophils, neutrophils, lymphocytes and basophils migrate into tissues
- *Priming* - increased sensitivity to allergens and irritants
- Minimal persistent inflammation

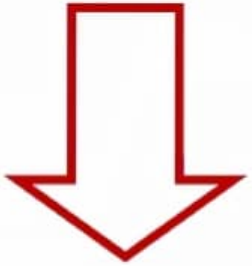
Pathophysiology

Mediators Of Inflammation

Vasodilatation, Mucus Production
Oedema, Neural Stimulation

Profuse Watery Rhinorrhea
Sneezing, Itching

Late phase mediators &
ongoing inflammation



Persistent nasal congestion

Posterior mucous discharge

Obstruction of sinus meatus

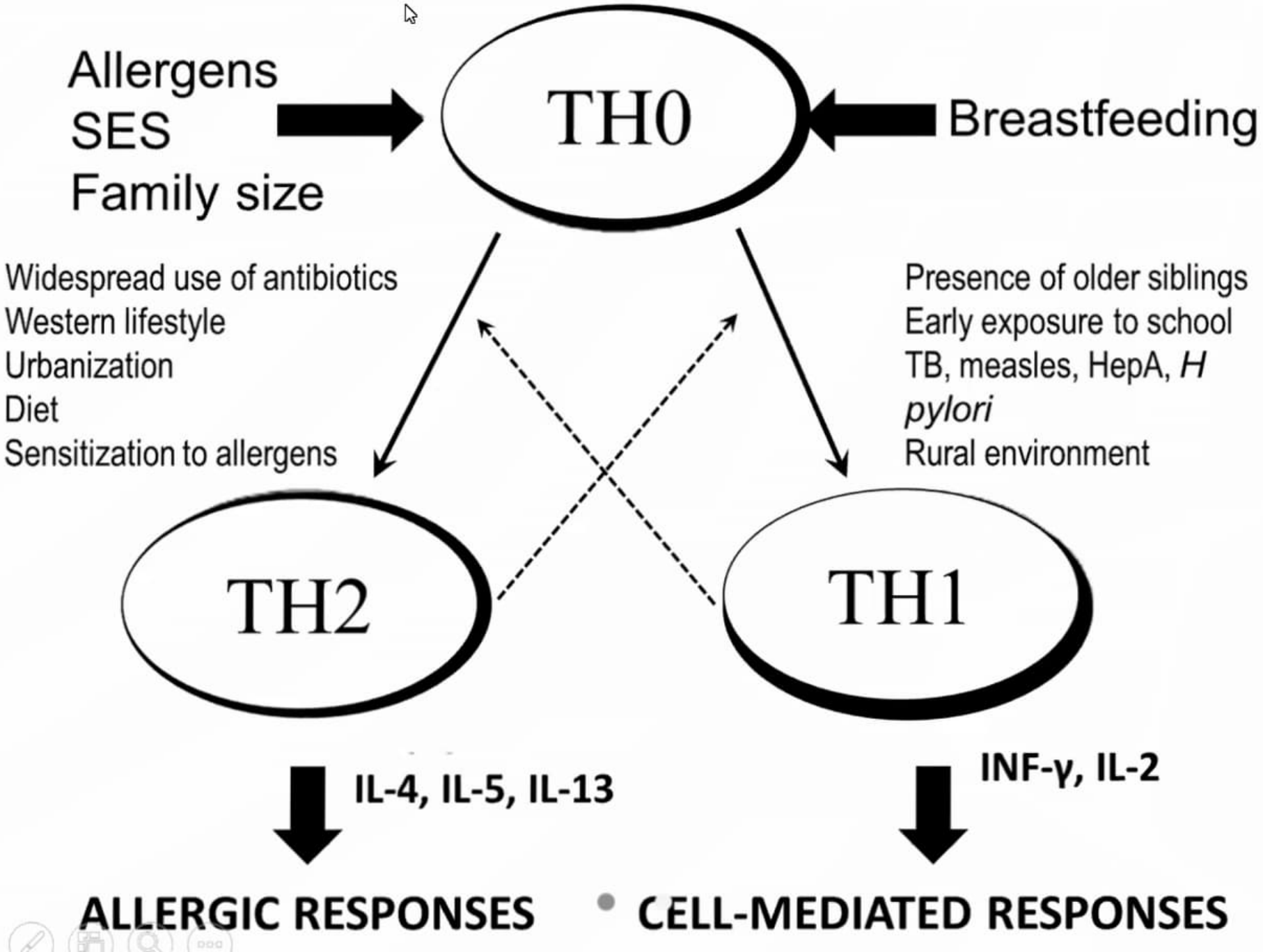
Mucosal hypertrophy

"RUNNERS" **BLOCKERS"**

Allergic rhinitis

- **The "one airway" hypothesis**
  - Upper airway inflammation results in lower airway inflammation
- **Allergy Gene - IL-4**
  - ↑TH_2, ↑ TH_2:TH_1 Lymphocytes
  - Up-regulates IgE receptors on B lymphocytes, Mast cells, Basophils, Mononuclear phagocytic cells

Hygiene Hypothesis



History

- Nature and duration of symptoms
- Time course
- Triggers
- Response to medications
- Comorbid conditions
- Family history of allergic diseases
- Environmental, occupational exposures
- Effects on quality of life

Clinical presentation

Comorbid states

1. Asthma (20%)
2. Atopic dermatitis (eczema)
3. Atopic rhinoconjuctivitis
4. NAR – hypothyroidism, sarcoidosis

Complications

1. Rhinosinusitis
2. Otitis media
3. OSA
4. Dental and palatal abnormalities
5. Nasal polyposis

General	Malaise, fatigue, headache, Drowsiness
Eyes	Allergic shiners, Conjunctivitis, Tearing, pruritus, swelling
Ears	Air fluid levels, otalgia
Nose	Purulent rhinorrhea, epistaxis, deviated nasal septum, polyps, hypertrophied inferior turbinates, sneezing, itching, rhinorrhea, postnasal drip, congestion, anosmia
Mouth	Enlarged tonsils, postnasal discharge, mouth breathing
Neck	Lymphadenopathy
Chest	Wheeze, rhonchi
Skin	Atopic dermatitis

