Non Allergic Rhinitis

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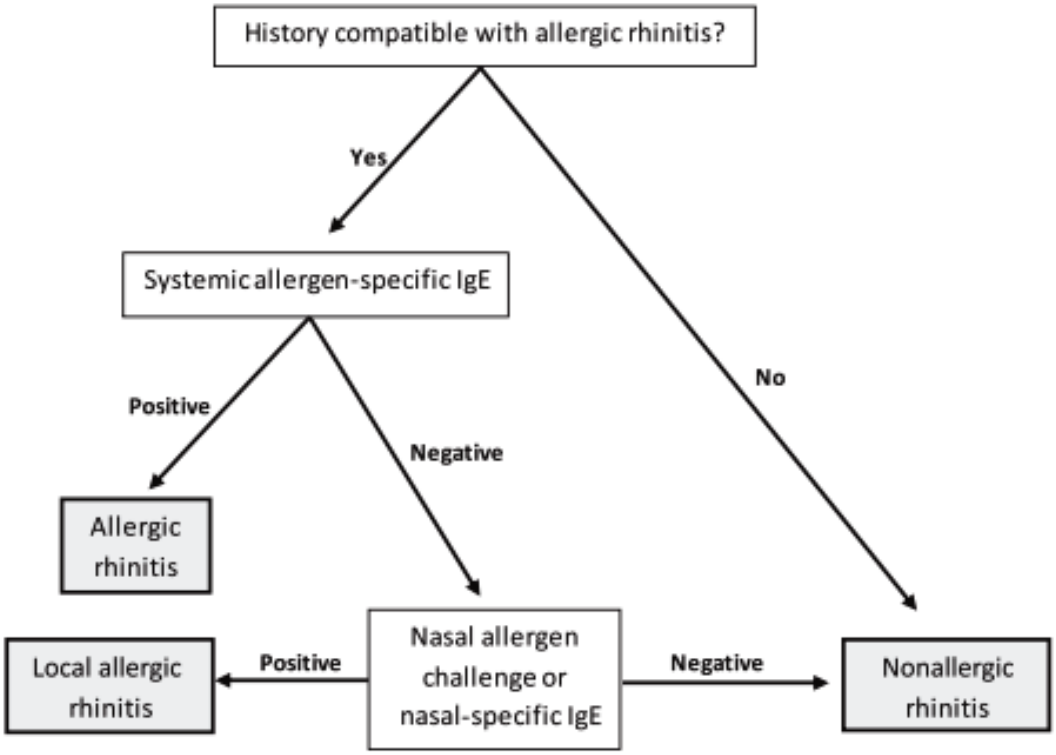
Noninfectious nonallergic rhinitis (NAR) is a heterogeneous group of nasal conditions in which the diagnosis requires negative systemic IgE testing (negative SPT andRAST tests)

