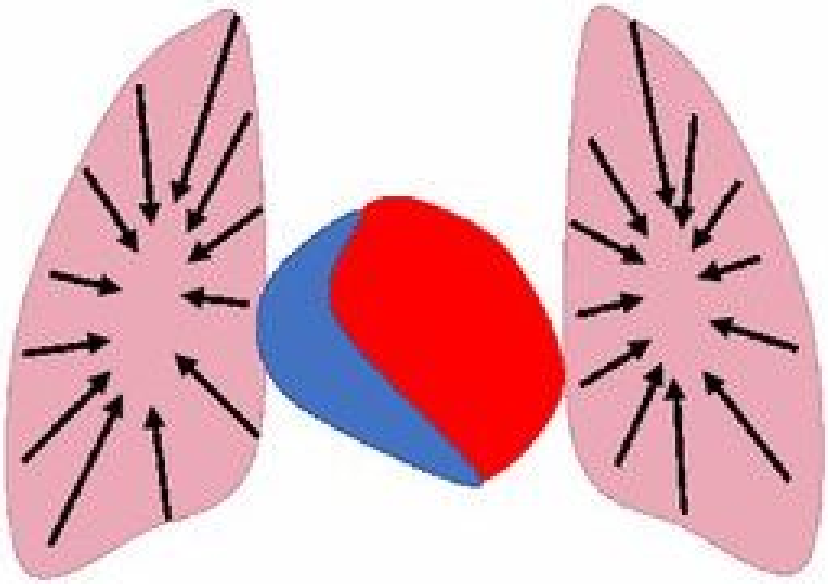
CARDIOVASCULAR DISEASE IN COPD: A DANGEROUSE LIAISON



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CARDIOPULMONARY INTERACTION

CARDIOPULMONARY CONTINUUM

CVD COPD

Shared risk factors

Overlapping symptoms

Worse prognosis due to missed concomitant diagnoses

Current guidelines are still mostly restricted to the management of the individual disease

CVD COPD

STABLE PATIENT

UNSTABLE PATIENT [AECOPD]

CVD COPD

HEART FAILURE

CORONARY ARTERY DISEASE

ARRYTHEMIA

COPD HF EPIDEMIOLOGY

1/5 COPD HAVE HF

1/3 HF HAVE COPD

Coincidences five-year survival 31% vs. 71%

CORONARY HEART DISEASE/COPD

1/6 COPD/CHD CONCOMITANT

TRANSIENT DURING EXACERBATION

Electrocardiographic signs of previous myocardial infraction are not recognized in 70% of patients presenting with acute COPD

AF COPD

AF was twice as high in COPD.

Length of hospital stays, mortality rate

CARDIOVERSION / SEDATIVE / ANTI ARRYTHEMIA

INFLAMMATION IN COPD

- **ICS DON'T alter inflamation.**
- **Dual-bronchodilation DO [HYPERINFLATION].**
- **ROFLUMILAST and STATINE DO.**
- **Decrease in hyperinflation was associated with a reduction of systemic inflammation.**

DIFFERANTIAL DIAGNOSIS

- CLINICALLY
- RADIOLOGICALLY
- ECG
- BIOMARKERS
- ECHOCARDIOGRAPHY
- THORACIC ECHOGRAPHY
- THORACIC CT
- EXERCISE TEST - [USUAL ± VO2]
- RIGHT HEART CATHETRISATION

