Allergic Rhinitis

* 2 types: 1) seasonal aka “hay fever” -🡪occurs at predictable times of year; caused by pollen (trees, grass, weeds)

2) perennial aka “intermittent or persistent”-🡪year round; causes nonseasonal allergens (dust mites, animal dander, mold); produces subtler, chronic symptoms

* 6th most prevalent chronic illness in US
* Also associated with asthma, chronic rhino sinusitis, otitis media, nasal polyps, respiratory infections, orthodontic malocclusions
* Development depends on:
  1. Genetics
  2. Allergen exposure
  3. Family hx
  4. Atopic dermatitis
  5. Asthma
  6. Predisposing factors🡪increases serum IgE before 6 yo, eczema, secondhand smoke

**Pathophysiology**

* inhaled allergen contacts mucous membranes -🡪elicit response mediated by IgE
* Nose performs 3 air conditioning fxns before gases enter lungs
  1. Heated
  2. Humidified
  3. Cleaned
     + Cleansing plays role in allergic rhinitis
     + Inhaled particulate matter attached to mucous blanket
     + Mucous blanket swallowed🡪trapped matter removed via GI, doesn’t reach lungs
     + Swallowing of mucous blanket concentrates matter into throat where lymph tissues produce allergic antibody responsible for allergic rhinitis
* Nasal vasculature tissue = erectile
  + Stimulate sympathetic fibers🡪vasoconstriction, decrease erectile tiisue size, membrane & turbinates, airway widening
  + Stimulate Parasymp fibers🡪vasodilate, increase erectile tissue, membrane & turbinates, airway widening
* IgE binds to mast cell releasing mediators

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| **Mediator** | **Effect** |
| **Preformed & rapidly released** |  |
| Histamine | Stimulates irritant receptors |
|  | pruritus |
|  | Vascular permeability |
|  | Mucosal permeability |
|  | Smooth muscle contraction |
| Neutrophil & Eosinophil chemo factor | Influx of inflamm cells |
| Kinins & NLA methyl esterase | Vascular permeability |
| **Newly Generated** |  |
| Leukotrienes | Smooth muscle contraction |
|  | Vascular permeability |
|  | Mucus secretion |
|  | chemotaxis |
|  | Neutrophil chemotaxis |
| Thromboxanes | Smooth muscle spasm |
| Platelet activating factor | Mucus secretion |
|  | Airway permeability |
|  | Chemotaxis |
|  | Vascular permeability |
| **Granule matric contents** |  |
| Heparin | Antiinflamm |
| Tryptase & Kallikrein | Protein hydrolysis |

* 4-8 hrs after initial exposure = late-phase rxn
* Inflammartroy response responsible for persistent, chronic symptoms

**Clinical Presentation**

* Clear rhinorrhea, sneezing, nasal congestion, postnasal drip, itchy eyes, ears, nose, palate
* Allergic conjunctivitis associated more frequently with seasonal AR
* Secondary to late phase rxn symptom usually nasal congestion, 3-5 hrs after exposure, peaks at 12-24 hrs
* Distinguish from other causes of rhinitis by a through history, physical exam, diagnostic tests
* In kids, physical exam may show allergic shiners, allergic salute, tearing, conjunctival injection & edema, periorbital swelling
* Diagnostic tests & labs
  + Immediate-type hypersensitivity skin test
  + Elevated blood eosinophil count
  + RAST detect IgE antibodies in blood
* Complications:
  1. Disturbed sleep
  2. Chronic malaise
  3. Fatigue
  4. Poor work/school performance
  5. Loss of smell/taste
  6. Postnasal drip w/ hoarseness, cough, vocal polyps
  7. Mouth breathing-🡪orthodontic problems
  8. Asthma
  9. Recurrent/chronic sinusitis
  10. Nasal polyps
  11. Epitaxis

**Treatment**

* Therapeutic goal = minimize/prevent symptoms & prevent long-term complications
* 3 approaches:
  1. Allergen avoidance
  2. Pharmacotherapy
  3. Immunotherapy

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| **Medication Class** | **Symptoms controlled** | **Notes** |
| ***Antihistamines*** |  |  |
| Systemic | Sneezing, rhinorrhea, itching, conjunctivitis | Seasonal: begin tx before exposure, try nonsedating agents 1st  Perennial: intranasal steroid in combo or alternative |
| Ophthalmic | Conjunctivitis |  |
| Intranasal | Sneezing, rhinorrhea, nasal itching | May cause drowsiness |
| ***Decongestants*** |  |  |
| Systemic | Nasal congestion | Only needed if congestion present |
| Topical | Nasal congestion | **DO NOT EXCEED 3-5 DAYS** |
| ***Intranasal Corticosteroids*** | Sneezing, rhinorrhea, itching, nasal congestion | Excellent choice for perennial rhinitis |
| ***Mast cell stabilizers*** |  | Prevents symptoms use before exposure for seasonal  Perennial improvement may take up to 1 month |
| ***Intranasal anticholinergics*** | Rhinorrhea | Use when failed above tx’s |
| ***Leukotriene receptor antag*** |  | When in combo with antihistamines more effective than antihistamines alone, maybe used as monotherapy in children w/ asthma & coexisting allergic rhinitis |

