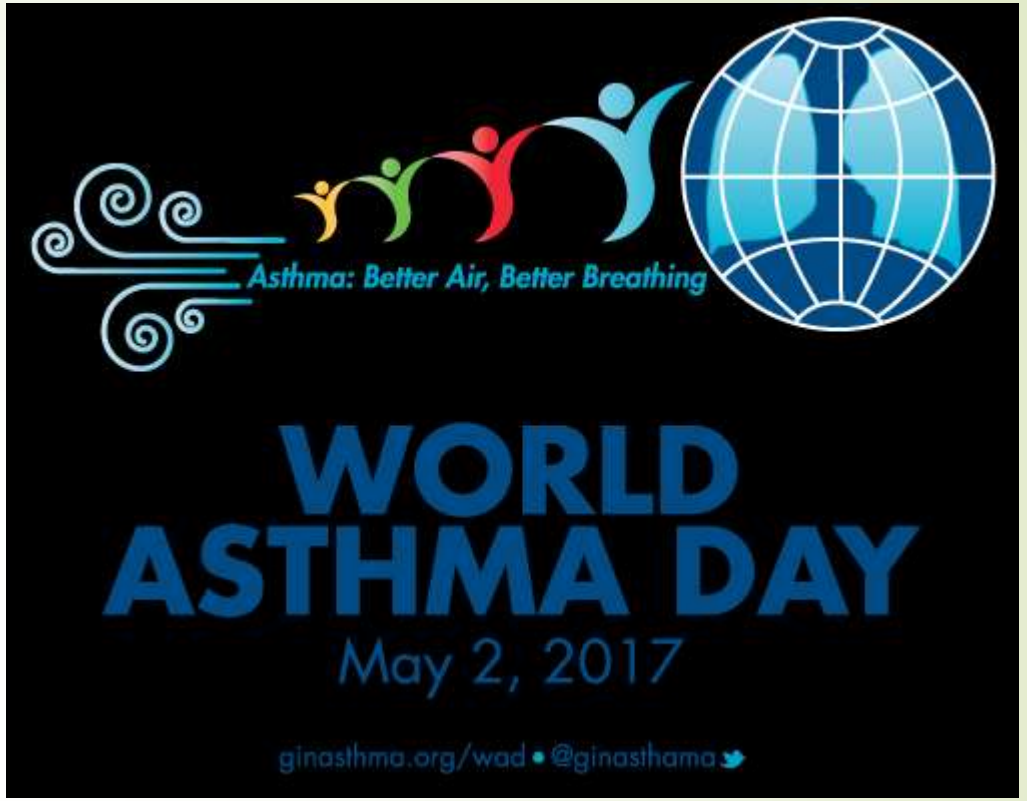
Asthma



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Definition

Asthma is a **chronic inflammatory respiratory disease** that is associated with **increased airway hyper responsiveness**, resulting in **recurrent episodes of dyspnea**, **coughing, and wheezing**. The bronchiolar lung tissue of patients with asthma is particularly **sensitive to a variety of stimuli**.

EPIDEMIOLOGY

Incidence and Prevalence

Asthma affects 300 million persons worldwide and accounts for 1 of every 250 deaths worldwide.

- 300 million people
- Adult 10-12 %
- Children 15%

4

Etiology

- **Possible factors that may be triggering asthma episodes, such as:**

1. **Viral respiratory infection (URI)**
2. **House dust (mites)**
3. **Plant pollens**
4. **Exercise**
5. **Exposure to smoke (cigarettes, cigars, indoor heaters)**
6. **Environmental irritants such as air pollution, perfumes**
7. **Latex particles (especially noted in medical personnel using latex gloves or tubing)**
8. **Animals and animal dander**
9. **Specific medications (such as aspirin or NSAID medications)**
10. **Emotional stress**
11. **Occupational factors such as chemical fumes**
12. **Food allergies (note that these are much less frequent as a cause of asthma than most inhalant allergies or irritants)**
13. **Dental materals.**

Types of Asthma- (Acute attack)

- **Extrinsic asthma**
  a) Acute episodes triggered by type I hypersensitivities
  b) Onset in childhood
- **Intrinsic asthma**
  a. Onset during adulthood
  b. Stimuli target hyper responsive tissue = acute attack

Mixed Asthma

Types of Asthma-

- Atopic/Extrinsic Asthma – **Most common type**
  - **+ve Family History common**
  - **+ve Allergy causing Attacks (Rhinitis, urticaria, eczema)**
  - **Elevated Ig-E serum levels**