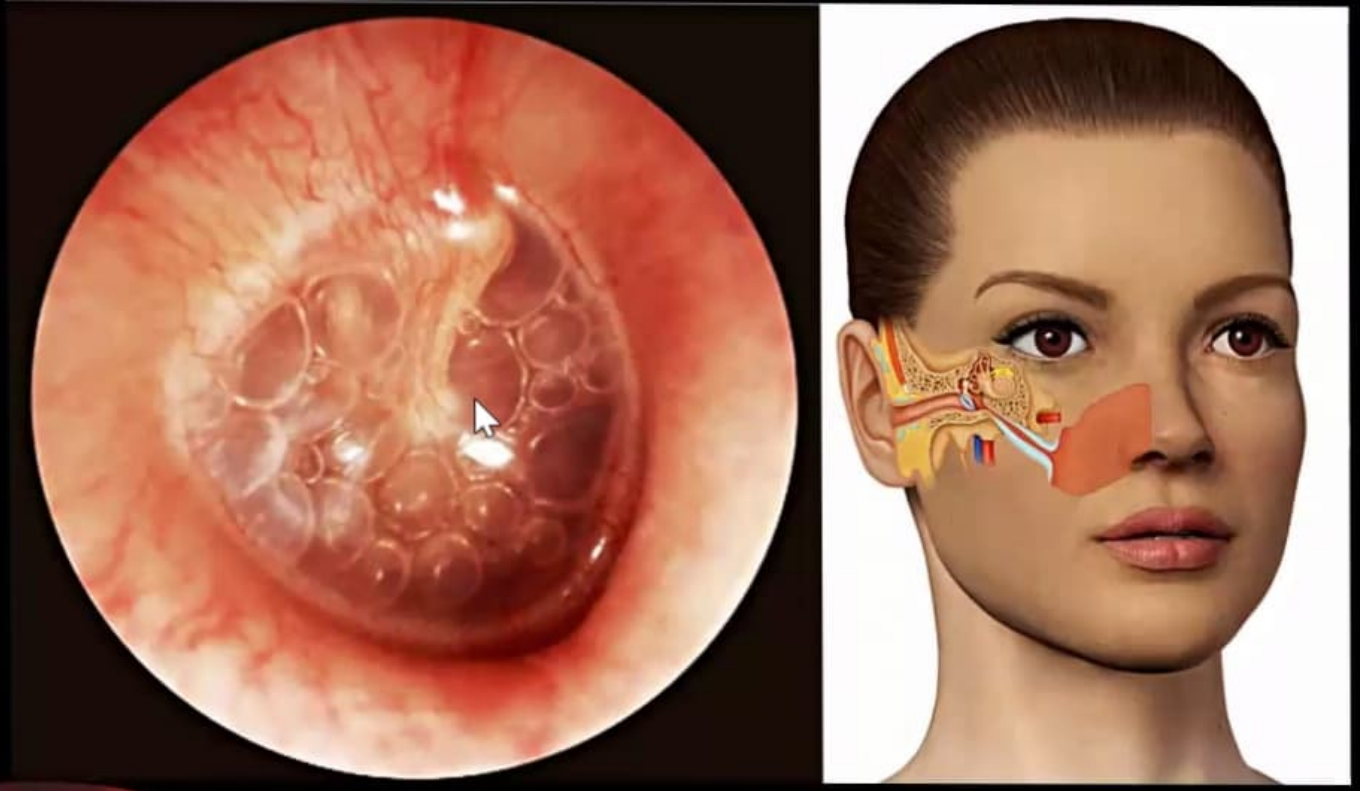
Allergic salute

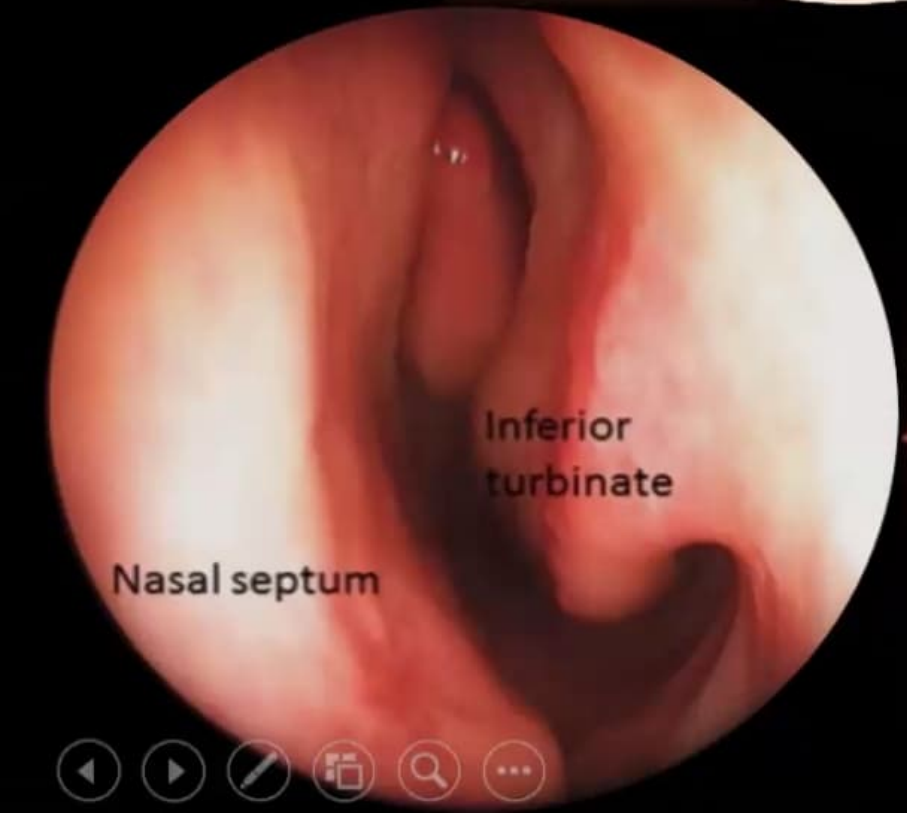
Allergic shiners

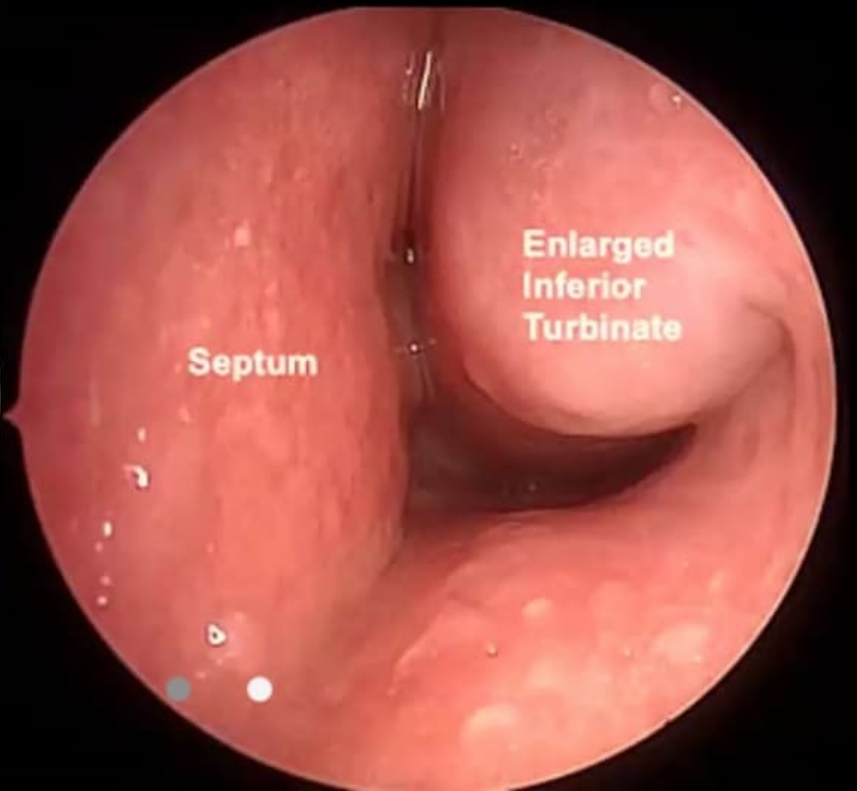
Nasal crease

- Dennie morgan lines




Inferior
turbinate
Nasal septum


Enlarged
Inferior
Turbinate
Septum

Diagnosis

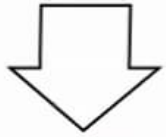
- In-vitro tests
  - Radio-allergosorbent test (Rast)
  - ELIZA
  - Serum IgE
- In-vivo tests:
  - Skin prick tests
  - Nasal provocation tests

THERAPY OVERVIEW

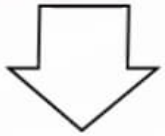
1. Prevention of sensitization
2. Prevention of IgE-allergen interaction
3. Prevention of mast cell mediator release
4. Blockade of mediator-receptor interaction
5. Suppression of resultant inflammation