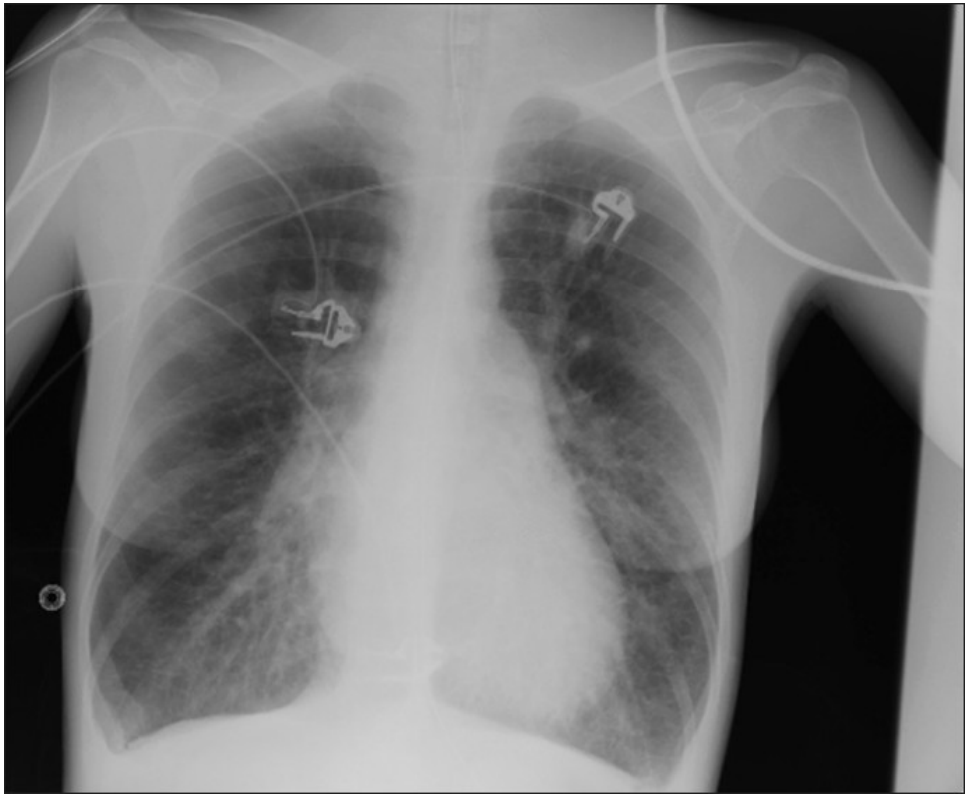
SIGNS & SYMPTOMS

RESPIRATORY	CARDIAC
Cough	Chest pain
Sputum	Pain, or Discomfort in the arms
Obstructive pattern	Nausea and Fatigue
Wheezing	Tachypnea
	Cold sweats
	Palor
	Cardiac Apex