- Non Atopic/ Intrinsic /Acquired Asthma– Non immune in nature
  - **+ve Family history uncommon**
  - **No associated Allergy**
  - **Ig-E serum levels are normal**

- Drug Induced Asthma
  - Drug like **Aspirin** provoke asthma
  - Patient with Aspirin sensitivity present with Recurrent Rhinitis,Bronchospasm,urticaria

- Occupational Asthma
  - Stimulated by fumes(plastics,resins), organic and chemical dusts(wood,cotton)
  - Attacks usually develop after repeated exposure to the inciting agents

Classification of chronic Asthma and Drug Management

MILD INTERMITTENT

Intermittent wheezing on **less than 2 days per week, exacerbations that are brief**, asymptomatic between exacerbations, **nocturnal symptoms less than2 times a month**, limited exercise tolerance;rare ER visit, **FEV1 more than 80% predicted.**

No daily medication or short-acting beta2 agonist (**Ventolin**)as needed 2 times a month, relatively good exercise tolerance.

MILD PERSISTENT

Wheezing **2 to 5 days per week** (occurs over several days), exacerbations that affect activity and sleep, **nocturnal asthma attacks more than 2 times a month**, limited exercise tolerance; rare ER visit, **FEV_1 more than 80% predicted.**

Low-dose inhaled corticosteroids or other antiinflammatory, as needed; short-acting beta2 agonist

FEV_1, Forced expiratory volume in 1 second; ER, emergency room.

Classification of Asthma and Drug Management

MODERATE PERSISTENT

Daily symptoms of wheezing (occur over several days), daily use of short-acting beta agonist, exacerbations that affect activity and sleep and may last for days, **nocturnal asthma attacks at least 1 time a week,** limited exercise tolerance,occasional ER visit**, FEV_1 60% to 80% predicted**.

Low- or medium-dose inhaled corticosteroids + long-acting bronchodilator, as needed; short-acting $beta_2$ agonist

SEVERE PERSISTENT

Frequent/daily exacerbations, **continual symptoms, frequent (more than 4 times a month) nocturnal asthma, exercise intolerance**, **FEV_1 less than 60%,** more often resulting in hospitalization

High-dose inhaled corticosteroids + long actin bronchodilator + oral corticosteroid, as needed short-acting $beta_2$ agonist FEV_1, Forced expiratory volume in 1 second; ER, emergency room.