Management of Allergic Rhinitis

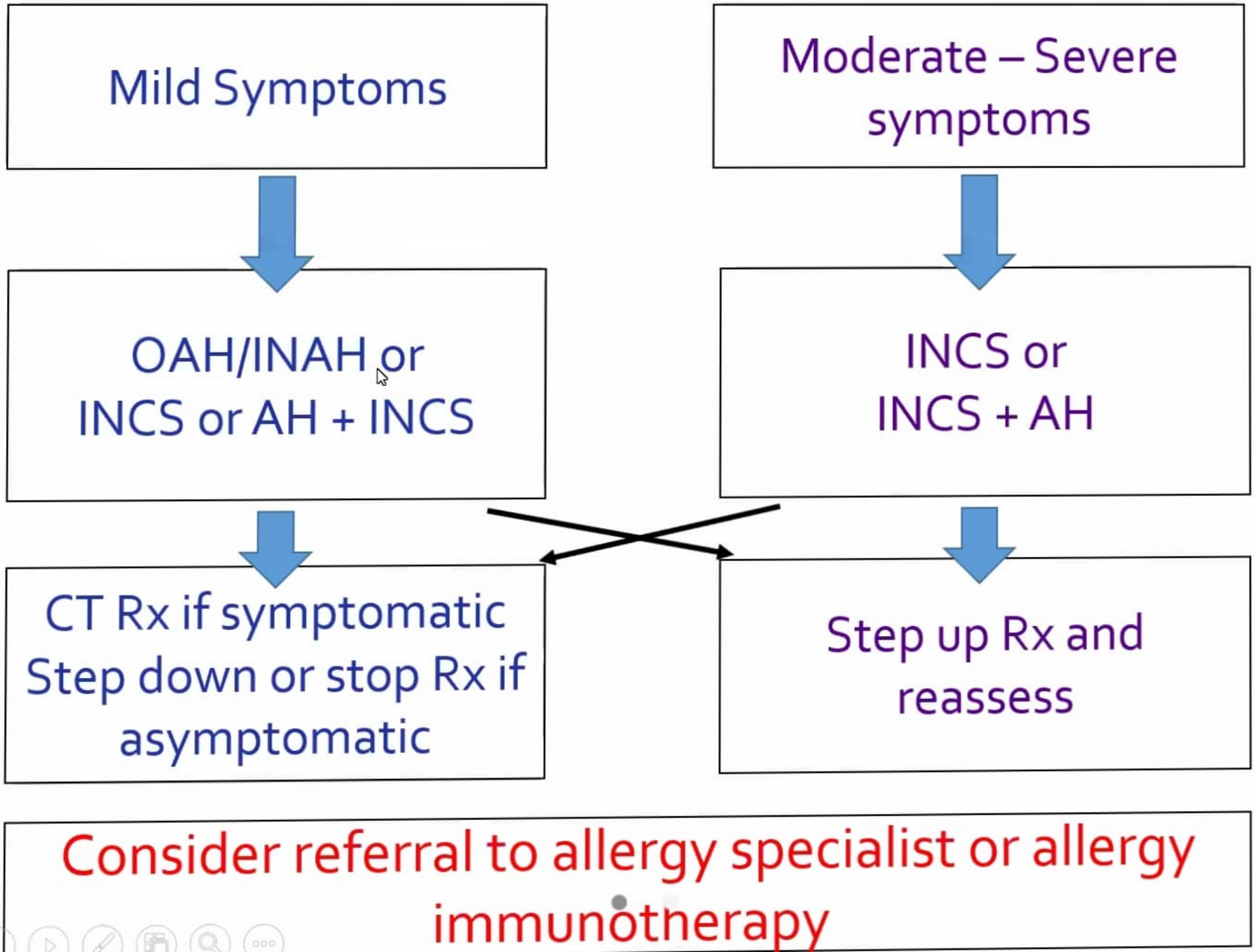
Allergen Avoidance

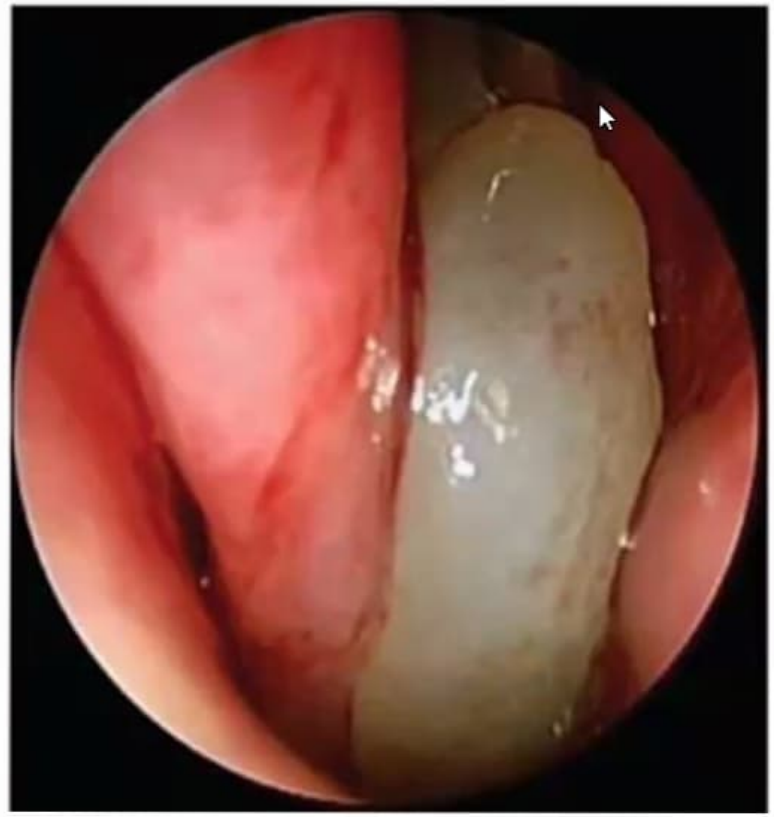


Pharmacotherapy



Immunotherapy


Mild Symptoms
Moderate – Severe symptoms
OAH/INAH or
INCS or AH + INCS
INCS or
INCS + AH
CT Rx if symptomatic
Step down or stop Rx if asymptomatic
Step up Rx and reassess
Consider referral to allergy specialist or allergy immunotherapy



