

Chronic Obstructive Pulmonary Disease (COPD)

DR ABRAR AKBAR



no post bronchodilator reversibility seen unlike asthma

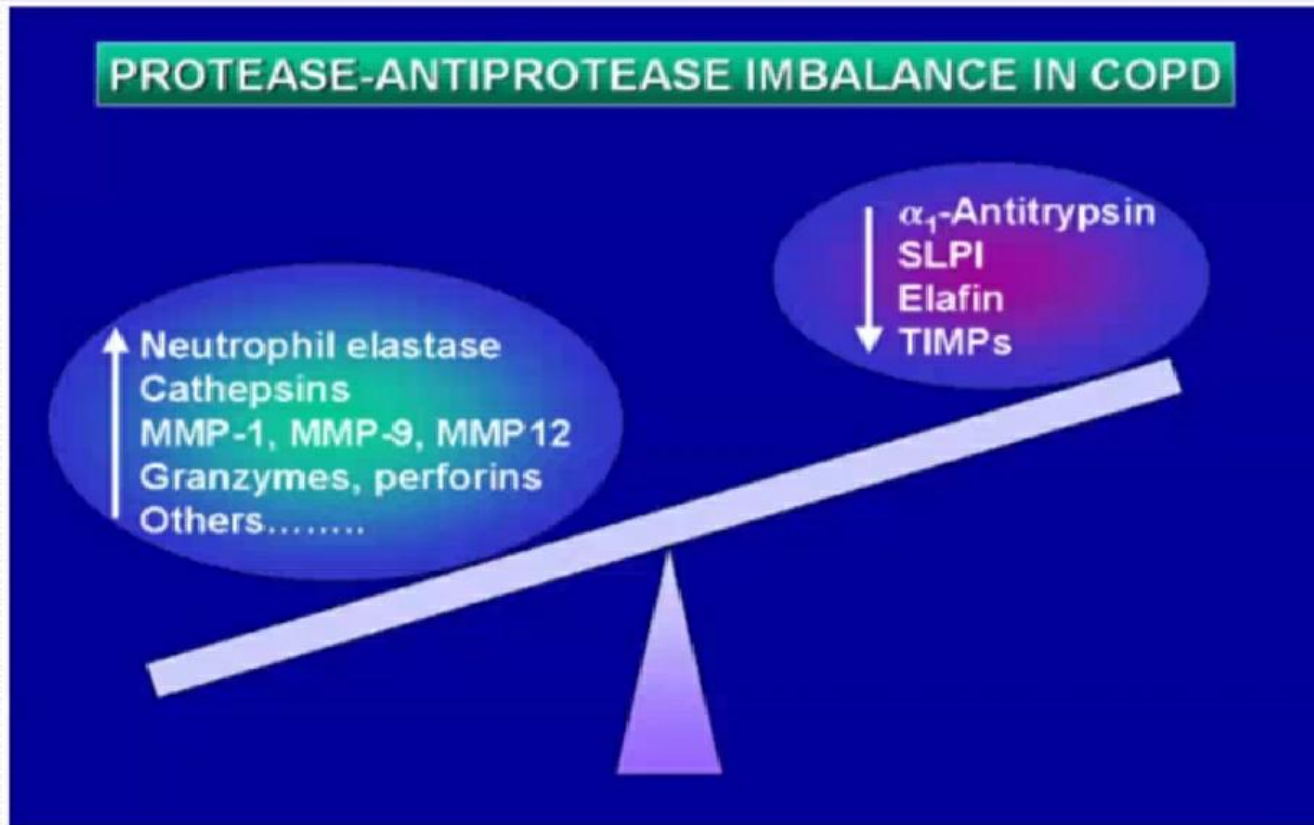
BURDEN OF DISEASE

- COPD was the 6th leading cause of death in the world in 1990.
Third leading cause by 2020.
4th leading cause by 2030.
- Physical impairment, debility, reduced quality of life, and death.
- High resource utilization due to acute exacerbations, and chronic therapy (eg, long-term oxygen therapy, medication)