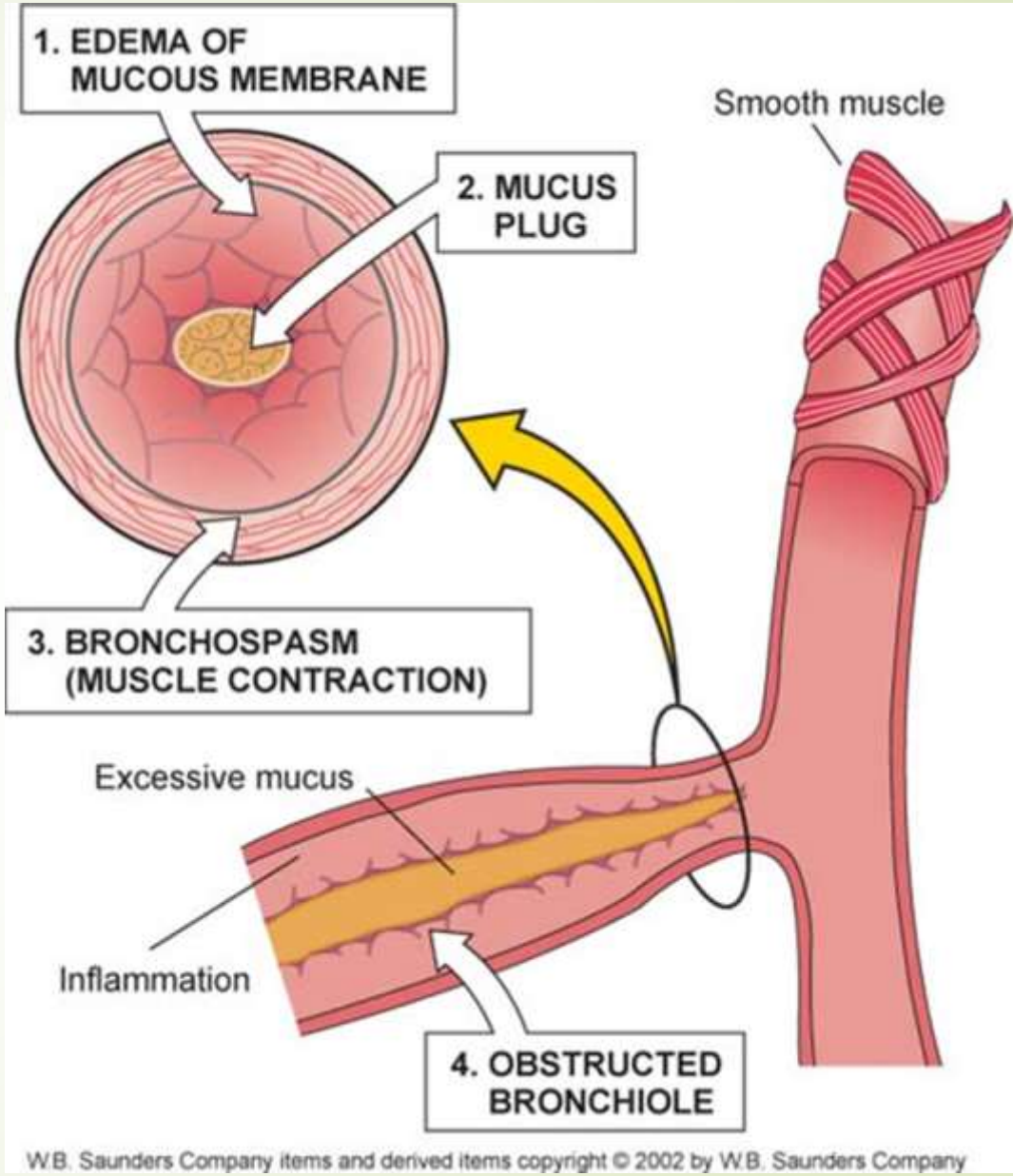
FEV_1, Forced expiratory volume in 1 second; ER, emergency room.

Asthma vs. COPD

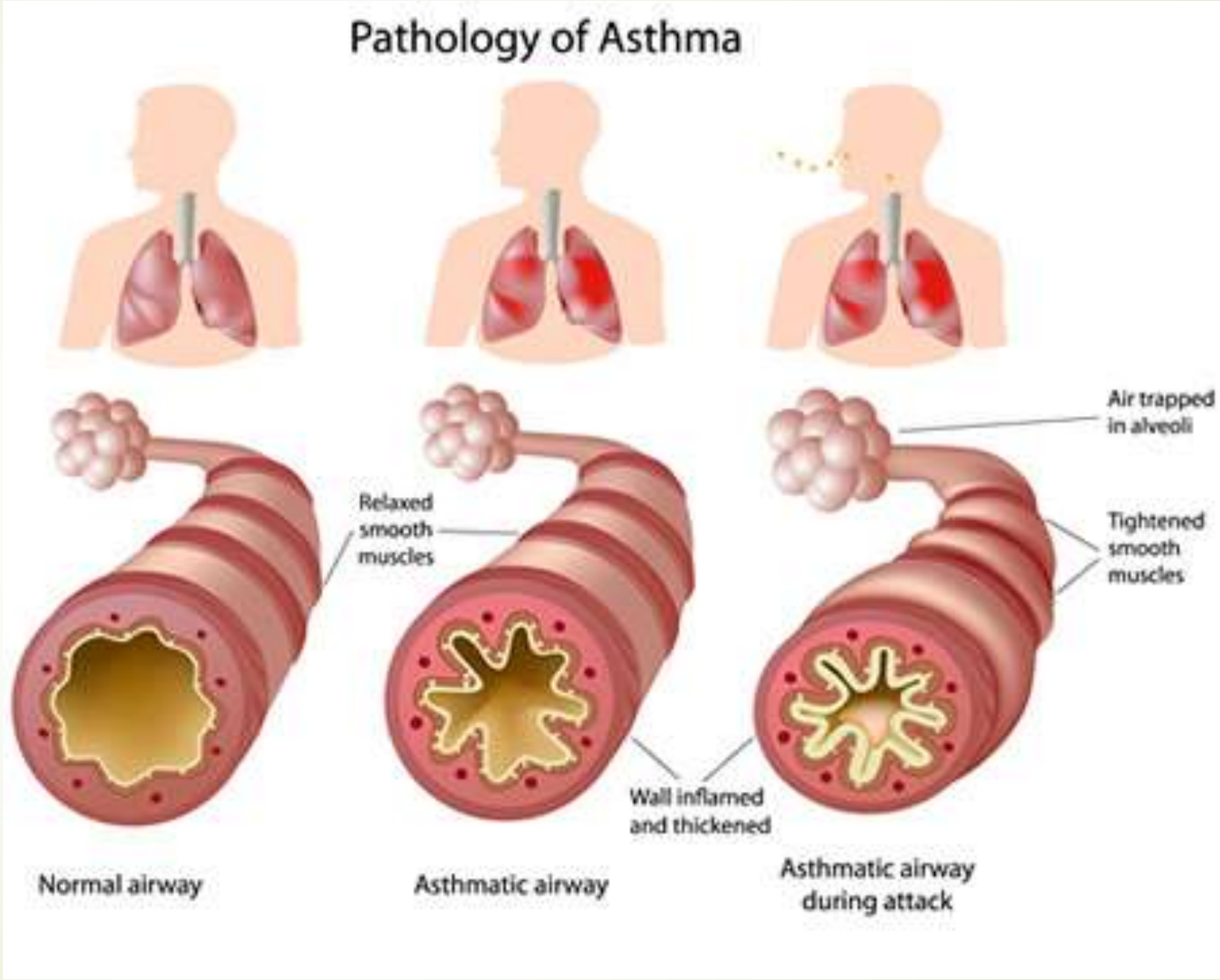
Disease Pathology	Asthma	COPD
Reversible airflow obstruction	+ ++	+
Airway inflammation	+ + +	+ +
Mucus hypersecretion	+	+ + +
Goblet cell metaplasia	+	+ +
Impaired mucus clearance	+ +	+ +
Epithelial damage	++	—
Alveolar destruction	—	++
Smooth muscle hypertrophy	+ +	—
Basement membrane thickening	+++	—

