



CHILDHOOD ASTHMA

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DEFINITION

- “Chronic inflammatory condition of airways characterized by episodic, reversible bronchospasm, resulting from an exaggerated bronchoconstrictor response to various stimuli”.
- Clinically manifested by episodic dyspnea, cough & wheezing.
- 7-10 % of children

ETIOLOGY

- Combination of environmental exposures & inherent biological and genetic vulnerability
 - Respiratory factors
 - Inhaled allergens
 - Respiratory viral infections
 - Chemical & biological pollutants
 - Genetics
 - > 22 loci on 15 autosomal chromosomes have been linked to asthma
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□ Environment

- Recurrent wheezing episodes in early childhood are associated with common respiratory viruses
- Recurrent pneumonias or bronchiolitis are risk factors for persistent asthma in childhood
- Indoor & home allergen exposure in sensitized individuals can initiate airway inflammation and hypersensitivity to other irritant exposures
- Cold dry air & strong odours can cause bronchospasm

TYPES OF ASTHMA

■ EXTRINSIC/ ALLERGIC ASTHMA

- Is a reagin-mediated type I hypersensitivity (atopic) reaction
- Common in childhood
- Has familial tendency
- Serum IgE is elevated
- Eosinophilia
- Skin test against offending antigen is positive

TYPES.....

■ INTRINSIC ASTHMA

- Triggering mechanism are non-immune
- Stimuli having no effect on normal subjects can trigger bronchospasm, due in part to abnormal β -adrenargic responses
- Aspirin, viral infections, cold, psychological stress, exercise & inhaled irritants
- These patients are said to have **asthmatic diathesis**



■ INTRINSIC ASTHMA.....

- IgE normal
- Skin test negative
- Occurs in older people

PATHOGENESIS

- In allergic asthma inhaled antigen combines with specific IgE on the mast cells → release of histamine as well as bradykinins, leukotriens, prostaglandins and platelet aggregating factors → bronchoconstriction and acute inflammation (bronchiolar vascular congestion, edema and infiltration by neutrophils and eosinophils) → mucus secretions



PATHOGENESIS

- Bronchiolar obstruction due to smooth muscle contraction, mucoid plugs and inflammatory edema is maximal in expiration
- Resultant distal airway trapping and alveolar distension causes decrease in vital capacity and FEV1 while residual volume increases

Asthma Triggers

Common viral infections of the respiratory tract

Aeroallergens in sensitized asthmatics Animal

dander Indoor allergens Dust

mites Cockroaches Molds Seasonal

aeroallergens Pollens (trees, grasses, weeds) Seasonal

molds Environmental tobacco smoke Air

pollutants Ozone Sulfur dioxide Particulate matter Wood-

or coal-burning smoke Endotoxin, mycotoxins Dust Strong

or noxious odors or fumes Perfumes, hairsprays Cleaning

agents Occupational exposures Farm and barn

exposures Formaldehydes, cedar, paint fumes Cold air, dry

air Exercise Crying, laughter, hyperventilation Co-morbid

conditions Rhinitis Sinusitis Gastroesophageal reflux



CLINICAL MANIFESTATIONS

SYMPTOMS

- Intermittent dry cough and/or expiratory wheezing → most common chronic symptoms
 - Older children → SOB and chest tightness
 - Younger children → intermittent non-focal chest pain
- Nonspecific symptoms include self imposed limitation of physical activity & general fatigue

CLINICAL MANIFESTATIONS

SIGNS

■ MILD ATTACK

- Slight tachycardia and tachypnea
- Vesicular breathing with prolonged expiration
- Mild diffuse ronchi

■ MODERATE ATTACK

- Use of accessory muscles of respiration
- Decreased breath sounds
- Loud ronchi
- Retraction of intercostal muscles
- Hyper resonant chest



■ SEVERE ATTACK

- Fatigue
- Pulsus paradoxus
- Inaudible breath sounds(silent chest)
- Diminished ronchi
- Inability to maintain lying position
- cyanosis

Investigations

■ CXR

- No specific diagnostic features of asthma
- During attack
 - Hyperinflated lungs (flattening of diaphragm)
- peribronchial thickening
- Helps to exclude pneumonia, pneumothorax or other asthma masquerading conditions

Investigations

- PEFR (PEAK EXPIRTORY FLOW RATE)
 - Indicates severity of airflow limitation
 - Marked diurnal variation is seen in asthma
 - Lowest in morning
 - Should be recorded in morning an evening for several weeks
 - Decrease $> 20\%$ is consistent with asthma

Investigations

■ PULMONARY FUNCTION TESTS

- NORMAL → FEV1/FVC ratio > 80% of predicted value
- Diagnosis is based on effect on inhaled bronchodilator
 - improvement in FEV1 of at least 12%
 - Improvement in PEFV of at least 25%

Investigations

■ ABGs

- Normal in mild attack
- In Moderate attacks → Respiratory alkalosis (dec. P CO₂) & mild hypoxaemia
- Hypoxaemia worsens and respiratory alkalosis disappears when respiratory muscles fatigue prevents hyperventilation
- A normal or increased PCO₂ may be a sign of impending respiratory failure
- PaO₂ < 60mmHg → sign of severe attack

Investigations

■ SKIN TEST

- ALLERGEN SKIN PRICK TEST SHOULD BE DONE ON ALL CASES OF SUSPECTED EXTRINSIC ALLERGEN


■ BLOOD

- Eosinophilia in blood CP
- Raised IgE



■ SPUTUM TESTS

- Eosinophils present in clumps
- Differentiate asthma from COPD
- EXERCISE CHALLENGE TEST
- Aerobic exertion or running for 6-8 min can help to identify children with exercise induced bronchospasm
- FEV1 decreased during or after exercise by 15%(within 15min)


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- HISTAMINE OR METHACHOLINE BRONCHOPROVOCATION TESTS
 - Shows airflow hyperactivity
 - Asthmatics show bronchoconstriction at much lower conc.



THANK YOU

Questions

- Define Asthma?
- What is genetic basis of asthma?
- Define vital capacity, FEV 1 & residual volume
- What are common asthma masqueraders?
- What are lung function abnormalities asthma?
- What are early childhood risk factors for persistent asthma?
- What is pulsus paradoxus?
- What is cardiac asthma?

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- 7 yrs old boy presents in private clinic with off and on episodes of cough & wheezing for the last 02 yrs. How will you confirm the diagnosis of asthma in this patient?