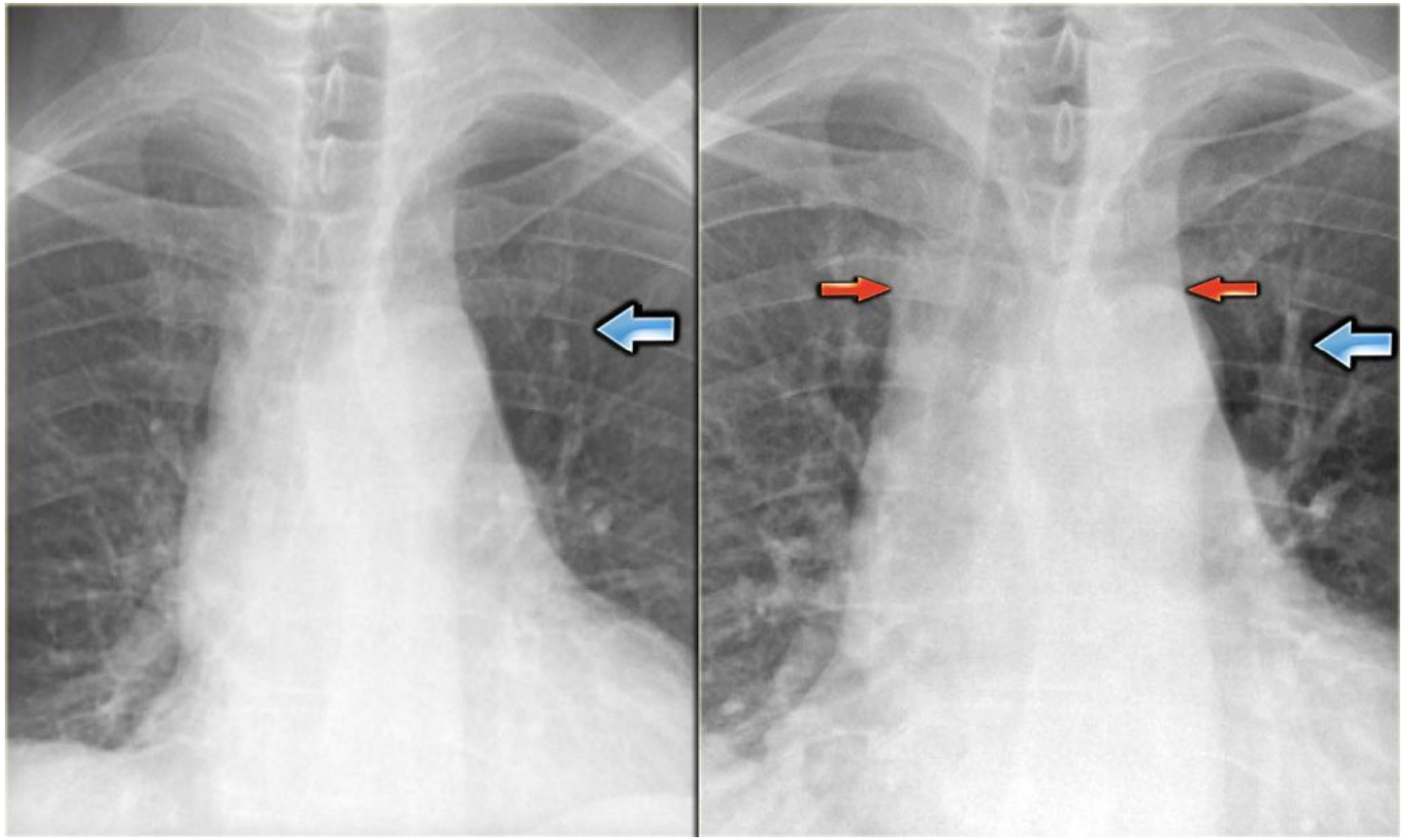
RADIOLOGY HF COPD

- **Hyperinflation MODIFIES the cardiothoracic ratio.**
- **Pulmonary vascular remodeling mask the typical alveolar shadowing of pulmonary edema.**
- **Asymmetry.**
- **Pleural effusions.**