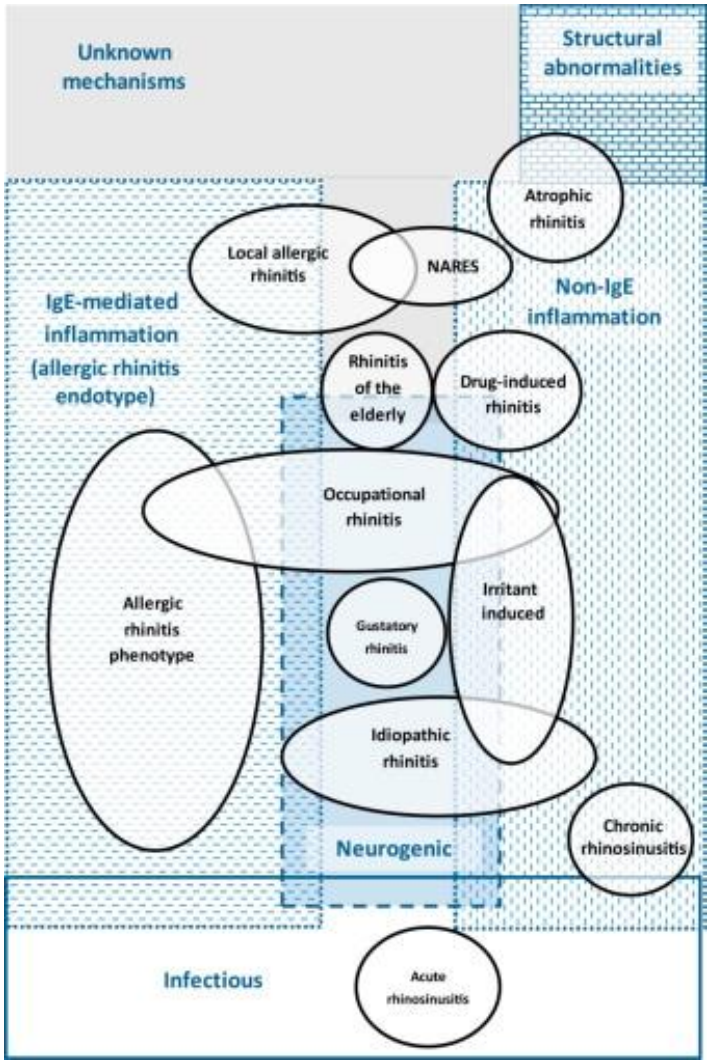
The term nonallergic rhinitis encompasses many nasologic entities that do not fit to a single pathophysiologic model

Algorithm for allergic rhinitis ,local allergic rhinitis and non allergic rhinitis



Non-allergic rhinitis classification

- Idiopathic
- Non allergic with eosinophilia
- Medication-related
- Hormonal
- Senile rhinitis or rhinitis of the elderly
- Gustatory
- systemic disease
- Atrophic



Idiopathic rhinitis
(vasomotor rhinitis or Non-allergic rhinopathy)

- The most common type of NAR(approximately 71% of non-allergic rhinitis, with a worldwide prevalence of 320-million people)
- primarily found in adults
- Female-to-male ratio :2:1 to 3:1
- Typically **not associated with nasal eosinophilia**
- **generally presents with profuse watery rhinorrhoea, particularly in the morning**
- Nasal congestion, postnasal drip, throat clearing, cough, Eustachian tube dysfunction, sneezing, hyposmia, and facial pressure/headache may also be present
- Symptoms may be perennial, persistent, or seasonal, ***and are typically elicited by defined triggers, such as cold air, climate changes (ie, temperature, humidity, barometric pressure), strong smells, tobacco smoke, changes in sexual hormone levels, environmental pollutants, physical exercise, and alcohol***

Idiopathic rhinitis(IR), Phatophysioloy,Diagnosis&Treatment

- ***Neurosensory abnormalities are thought to play a crucial role***
  - Tachykinin release with Nonspecific irritants and alcoho →inhibition of sympathetic mediators,→ enhancing the parasympathetic response.
  - Some forms of IR may be disorders of the nonadrenergic noncholinergic (NANC) or peptidergic neural system.
- **Diagnosis**
  - **Usually made following exclusion of AR**
  - On physical exam, the nasal mucosa usually appears normal, but may showsigns of erythema and clear rhinorrhea

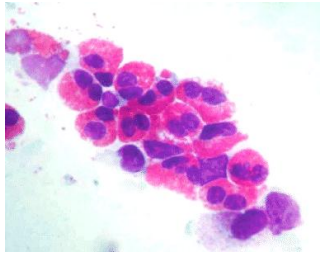
- Patients with a predominant symptom of rhinorrhea will often respond to treatment with **intranasal anticholinergics such as ipratropium bromide (IPB)**

Non-Allergic Rhinitis with Eosinophilia syndrome (NARES)