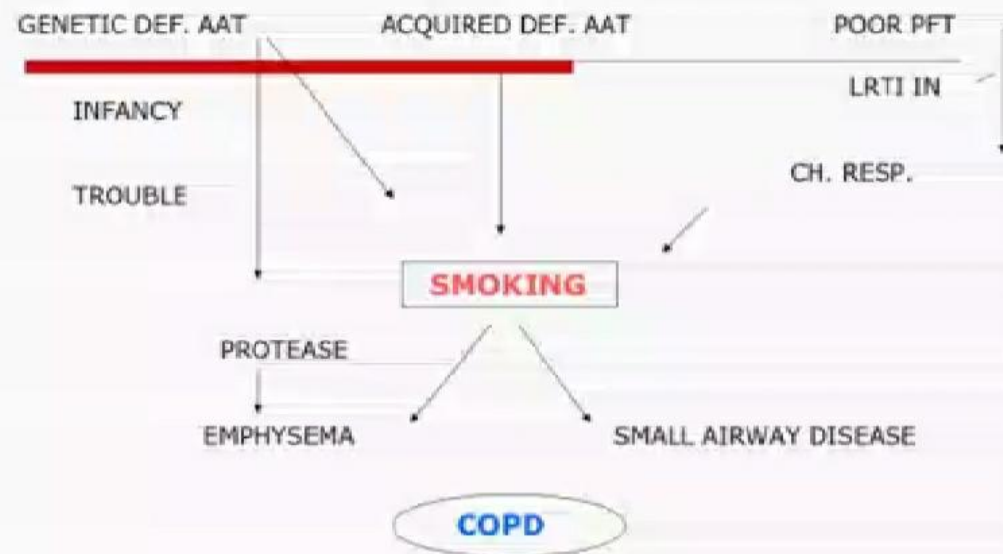
PROTEASE-ANTIPROTEASE IMBALANCE IN COPD

↑ Neutrophil elastase
Cathepsins
MMP-1, MMP-9, MMP12
Granzymes, perforins
Others.....

↓ α_1 -Antitrypsin
SLPI
Elafin
TIMPs



PATHOGENESIS OF COPD (SUMMARY)