Pathophysiology:

- **Both types**
- Bronchi and bronchioles respond to stimulus ***with 3 changes***
  a. **Bronchoconstriction**
  b. **Inflammation of mucosa with edema**
  c. **Increased secretion of thick mucus in passageways**
- Changes may result in partial or total obstruction of airways
  - **Interferes with oxygen supply, air flow**

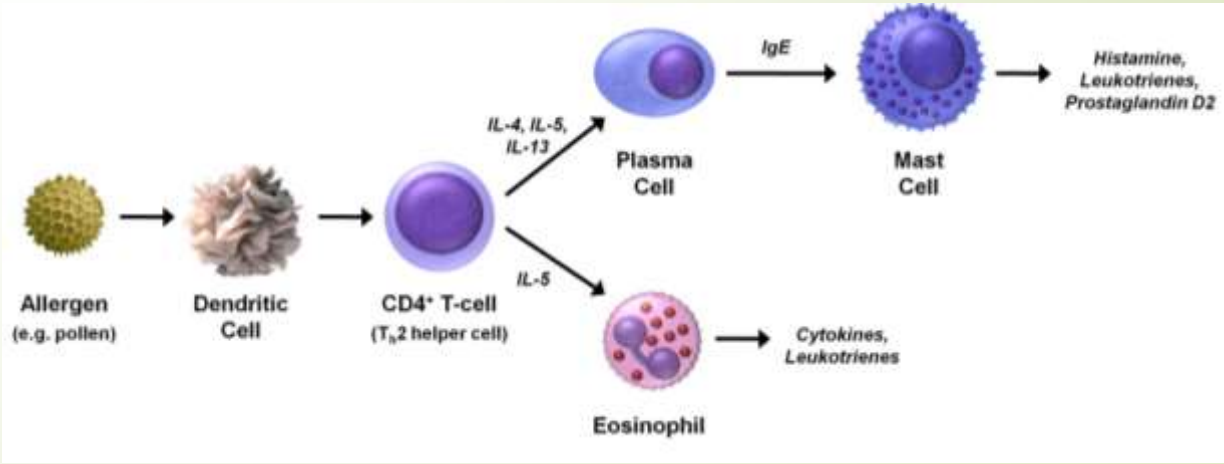


Pathophysiology:



Pathophysiology: Extrinsic Asthma

- **1st stage**
  - Allergen reacts with IgE on previously sensitized mast cells in resp. mucosa
    - **Release chemical mediators (histamine, prostaglandin)**
  - Stimulates vagus nerve
    - **Reflex bronchoconstriction**
- **2nd stage**
  - **Hours later**
  - **Increased leukocytes release more chemical mediators**
    - Prolong bronchoconstriction and epithelial damage
    - Increase WBC
    - Obstruction, hypoxia



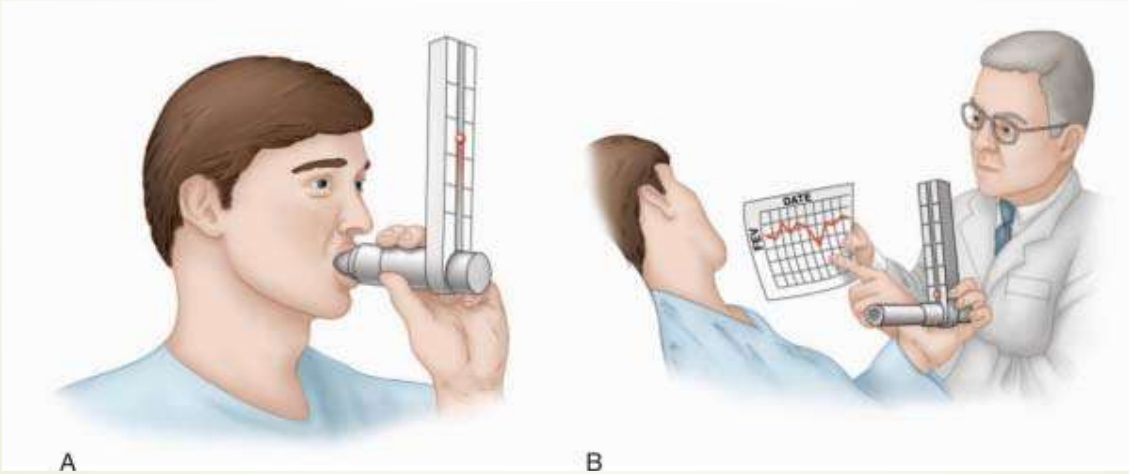
Laboratory tests

Diagnostic testing by a physician is important in the differentiation of asthma from COPD.
Clinical judgment is required because laboratory tests for asthma are relatively nonspecific, and any test alone is not diagnostic. Commonly ordered tests include:

1. chest radiographs (for hyperinflation),
2. skin testing (for specific allergens),
3. histamine or methacholine chloride challenge testing,
4. sputum smears
5. Blood counts (for eosinophilia),
6. arterial blood gases,
7. antibody-based enzyme-linked immunosorbent assay
8. enzyme-linked immunosorbent assay (ELISA) for measurement of environmental allergen exposure,
9. spirometer (a peak expiratory flow meter that measures pulmonary function) before and after administration of a short-acting bronchodilator.

Laboratory tests

Spirometer is widely applied in diagnosing asthma because this disease requires that airflow obstruction must be episodic and at least partially reversible. **Accordingly, decreased pulmonary function (i.e., FEV1) as measured by spirometer is a feature of the disease**. A recent **drop in FEV1 can be interpreted as a prediction of an asthma attack** ,and a drop of more than 10% during exercise fulfills the diagnosis of exercise-induced asthma.



A, Measure of forced expiratory volume(FEV) by spirometer. B, Discussion of daily spirometer results with physician.

Asthma—Signs and Symptoms

1. Cough,
2. dyspnea,
3. tight feeling in chest
4. Wheezing
5. Rapid, labored breathing
6. Thick, sticky mucus coughed up
7. Tachycardia and pulse paradoxes-Pulse differs on inspiration and expiration
8. Hypoxia
9. Respiratory acidosis
10. Severe respiratory distress
11. Respiratory failure