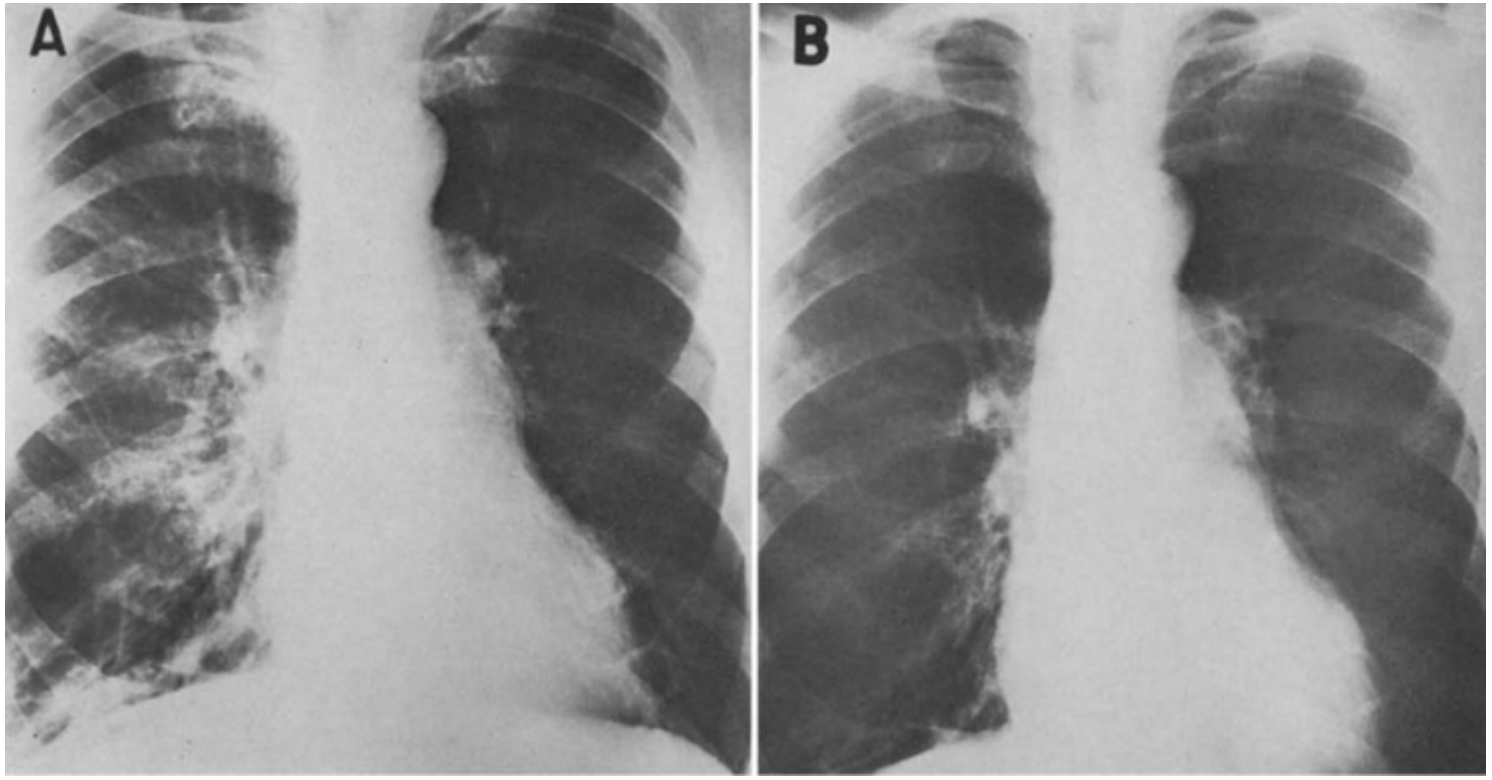
CARDIOMEGALY IN COPD



COPD HF



FOCAL PULMONARY EDEMA



FOCAL PULMONARY EDEMA

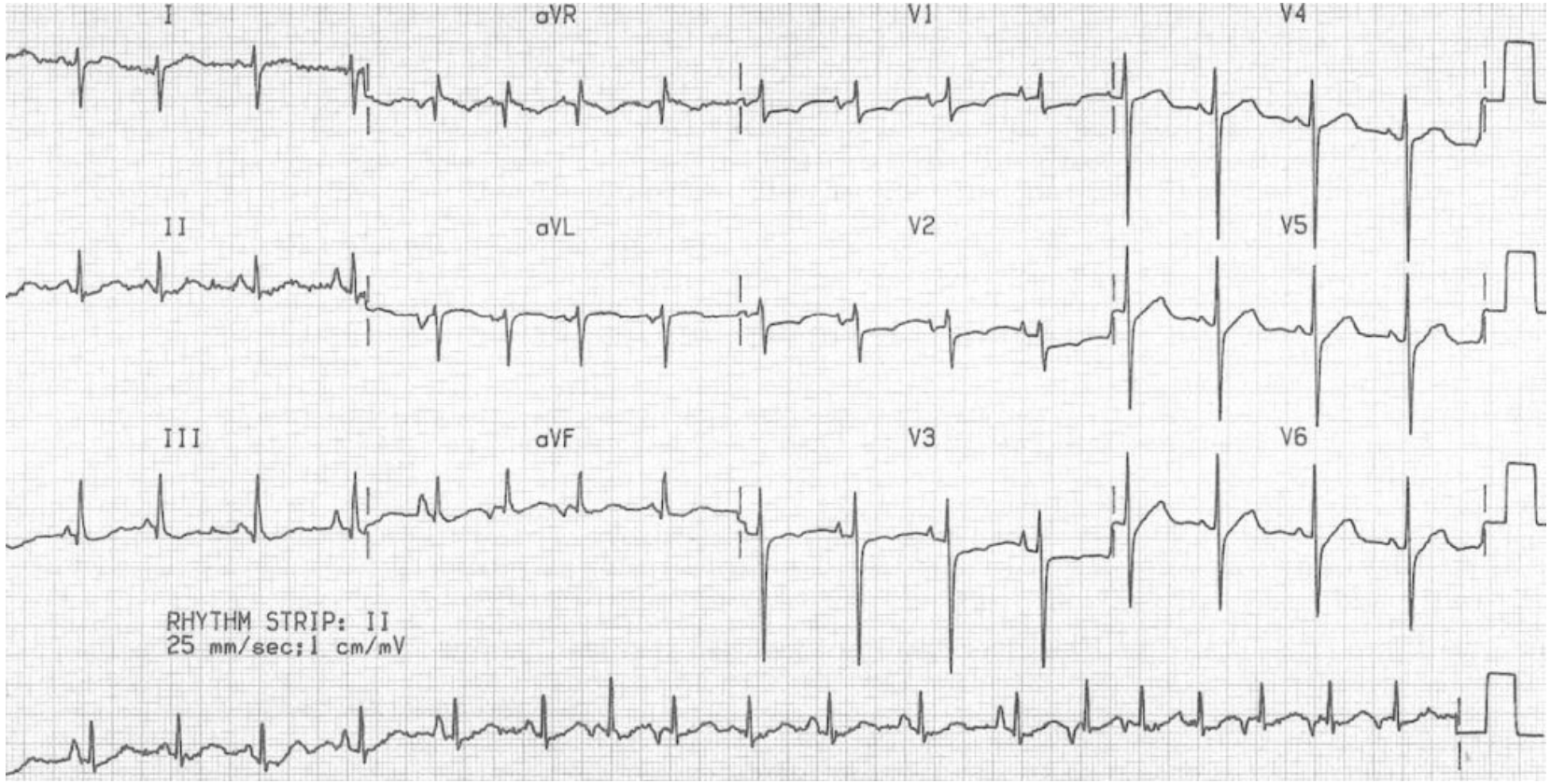