- NARES is an inflammatory rhinitis with the presence of eosinophils on nasal smear, without evidence of an allergy or other nasal pathologies
- In addition to eosinophilia, histology may demonstrate elevated levels of mast cells& lymphocytes
- NARES usually occurs in isolation but may be associated with aspirin-exacerbated respiratory disease (AERD), characterized by asthma, nasal polyps, and NSAID intolerance.
- NARES has also been identified as a risk factor for the induction or augmentation of obstructive sleep apnea (OSA)
- Patients experience perenial symptoms including rhinorrhoea, sneezing, nasal pruritis, hyposmia and often bronchial hyperreactivity

A prominent feature not shared with AR is anosmia

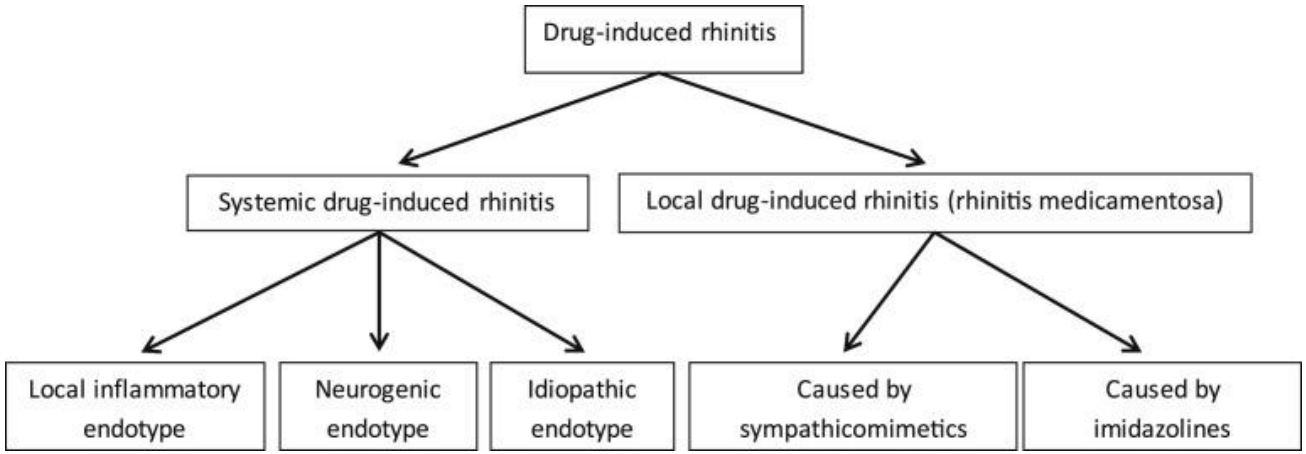
NARES *Diagnosis&*Treatment



- ***Diagnosis***
- Careful history
- Pale, boggy turbinates, like those found in PAR patients
- Negative skin or in vitro allergy testing
- Prominent eosinophilia, usually 10% to 20%on nasal smear, with a diagnostic criterion of more than 25% eosinophilia
- Increased numbers of mast cells and prominent mast cell degranulation in nasal biopsies

- **Treatment**
- Often respond well to anti-inflammatory treatment with topical INCs and/or topical antihistamine nasal spray.
- Patients with the ‘aspirin triad, an aspirin challenge will confirm the diagnosis, and they may also benefit from aspirin desensitisation where a challenge is positive

Drug-Induced Rhinitis



There are two groups of nasal decongestants responsible for this condition:

I. **Sympathomimetic amines (caffeine, Benzedrine, amphetamine, mescaline, phenylpropanolamine, pseudoephedrine, phenylephrine, and ephedrine)**

II. **Imidazolines (oxymetazoline, naphazoline, xylometazoline and clonidine)**

- ***Apart from nasal decongestants, rhinitis medicamentosa may also be caused by cocaine***