Asthma—Treatment

General measures

a. Determine allergies

b. Avoid triggers

Acute attacks

a) Inhalers

- ✓ Bronchodilators (albuterol)
- ✓ Most effective at 1st indication of attack

b) Controlled breathing techniques and decrease anxiety

c) Glucocorticoids

Hospital care—status asthmaticus

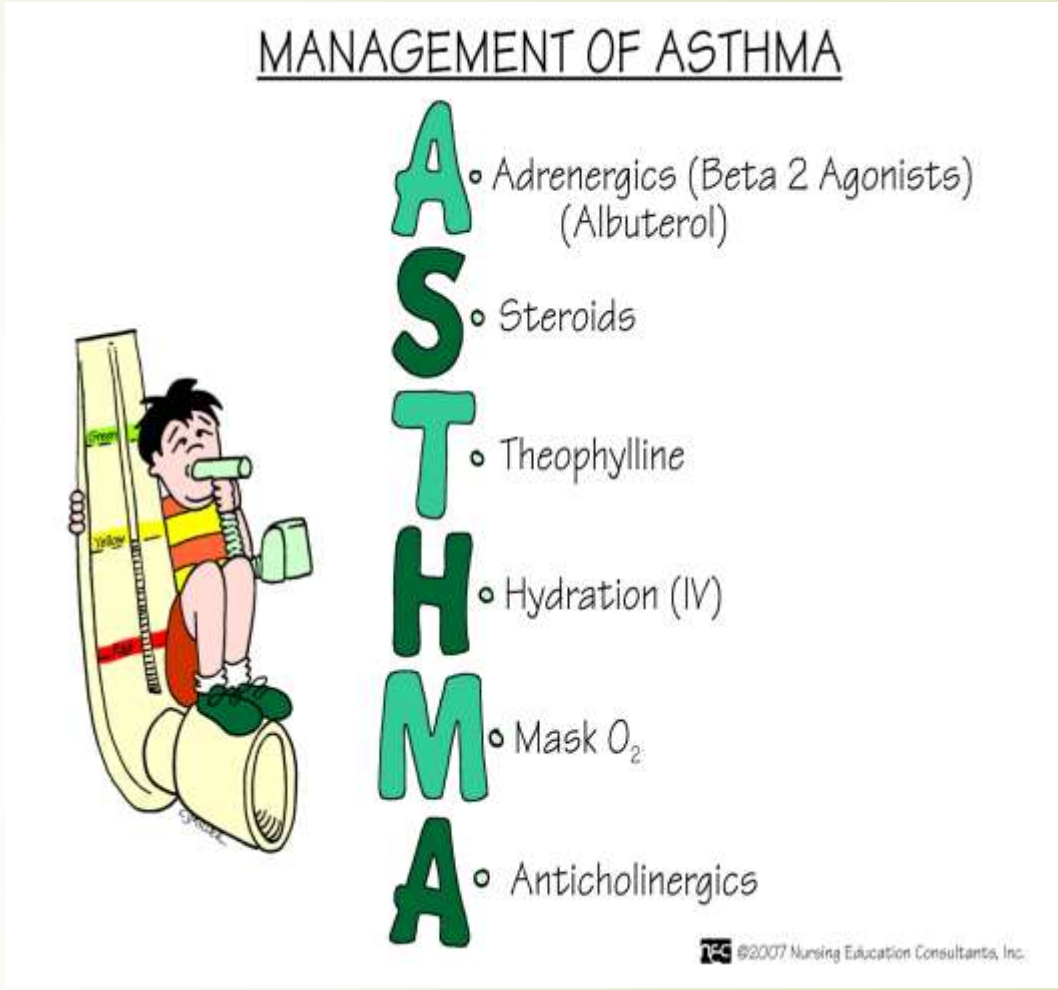
Prophylaxis and treatment of chronic asthma

a) Leukotrine receptor antagonists (Singulair)

- Block inflammation response
- Taken regularly, not effective for acute attacks

b) Cromolyn sodium

- Inhibits release of chemical mediators from sensitized mast cells
- Not effective for acute attacks



Possible effects of anticholinergics include:

Poor coordination
Dementia
Decreased mucus production in the nose and throat; consequent dry, sore throat
Dry-mouth with possible acceleration of dental caries
Stopping of sweating;
Increased body temperature
Pupil dilation; consequent sensitivity to bright light (photophobia)
Loss of accommodation (loss of focusing ability, blurred vision – cycloplegia)
Double-vision
Increased heart rate
Tendency to be easily startled
Urinary retention
Diminished bowel movement, sometimes ileus (decreases motility via the vagus nerve)
Increased intraocular pressure; dangerous for people with narrow-angle glaucoma.