PATHOGENESIS OF COPD

ABILITY TO FORM IgE
BR. HYPERREACTIVITY

PREDISPOSED

EXPOSURE TO ALLERGENS

LRT IN INFANCY

ASTHMA

SEVERITY OF DISEASE

AGEING

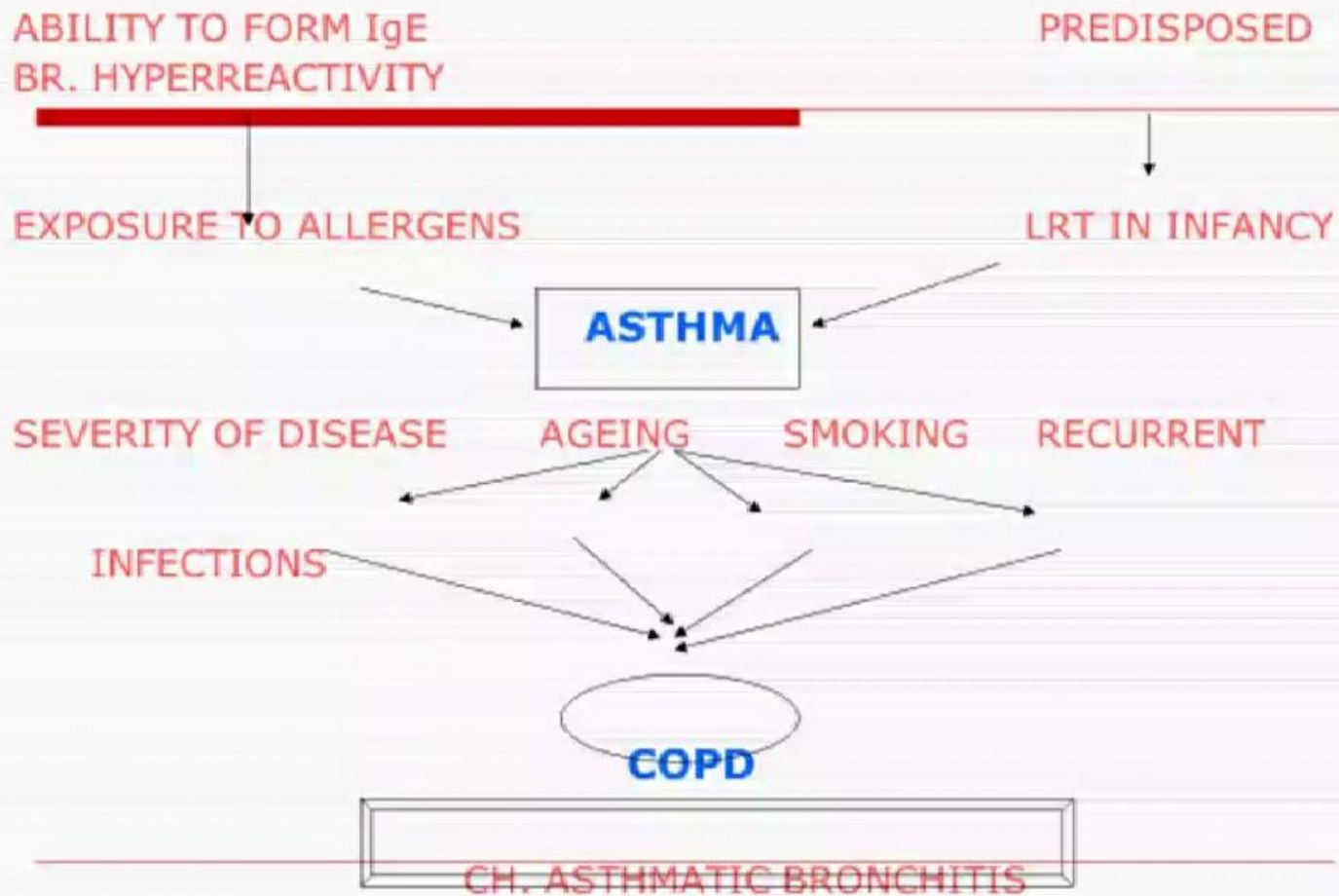
SMOKING

RECURRENT

INFECTIONS

COPD

CH. ASTHMATIC BRONCHITIS



PATHOPHYSIOLOGY

Normal bronchi



Bronchitis



TWO CLASSICAL PHENOTYPES:

- Chronic Bronchitis

- Presence of cough and sputum for at least 3 months in each of 2 consecutive years.
- Not necessary to have airflow limitations.

- Emphysema

- abnormal permanent enlargement of air spaces distal to the terminal bronchioles, accompanied by the destruction of alveolar walls and without obvious fibrosis.

CLINICAL FEATURES

- Chronic cough
- Sputum production
- Chest tightness
- Fever
- Wheezing

RISK FACTORS

- SMOKING (ACTIVE / PASSIVE)
- OCCUPATIONAL EXPOSURE
- POLLUTION
- POOR NUTRITION
- SOCIOECONOMIC STATUS
- ALCOHOL
- AGE/GENDER
- FAMILIAL / INHERITED
- MUCOUS HYPERSECRETION / AIRWAY
- HYPERRESPONSIVENES

DEFINITION

"A common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced inflammatory response in the airways and the lungs to noxious particles or gases."

- Exacerbations and co morbidities contributes to the overall severity in individual patients.