Medications causative or contributory to drug-induced rhinitis

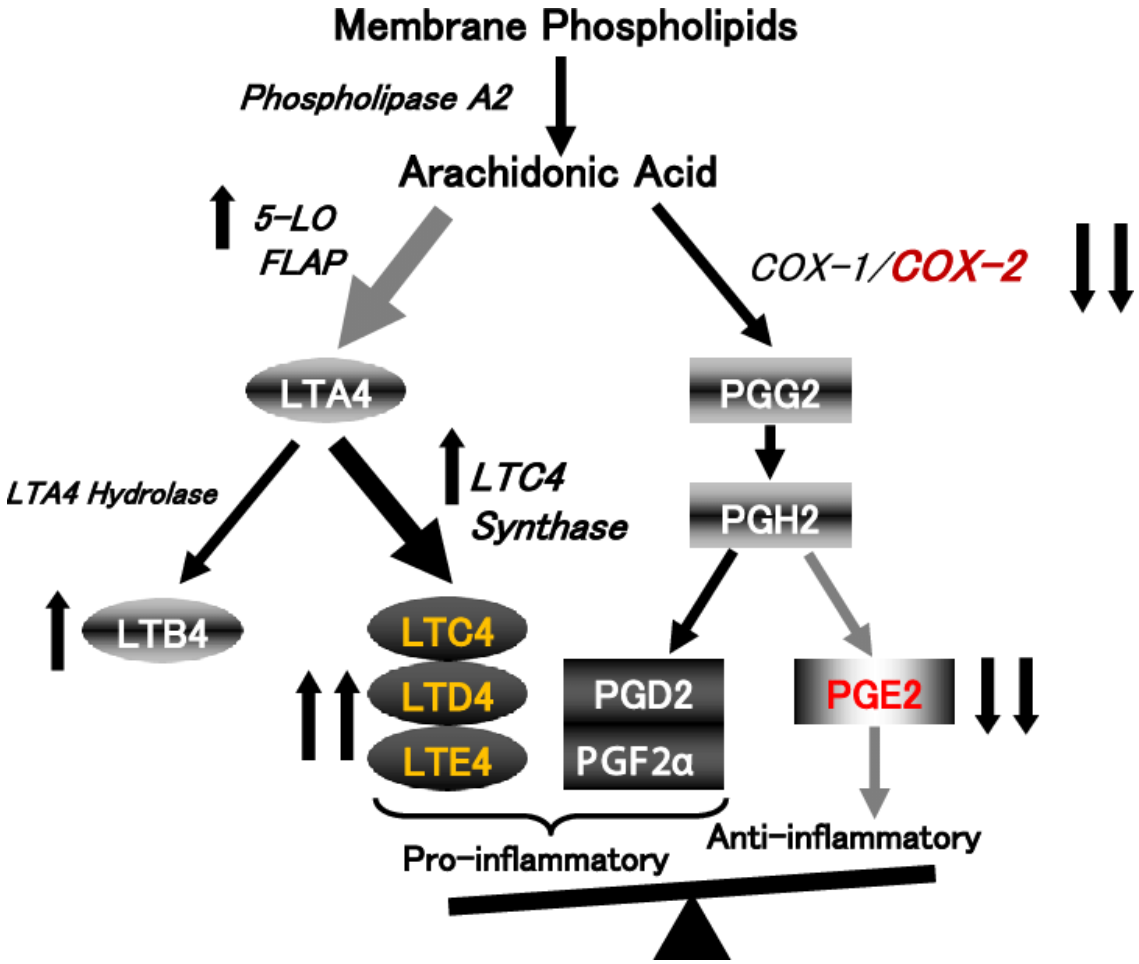
Type of drug-induced rhinitis	General drug category	Specific drug category	Examples
Local inflammatory			- NSAIDs (ibuprofen, indomethacin, diclofenac, sulindac, ketoprofen, naproxen, flurbiprofen, fenoprofen, piroxicam, meclofenamate, etodolac); - Aspirin; - Ketorolac (if administered via nasolacrimal duct)
Neurogenic and neuromuscular	α- and β-Adrenergic receptor modulators	α Antagonists	- α-1: doxazosin, silodosin, prazosin, tamsulosin, alfuzosin, indoramin; - α-1, α-2: phentolamine
		Presynaptic α-2 agonists	Clonidine, methyldopa, guanfacine, piribedil
		Beta-antagonists	- β-1: metoprolol, atenolol, bisoprolol; - β-1, β-2: pindolol; - β-1, β-2, α-1: carvedilol, labetalol
		Presynaptic depletion of norepinephrine stores	Guanethidine
	Phosphodiesterase inhibitors	Phosphodiesterase-3 specific	Cilostazol
		Phosphodiesterase-5 specific	Sildenafil, tadalafil, vardenafil
		Nonselective phosphodiesterase	Pentoxifylline
	Angiotensin converting enzyme inhibitor		Ramipril, captopril, lisinopril, benazepril, quinapril, enalapril
Idiopathic		Psychotropics	Chlorpromazine, thioridazine, amitriptyline, alprazolam, reserpine, risperidone, mianserin
		Immunomodulators	Cyclosporine
		Hormones	Estrogen, oral contraceptives
		Antihypertensives	Amiloride, chlorothiazide, hydralazine, hydrochlorothiazide
		Other	Gabapentin, gingko biloba