Dental Management of the Patient With Asthma

1. Identify and assess by history
   - ✓ Type of asthma (mild, moderate, or severe)
   - ✓ **Precipitating factors (and plan for allergen avoidance)**
   - ✓ Age at onset
   - ✓ **Level of control (frequency, time of day, and severity of attacks)**
     - ❑ How usually managed
     - ❑ **Medications being taken (how often quick-relief medication is used) and taken correctly on the day of the appointment**
     - ❑ Necessity of emergency care (life-threatening attacks, hospitalizations, emergency department visits)
     - ❑ **Baseline forced expiratory volume in 1 second (FEV_1) stable (not decreasing)**

Dental Management of the Patient With Asthma

2. Avoid known precipitating factors
3. Obtain medical consultation for patient with severe persistent asthma
4. Ask patient to bring current medication inhaler to every appointment and to keep it available; (used prophylactically in persons with moderate to severe persistent disease)
5. Drug considerations

- **Avoid aspirin-containing medications (use acetaminophen)**
- **Avoid non-steroidal anti-inflammatory drugs (NSAIDs)**
- **Avoid barbiturates and narcotics (histamine-releasing drugs)**
- **Avoid erythromycin and macrolide antibiotics in patients taking theophylline**
- **Discontinue cimetidine (Treating and preventing ulcers of the stomach and small intestine, and treating gastroesophageal reflux disease (GERD) 24 hr. before intravenous sedation in patients taking theophylline**

Dental Management of the Patient With Asthma

6. Local anesthetic considerations (may elect to avoid solutions containing epinephrine because of sulfite preservative)

7. Patients taking chronic corticosteroid medications over the long term may require supplementation

8. Provide stress-free environment.

9. If sedation is required, nitrous oxide/oxygen inhalation sedation and/or small doses of oral diazepam recommended

10. Recognize signs and symptoms of a severe or worsening asthma attack

- Inability to finish sentences with one breath
- **Ineffectiveness of bronchodilators to relieve dyspnea**
- Tachypnea equal to or greater than 25 breaths per minute
- **Tachycardia equal to or greater than 110 beats per minute**
- Diaphoresis (excessive, abnormal sweating)
- **Accessory muscle usage**
- Paradoxical pulse

  (An exaggeration of the normal variation in the pulse during respiration, in which the pulse becomes weaker as one inhales and stronger as one exhales

11. Administer fast-acting bronchodilator (Note: Corticosteroids have delayed onset of action), oxygen, and, if needed, subcutaneous 0.3 to 0.5 ml mL of epinephrine (1:1000)

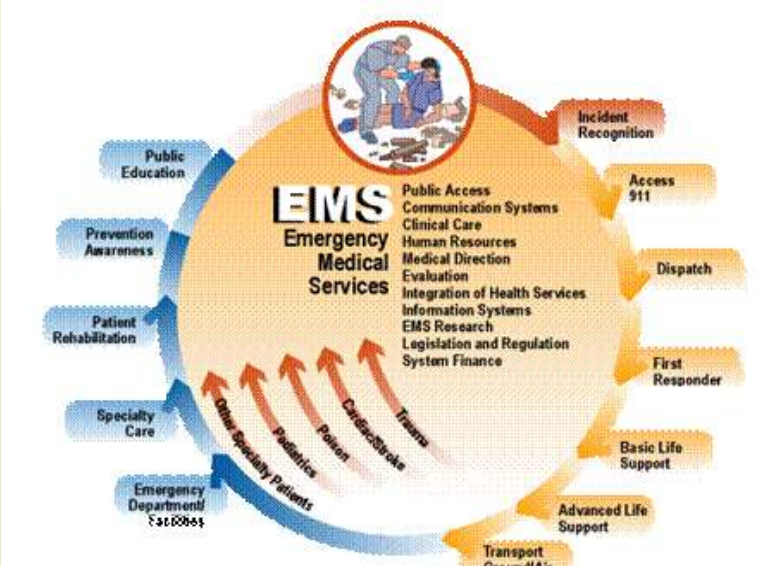
Dental Management of the Patient With Asthma

12. **Activate emergency medical system (EMS)**

Your role to activate the emergency medical services system (EMS) includes four basic steps:

Step 1: Recognize that an emergency exists
Step 2: Decide to act
Step 3: Activate the EMS system
Step 4: Give care until help takes over

13. Repeat administration of fast-acting bronchodilator every 5 minutes until EMS arrives



References

Dental Management of the Medically Compromised Patient, 7th ed.
James W. Little, DMD, MS, Donald A. Falace, DMD, Craig S. Miller, DMD, MS
Nelson L. Rhodus, DMD, MPH.

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