FOCAL PULMONARY EDEMA

COMMON ECG FINDINGS IN COPD

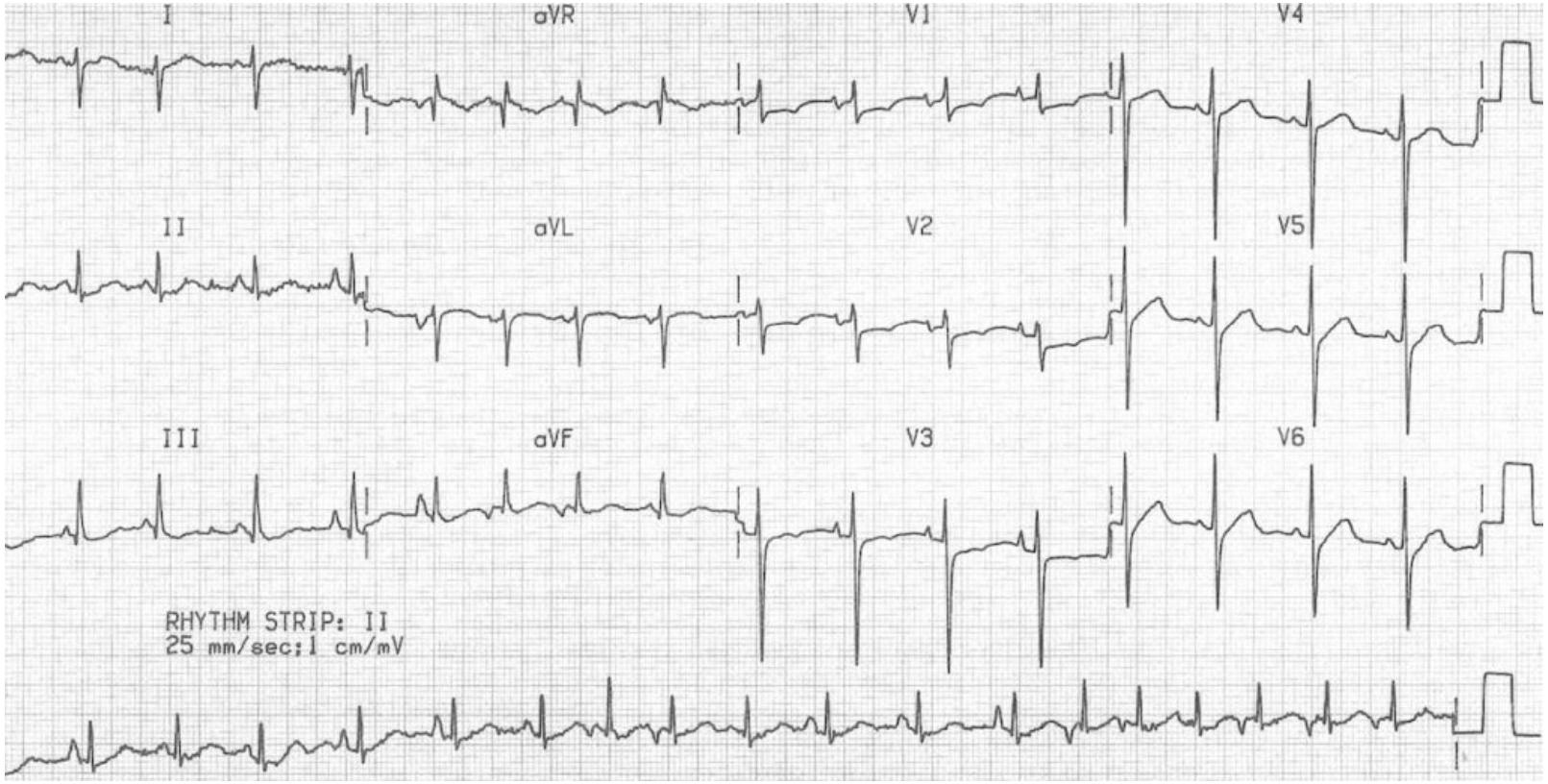
- **Rightward deviation of the P wave and QRS axis**
- **Low voltage QRS complexes, especially in the left precordial leads (V4-6)**
- **Arrhythmias including multifocal atrial tachycardia**
- **HYPOKALEMIA**