Drug-Induced Rhinitis
local inflammatory type

- **Aspirin and non-steroidal anti-inflammatory drugs (NSAIDs)** may cause an acute nasal inflammatory response with the inhibition of cyclooxygenase 1 (COX-1) mechanism
- Inhibition of COX-1 increases the metabolism of arachidonic acid due to the lypoxygenase pathway, and decrease of prostaglandin 2 (PGE2) followed by an elevation of LT4, D4, E4, with LTC4 responsible for aspirin exacerbated asthma
- Cysteinyl leukotrienes may cause bronchoconstriction, mucosal edema ,hypersecretion, and vasoconstriction

- LTC4 synthase(responsible enzyme for cysteinyl LT activation) is overexpressed in aspirin-induced rhinitis

Imbalance of acid metabolites in patients with AERD (hypothesis). The COX-2 level decreases in patients with AERD and the production of endogenous PGE2 also decreases. With the addition of a COX-1 inhibitor, the amount of PGE2 further decreases, the suppression of 5-lipoxygenase (5-LO) activity disappears, and CysLT is overproduced

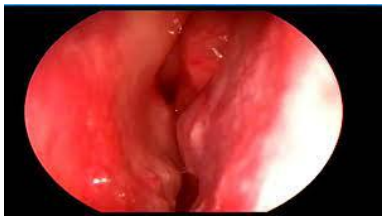


Drug-Induced Rhinitis
neurogenic type& Idiopathic

- Alpha and beta adrenergic antagonists cause down-regulation of the sympathetic tone, resulting in vascular dilation, nasal congestion, and rhinorrhea
- Phosphodiesterase-5 selective inhibitors such as sildenafil, tadalafil, and vardenafil may also provoke neurogenic-type rhinitis through their vasodilator properties, affecting the erectile tissue of nasal turbinates and causing nasal obstruction

Rhinitis medicamentosa rebound rhinitis (RM)

- **Diagnostic criteria**
- Prolonged topical intranasal decongestant(IND) use
- Constant nasal obstruction, and poor shrinkage of the nasal mucosa in the setting of nasal congestion& rhinorrhea
- Decreased efficacy of further INDs



- **Physical exam**

mucosal edema, erythema, and hyperemia

- **physiologic mechanism (causing RM is unclear)**

Down regulation a- agonist receptors, decrease endogenous norepinephrine production ,upregulation of the parasympathetic system, leading to rebound congestion once the the medication is withheld

- **Mucosal changes**

Ciliary damage and loss, epithelial metaplasia and hyperplasia, dilated intercellular spaces, goblet cell hyperplasia, and edema