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D

NASAL POLYPOSIS

Nasal Polyposis

- 'Bags' of semi translucent oedematous mucosa
- Usually arise from the ethmoid sinus, middle meatus
- Very rare in children except with cystic fibrosis
- NAR > AR or asthma

Epidemiology

- Incidence in adults > children
- Male to female ratio is 3:1 in adults
- ↑prevalence in asthma
- ↑ Incidence with age peaking at >40 yrs
- R/O cystic fibrosis in children <10 years
- Ethmoidal polyps - middle-aged patients
- Antrochoanal polyps - younger patients
- In upto 2/3 of patients with cystic fibrosis.

Types

1. Nasal polyps
2. Antrochoanal polyps
3. Neoplastic polyps
4. Miscellaneous polyps

Pathophysiology

- Precise mechanism incompletely understood.
- Numerous pathogenic theories
  - Final manifestation of chronic inflammatory disease
  - Autonomic nervous system dysfunction
  - Genetic predisposition
  - Allergic verses non-allergic causes
- B-cell stimulation - specific IgE to the *S. aureus* enterotoxin
- Autonomic dysfunction of nasal mucosal blood vessels

Stammberger Classification

I. Antrochoanal polyp
II. Large isolated polyps
III. Polyps associated with CRS, non-eosinophil dominated
IV. Polyps associated with CRS, eosinophil dominated
V. Polyps associated with specific disease (CF, fungal ball, malignancy)

Factors predisposing to nasal polyps

- Chronic sinonasal infection
- GABHS, S. aureus, S. pneumoniae, H. influenzae
- Mainly neutrophillic infiltration > eosinophillic
- Allergy – mainly eosinophilic infiltration*
- Aspirin hypersensitivity
- Cystic fibrosis
- Nasal mastocytosis

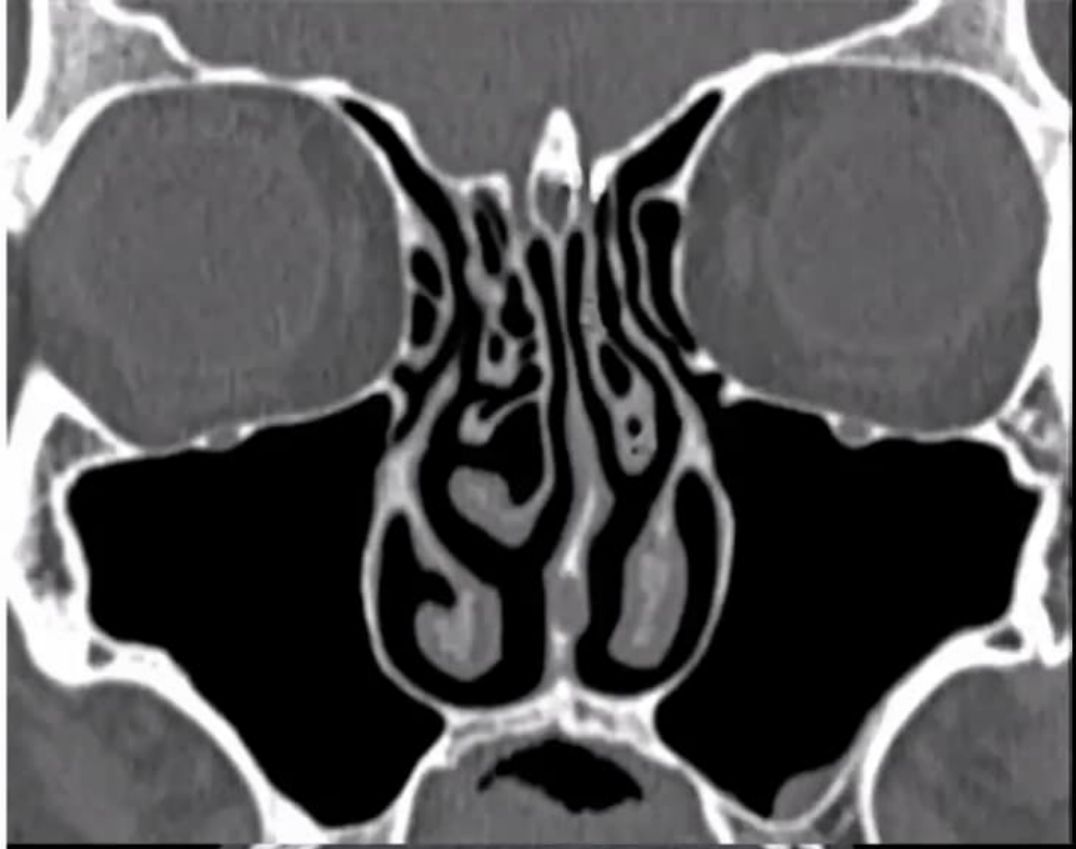
DISEASE	Frequency of NP%
Allergic rhinitis in children	0.1
Allergic rhinitis in adults	1.5
Non-allergic rhinitis	5
Allergic Asthma in adults	5
Non-allergic Asthma in adults	13
NSAID intolerance	36-72
NSAID intolerance and asthma	80
Allergic fungal rhinosinusitis	>80
Churg-strauss syndrome	50
Cystic fibrosis in children	10
Cystic fibrosis in adults	40
Primary ciliary dyskinesia	40