**Antihistamines**

* Along w/ decongestants & intranasal corticosteroids used first in treating AR
* More effective in preventing action of histamine than reversing
* Well absorbed, large vol of dist, metabolized by liver
* SE:
  + Drowsiness
  + Difficulty voiding urine
  + Constipation
  + Potential CV effects
  + Loss of appetite
  + N/V, GI distress
* Caution in pt’s w/ increased intraocular pressure, BPH, hyperthyroidism, CV disease
* Only fully effective if taken 1-2 hrs before exposure
* Watch use of alcohol
* Don’t double up dose if dose is missed
* Take w/ food or full glass of water to minimize GI upset
* Do not use more than one antihistamine at a time
* For seasonal & perennial intranasal antihistamine available
  + Azelastine
    - 0.1% used in kids, effective against seasonal AR
    - 0.15% adults use only, either type of AR
    - Successful in pt who didn’t respond to loratidine
    - SE:
      * Drying effects
      * HA
      * Drowsiness
      * Bitter taste
  + Olopatadine
    - Also possess mast cell stabilizing properties
    - Seasonal AR for patients ≥ 6
* Ophthalmic antihistamine= levocabastine

**Decongestants**

* Topical & oral
* Shrink swollen mucosa, improve ventilation
* Topical
  + Limit use to 3-5 days
  + Applied directly to swollen nasal mucosa via drops or sprays
  + Little to no systemic absorption
  + Prolonged use result rhinitis medicamentosa
  + SE:
    - Burning, stinging, sneezing, dying of nasal mucosa
* Oral
  + Most common pseudoephedrine
  + Cause mild CNS stimulation
  + Stroke can occur in pt’s w/ vasospasm &/or HTN
  + Severe hypertensive reaction when given with MAOI’s
  + Avoid use in hypertensive pt’s
  + SE:
    - Insomnia
    - Tremor
    - Restlessness
    - Anxiety
    - Panic attacks
    - palpitations

**Nasal Steriods**

* 1st line along with antihistamines & decongestants
* Excellent for perennial AR
* Most effective against late-phase mediators
* Useful controller drugs, should be used in chronic manner
* Budesonide only category B drug
* 14-day course at onset of symptoms provides adequate relief during AR episode
* Minimal SE
  + Sneezing
  + HA
  + Stinging
  + Epistaxis
* Peak response in 2-3 weeks
* Avoid sneezing or blowing nose for at least 10 min after admin
* Don’t use in pts with nasal septum ulcers, recent nasal surgery or trauma

**Cromolyn Sodium**

* mast cell stabilizer
* limits antigen-triggered mast cell degranulation & release of mediators
* use before exposure; preventative agent
* very short half-life; frequent dosing
* dose in adults & children ≥ 2:
  + one spray in each nostril 3-4 times/day every 4-6 hrs
  + must cover entire nasal lining
* SE:
  + Nasal stinging
  + Sneezing

**Ipratropium**

* Anticholinergic
* Provides symptomatic relief of rhinorrhea
* Quick onset of action
* Frequent admin
* Dose:
  + 0.03% solution = 2 sprays (42 mcg) 2 -3 times/day
* SE:
  + HA
  + Nosebleeds
  + Nasal dryness
  + High doses: systemic SE can occur

**Leukotriene receptor Antagonist**

* Inhibit cysteinyl leukotriene receptor, primarily C4 & D4
* As effective as antihistamines, less effective than nasal corticosteroids
* Monteleukast approved for tx of perennial AR in children as young as 6 months; and seasonal AR in children ≥ 2 years
* Monotherapy for children w/ mild persistent asthma & coexisting AR
* May be advantageous in men with BPH
* Zileuton—used off label to treat AR

**Immunotherapy**

* Slow, gradual process introducing allergen to patient w/ hopes of pt developing tolerance to allergen when natural exposure occurs
* Expensive, potential risks, major time commitment
* More effective in seasonal AR
* SE:
  + Swelling at injection site
  + Generalized uticaria
  + Bronchospasms
  + Laryngospasms
  + Vascular collapse
  + Anaphylactic rxns