Benzalkonium chloride (BKC), an antimicrobial preservative used in many nasal decongestants, has been implicated in the mechanism of RM. BKC is toxic to nasal epithelium and may propagate RM

Treatment of drug-induced rhinitis

- Discontinuation of the responsible drug
- INCSs or a combination of INCSs and intranasal antihistamine if the intranasal corticosteroid is not effective alone
- INCSs; sometimes used in conjunction with brief courses of systemic corticosteroids(They are best reserved for patients with RM who present initially with severe nasal obstruction. A short course of oral prednisone, 30 mg daily for 3 to 5 days, with or without a rapid taper (depending on the severity of the condition
- Although inconclusive, studies suggest that IND use should be discontinued after 3 days to avoid rebound congestion

Hormonally-induced rhinitis

- Rhinitis of pregnancy
- Hypothyroidism (but without definite scientific) and acromegaly
- Rhinitis during puberty, menstruation, and the perimenopasal years

Rhinitis of pregnancy
Definition &symptom

- It Occurs in about 22% of pregnancies

- It has been defined as nasal congestion in the last 6 or more weeks of pregnancy, without other signs of respiratory tract infection or allergic cause
- Typically starts after the second month of pregnancy and is most severe in the second trimester
- Spontaneous resolution of symptoms occurs within 2 weeks after delivery
- The symptoms of rhinitis of pregnancy, like those of AR, include rhinorrhea and nasal congestion, which can be prominent and prolonged

Rhinitis of pregnancy Etiologic factors

- **Hormonal changes**
  - ↑progesterone, ↑estrogen, ↑prolactin,↑ vasoactive intestinal peptide,
  - and/or↑ placental growth hormone have been implicated
- **Physiologic phenomena occurring during pregnancy**
  - Vasodilation
  - progesterone-induced smooth muscle relaxation
  - Increased nasal vascular due to massive expansion of the circulating blood volume

Rhinitis of pregnancy Treatment

➢ Conservative no pharmacologic

- Elevation of the head of the bed
- Easal dilator strips
- Exercise
- Saline lavage using hypertonic saline

➢ Pharmacological treatment?

- Does not usually require therapy, nor does it respond well to standard allergy medications

- The use of various other medications (ie, topical and oral decongestants) is controversial and should be addressed at the individual patient level, with close involvement of the obstetrician

- ***Oral decongestants*** ***should be avoided, if possible, during the first trimester because of conflicting reports of an association of phenylephrine and pseudoephedrine with congenital malformations such as gastroschisis and small intestinal atresia***

Age-related rhinitis (Elderly rhinitis)

- Age-related rhinorrhea (drippy nose" or "senile rhinorrhea)

physiologic reason:

Imbalance of sympathetic and parasympathetic tone

- Age-related nasal obstruction and congestion

physiologic reason:

- Thicker mucus secondary to a decrease in body water content
- Loss of nasal cartilage elasticity and tip support mucus stasis secondary to less effective mucociliary clearance

Age-related rhinitis Treatment

- **the most important: Improving intranasal moisture content**

&Removing dried secretions

- **Nasal irrigation** using buffered saline or a saline nasal spray
- **INCS, generally safe**, may cause more bleeding than is seen in younger patients, because of the increased fragility of the nasal mucous membranes
- **Older-generation oral antihistamines should be avoided** because of their potential said effect(sedation or anticholinergic effects)
- **Oral decongestants should be avoided** because of possible adverse effects on blood pressure (hypertension), cardiac rhythm (extrasystoles, arrhythmias), central nervous system (insomnia, agitation), and urinary tract(obstruction)

Gustatory rhinitis(GR)