OSA obstructive sleep apnea

ASSOCIATIONS OF DISEASE

- Obesity
- OSA
- HTN
- DM
- Osteoporosis
- Metabolic problems
- Depression

HALLMARK OF COPD

- Limitation of expiratory airflow;
- Progressive and irreversible
- Accompanied by Systemic Signs

8:27



25%

HRCT used to see airways eg. in COPD
contrast CT used for lung parenchyma

INVESTIGATIONS

CXR

Spirometry / PFTs

ABGs/oximetry

CBC

Sputum examination

■ ECG

■ HRCT chest

■ MMRC

hyperinflated lungs, inc bronchoalveolar markings

RADIOLOGY

■ CXR



SPIROMETRY

- Spirometry is the gold standard.
- Post bronchodilator $FEV_1/FVC < 0.70$
- Low FEV_1 more than FVC
- Ratio is also less than 0.7

DIAGNOSTIC STANDARD

Clinical diagnosis

- Spirometry low FEV₁ and ratio of FEV₁/FVC is less than 0.7

Severity OF COPD.....GOLD

Table 3. Classification of Severity of Airflow Limitation in COPD (Based on Post-Bronchodilator FEV ₁)		
In patients with FEV ₁ /FVC < 0.70:		
GOLD 1:	Mild	FEV ₁ ≥ 80% predicted
GOLD 2:	Moderate	50% ≤ FEV ₁ < 80% predicted
GOLD 3:	Severe	30% ≤ FEV ₁ < 50% predicted
GOLD 4:	Very Severe	FEV ₁ < 30% predicted

New ABCD classification

Figure 1. COPD Patient Staging Assessment Tool

RISK GOLD Classification	3-4	C High Risk, Less Symptoms	D High Risk, More Symptoms	≥2	RISK Exacerbation History
	1-2	A Low Risk, Less Symptoms	B Low Risk, More Symptoms	0-1	
mMRC 0-1 CAT <10		mMRC ≥2 CAT ≥10			
SYMPTOMS					

Treatment Goals

- To improve the quality of life
- To avoid exacerbation
- To control the associated complications

ICS inhaled corticosteroids

Treatment

- LABA/LAMA
- LABA/ICS
- Antibiotics
- Oral/i.v steroids
- LABA/LAMA/ICS
- Diuretics
- Oxygen
- Methylxanthine

acute cor pulmonale is pulmonary embolism

Complications of COPD

- Frequent exacerbations
- Respiratory failure
- Cor pulmonale
- Osteoporosis
- Recurrent infections
- Sec. polycythemia
- Pneumothorax
- Pulmonary cachexia

Non pharmacological treatment

- Vaccination (pneumococcal and flu)
- Pulmonary Rehabilitation
- Vitamin supplementation
- Smoking cessation
- Oxygen

Oxygen: Indications

$\text{PaO}_2 < 59$, > 55 but $\text{PaCO}_2 > 45$

$\text{PaO}_2 < 55$

- Acute exacerbation

Role of surgery

- Bullectomy
- Stapling and pleurodesis for pneumothorax
- Lung transplantation

Acute Exacerbation of COPD

“Changes in symptom and sign of a COPD Patient that leads to changes in treatment”.

Worsening of SOB

Increase in quantity of sputum

Increase in purulence of sputum

Precipitating factors

- Infection
- Non compliant to treatment
- Improper inhaler technique
- Pneumothorax
- Old age
- Sepsis

Treatment of AECOPD

- Antibiotics
- i.v/Oral corticosteroids
- SABA/SAMA/ICS
- LABA/LAMA/ICS
- Controlled oxygen via venturi
- BiPAP
- Invasive ventilation
- DVT prophylaxis

FOLLOW UP

- Inhaler technique
- Compliance to treatment
- Smoking cessation
- Vaccination
- Diet
- Rehabilitation

COUNSELLING

- Smoking cessation
- Make sure compliance to Rx
- Vaccination
- Healthy life style

PROGNOSIS ...BODE index

VARIABLE	POINTS ON THE BODE INDEX			
	0	1	2	3
FEV ₁ (% of predicted)	≥ 65	50–64	36–49	≤ 35
Distance walked in 6 min (m)	≥ 350	250–349	150–249	≤ 149
Medical Research Council dyspnea scale score (0–4)	0–1	2	3	4
Body mass index	> 21	≤ 21		

FEV₁—forced expiratory volume of air in 1 second.

Adapted from Celli et al.¹² © 2004 Massachusetts Medical Society. All rights reserved. Reprinted with permission.