COMMON ECG FINDINGS IN COPD

MULTIFOCAL ATRIAL TACHYCARDIA



COMMON ECG FINDINGS IN COPD



COMMON ECG FINDINGS IN COPD

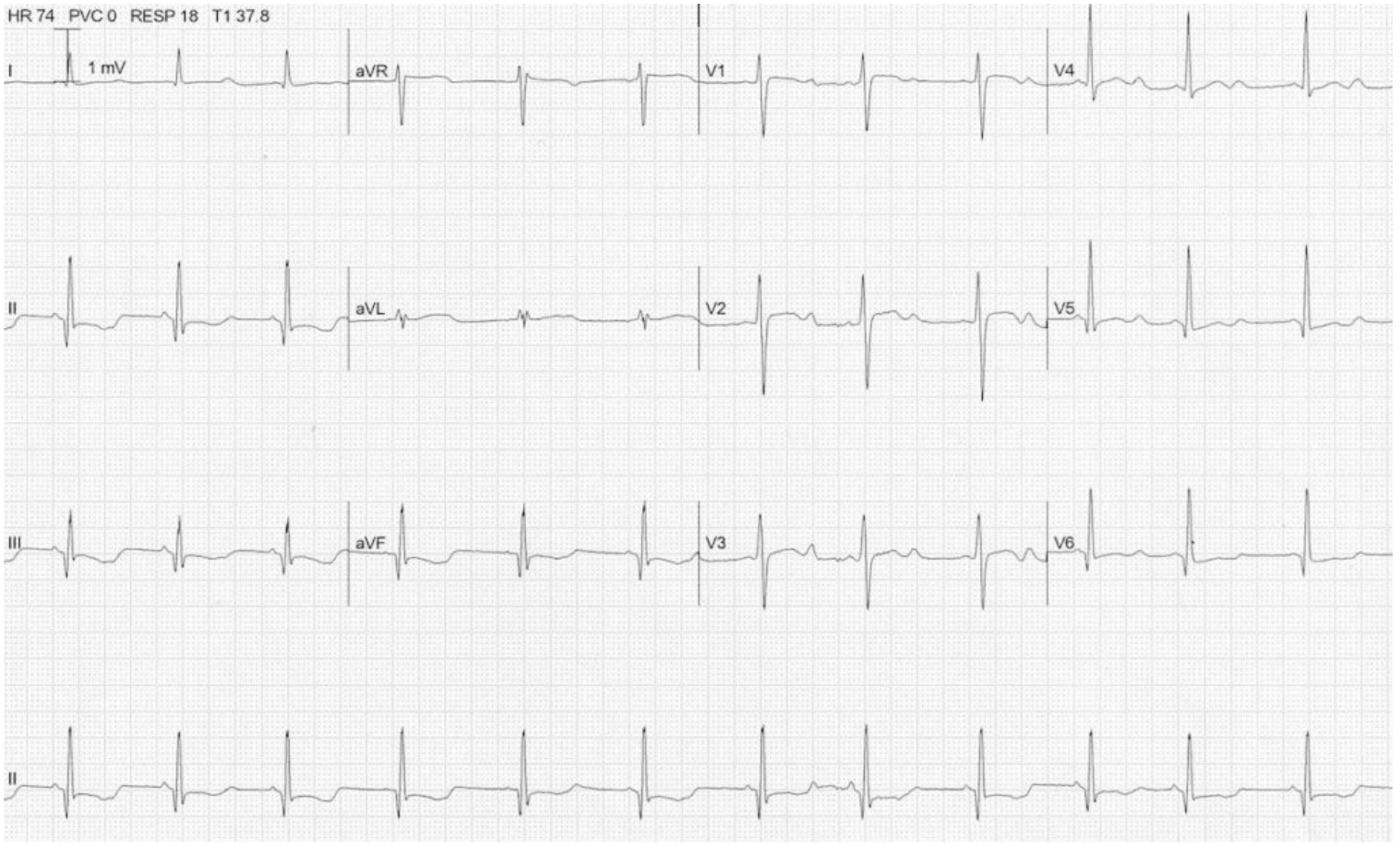

V1
'W'
V6
'M'