- **Is a non-allergic, non-inflammatory type of rhinitis characterized by watery, uni- or bilateral rhinorrhea occurring a few minutes after ingestion of solid or liquid foods, most often hot and spicy**
- **Is Not associated with pruritus, sneezing, nasal congestion or facial pain.**
- **Is not clearly associated with sex, age, or atopy but The peak prevalence is between 20 -60 years**
- **Types: Idiopathic; posttraumatic** (skull trauma) **postsurgica**l (uni and bilateral total parotidectomy ,hemi resection of maxilla ,total maxillectomy ,septoplasty and oral surgery (such as difficult dental extraction); **Cranial nerve neuropathy**(leprosy)

GR ,pathophysiologic mechanisms &diagnosis

- GR is most likely caused by **stimulation of trigeminal sensory nerve endings** located at the upper aerodigestive track.
- Sensory nerve stimulations could be associated with a parasympathetic reflex and activation of cholinergic muscarinic receptors, sensitive to atropine.
- **Capsaicin(the most common ingredient in spicy food) causes secretory hyper function** through activation of TRPV1 on sub mucosal glands and goblet cells
- **The stimulation of C fibers by capsaicin** leads to local release of several neuropeptides
- **The diagnosis of GR is based on medical history and is essentially a diagnosis of exclusion**

GR TREATMENT

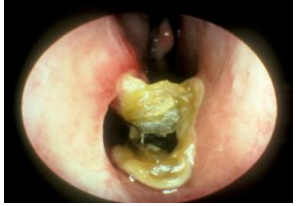
- **Avoidance of the provocative food**, especially hot and spicy
- **Intranasal anticholinergic** can be used prophylactically, or therapeutically
- Topical, intranasal atropine is the drug of choice, but intranasal ipratropium(IPB) and oxitropium bromide are also proven to be efficacious
- **The concomitant use of IPB and an INCS is more effective** than administration of either drug alone
- **Local capsaicin administration** may lead to the degeneration of C fibers and long-term alleviation of gustatory rhinitis symptoms
- **Injections of botulinum toxin type A** in the mucosa of the middle& inferior turbinate, and nasal septum
- **Surgical therapy :posterior nasal nerve resection or vidian nerve isnot recommended**(because of its short lasting effect, &unpleasant side effects)
- **bilateral parotidectomy with GR** has been successfully treated with **bilateral vidian neurectomy** (but re-innervation can occur)

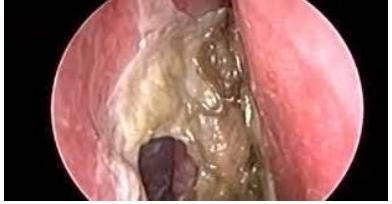
Rhinitis Related to Systemic Disease

- **Granulomatous diseases** (e.g., granulomatosis with polyangiitis, sarcoidosis, midline granuloma)
- **Cystic fibrosis**
- **Ciliary dyskinesia syndromes**
- **Immunodeficiencies**

" In most of these conditions, typically the nose and sinuses are affected, rather than the nose alone
The symptoms often extend to involve other organ systems, particularly the lungs; and associated constitutional complaints, such as fatigue and poor appetite, are common"

Atrophic rhinitis





Primary (idiopathic) subtype

Primarily affects people from areas with warm climates and **defined by nasal mucosal and glandular atrophy**

Lack of mucus, facilitating bacterial growth, and mucosal colonization (usually with Klebsiella ozaenae, S aureus, Proteus mirabilis, and Escherichia coli) microbial colonization may be the primary cause of this condition

- **Findings**: crusting of nasal mucosa, foul-smelling nasal discharge, and sense of severe congestion, paradoxically in spite of considerably wide and unobstructed nasal cavities
- **secondary subtype**

caused by extensive surgical removal of mucus-secreting tissue, trauma, or chronic granulomatous disorders, has a similar presentation, signs of these underlying causes may be evident on physical examination

- **Empty nose syndrome**

Aggressive resection of the turbinates often causes the empty nose syndrome, in which the patient exhibits severe nasal obstruction and inability to sense airflow despite complete nasal patency

- **Diagnosis:** Is established from clinical examination, nasal biopsy, and nasal cultures for associated bacteria


Thank You
For Your Atten