**Dosing:**

Antihistamines & Decongestants

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|  |  | **Dosage and Interval** | |
| **Meds** | **Availability** | ***Adults*** | ***Children*** |
| **1st gen antihistamine** |  |  |  |
| Chlorpheniramine | OTC | 4 mg q 6 h | 6-12 yrs: 2 mg q 6 h  2-5 yrs: 1 mg q 6 h |
| Chlorpheniramine, sustained release | OTC | 8-12 mg daily HS or 8-12 mg q 8 h | 6-12 yrs: 8 mg HS  < 6: not recommended |
| Clemastine furmarate | OTC | 1.34 mg q 8 h | 6-12 yrs: 0.67 mg q 12 h |
| Diphenhydramine | OTC | 25-50 mg q 8 h | 5 mg/kg/day divided q 8 h (up to 25 mg/dose) |
| **2nd gen antihistamines** |  |  |  |
| Loratidine | OTC | 10 mg daily | 6-12 yrs: 10 mg daily  2-5 yrs: 5 mg daily |
| Fexofenadine | OTC & RX | 60 mg BID or 180 mg daily | 6-11 yrs: 30 mg BID |
| Cetirizine | OTC | 5-10 mg daily | >6 yrs: 5 mg daily  Infants 6-11 months: 0.25 mg/kg/day |
| Levocetirizine | Rx | 5 mg PM | 6-11 yrs: 2.5 mg PM |
| **Oral Decongestants** |  |  |  |
| Pseudoephedrine, plain | OTC | 60 mg q 4-6 h | 6-12 yrs: 30 mg q 4-6h  2-5 yrs: 15 mg q 4-6h |
| Pseudoephedrine, sustained-release | OTC | 120 mg q 12 h | Not recommended |
| Phenylephrine | OTC | 10-20mg q 4 h | 6-12 yrs: 10 mg q 4 h  2-6 yrs: 0.25% drops, 1 ml q 4h |

Topical Decongestants

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| **Meds** | **DOA** |
| Phenylephrine | up to 4 h |
| Naphazoline & Tetrahydrozoline | 4-6 h |
| Oxymetazoline & Xylometazoline | Up to 12 h |

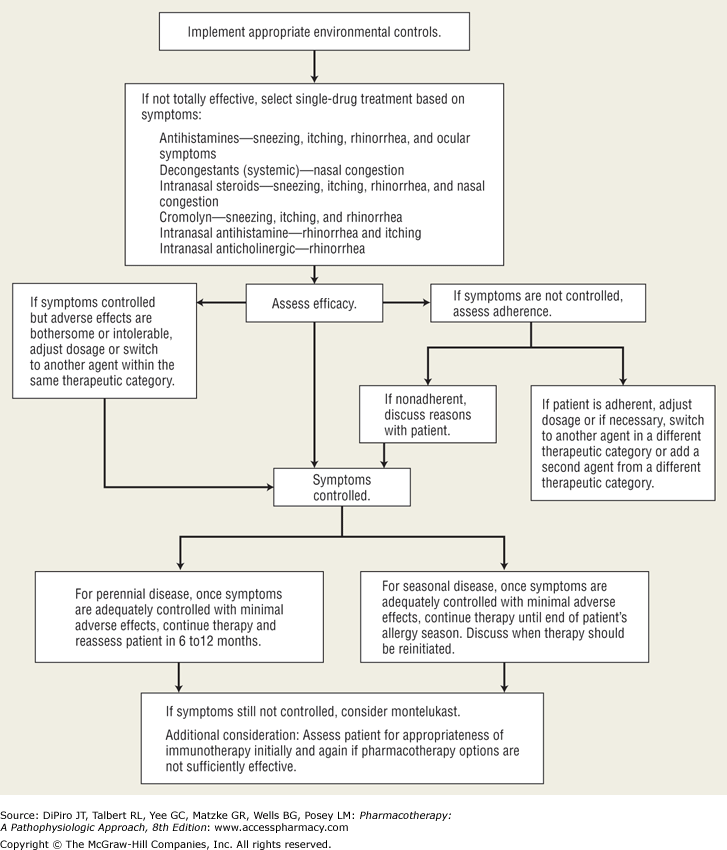
Nasal Steriods

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| **Meds** | **Dosage & Interval** |
| Beclomethasone dipropionate, monohydrate | >12 yrs: 1-2 inhalations BID in each nostril  6-12 yrs: 1 inhalation BID each nostril to start |
| Budesonide (Category B) | >6 yrs: 2 sprays/nostril in AM & PM or 4 sprays/nostril in AM (max: 256 mcg) |
| Flunisolide | Adults: 2 sprays/nostril BID (max: 400 mcg)  Kids: 1 spray/nostril TID |
| Fluticasone | Adults: 2 sprays/nostril daily; after a few days decrease to 1 spray/nostril  Kids >4 yrs & adolescents: 1 spray/nostril daily (max: 200 mcg/day) |
| Mometasone furoate | >12 yrs: 2 sprays/nostril daily |
| Triamcinolone | >12 yrs: 2 sprays/nostril daily (max: 440 mcg/day) |

Montelukast

|  |  |
| --- | --- |
| Adults & adolescents >14 yrs | 10 mg daily |
| Children 6-14 yrs | 5 mg chewable daily |
| Children 6 months-5 yrs | 4 mg chewable daily or oral granule packet daily |

**Algorithms**

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