History

1. Asymptomatic – small polyps
2. Airway obstruction
3. Obstructive sleep apnoea
4. Postnasal drip
5. Dull headaches or facial pain
6. Snoring
7. Rhinorhoea
8. Hyposmia / Anosmia
9. Craniofacial abnormalities
10. Optic nerve compression

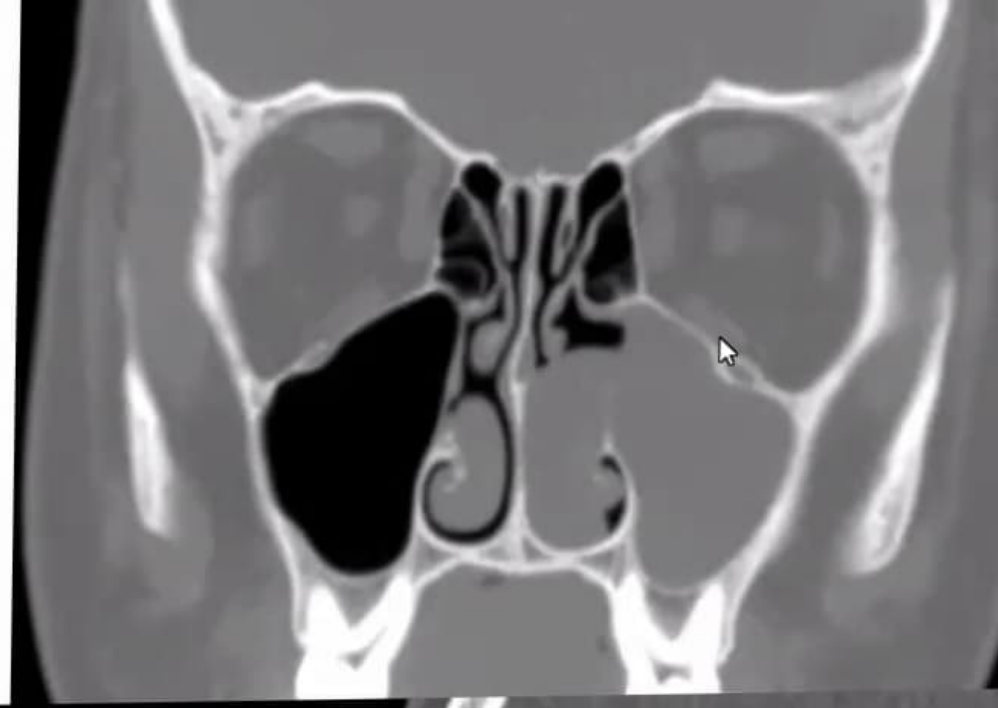
Clinical examination

- ENT examination
- Rigid nasal endoscopy
- Otoscopy
- Radiology



Imaging Studies

- Coronal sinus CT
  - Gold standard

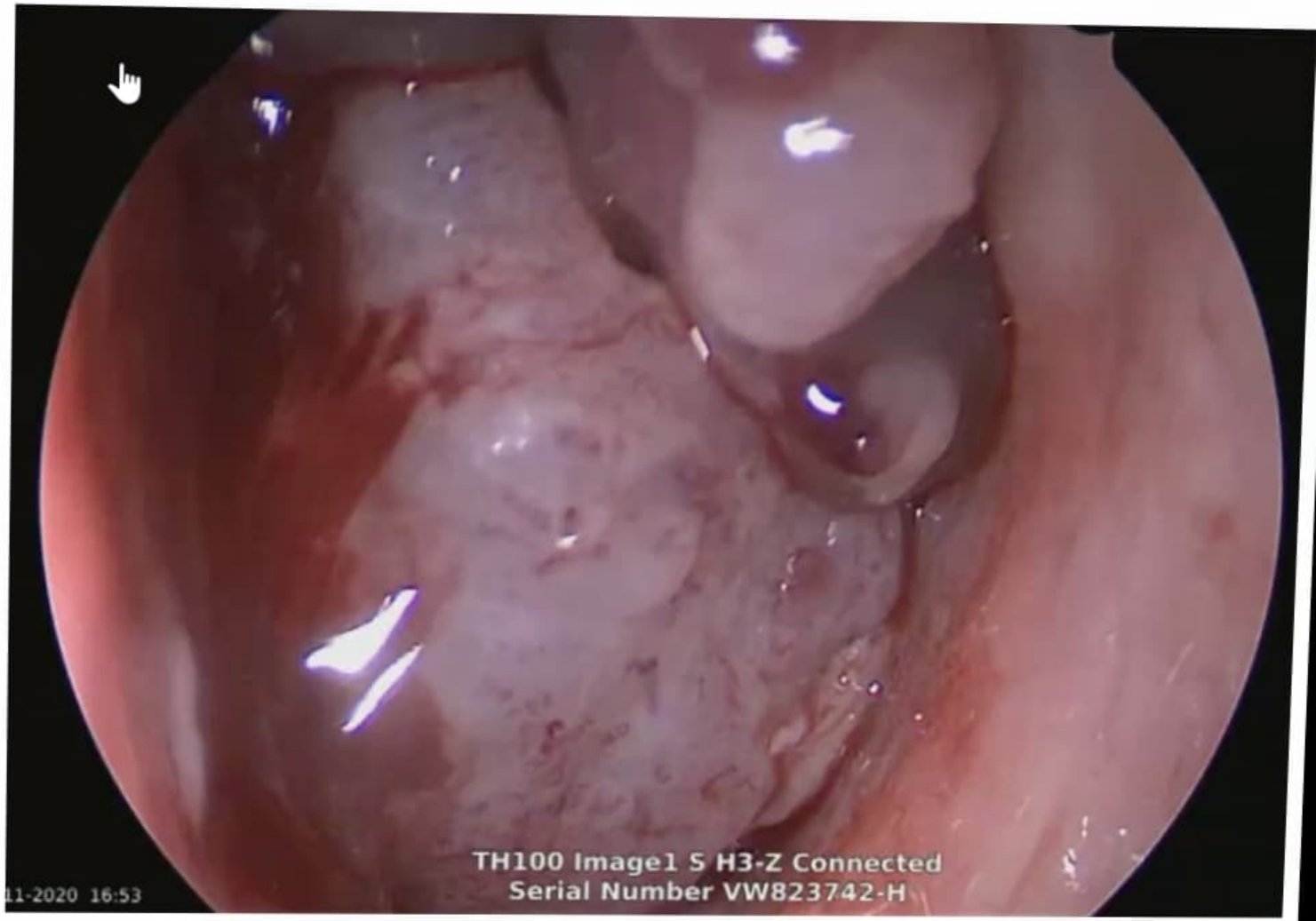


Endoscopic Staging Of Nasal Polyposis

Endoscopic appearance	Score
No polyps	0
Restricted to middle meatus	1
Below middle turbinate	2
Massive polyposis	3

Differential diagnosis

- Encephalocoeles,
- Gliomas
- Dermoid tumours
- Haemangiomas
- Lymphomas
- Mesenchymal malignancies
- Nasopharyngeal carcinomas
- Juvenile nasopharyngeal angiofibroma



Treatment

- Management of allergies no effect on polyps
- Intranasal steroid sprays - small intranasal polyps
- Oral corticosteroids - most effective short-term treatment
- Macrolides antibiotics
- Endoscopic sinus surgery and polypectomy
- Recurrence

Complications

- Recurrent sinusitis
- Chronic sinusitis
- Nasal deformity
- Proptosis, Diplopia
- Meningitis
- Encephalitis