MULTIFOCAL ATRIAL TACHYCARDIA

MULTIFOCAL ATRIAL TACHYCARDIA

- TREATEMENT ONLY IF VENTRICULAR RESPONSE IS BADLY TOLERATED
- HYPO-MAGNESEMIA
- HYPO-KALEMIA

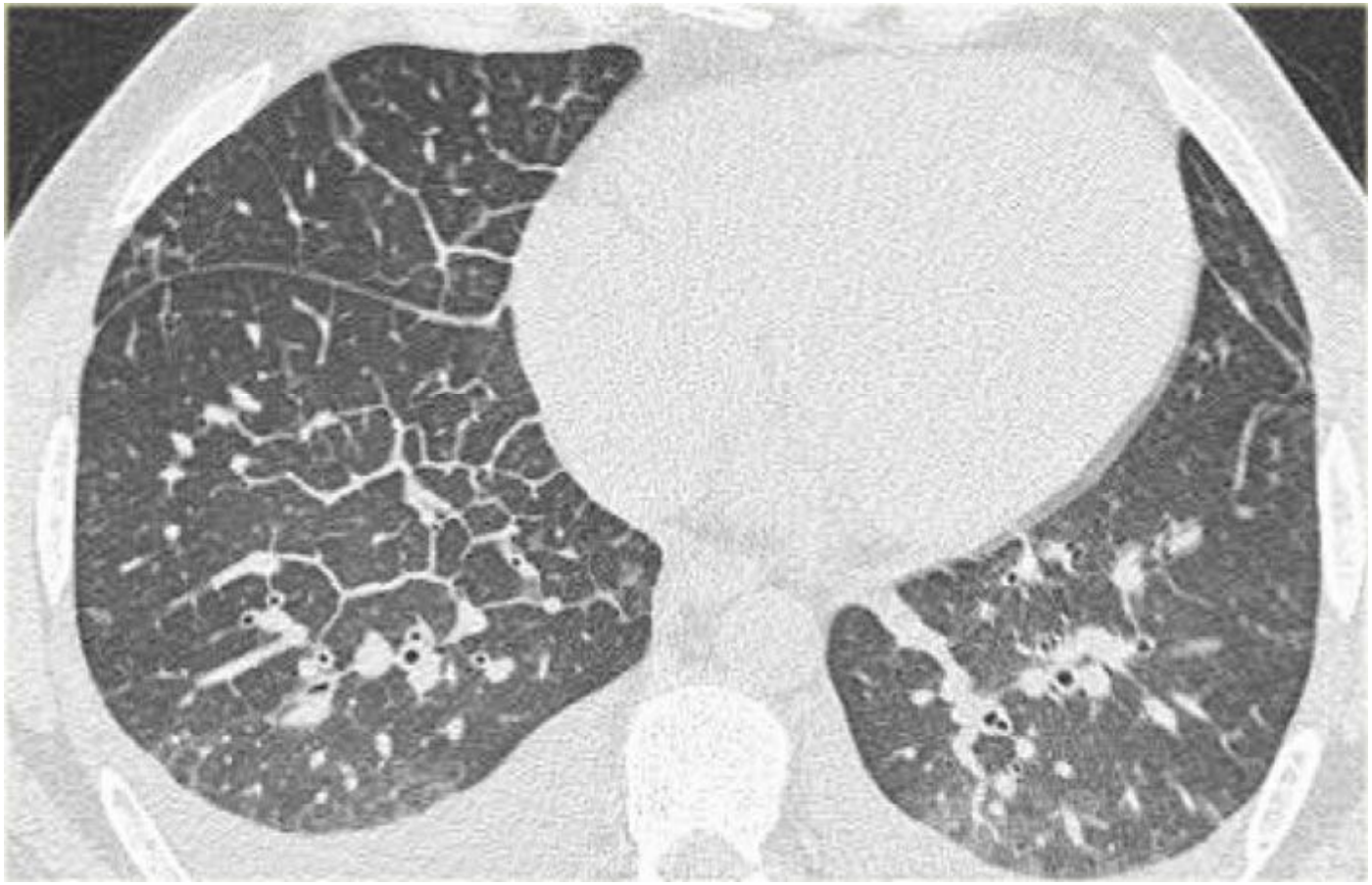
COMMON ECG FINDINGS IN COPD



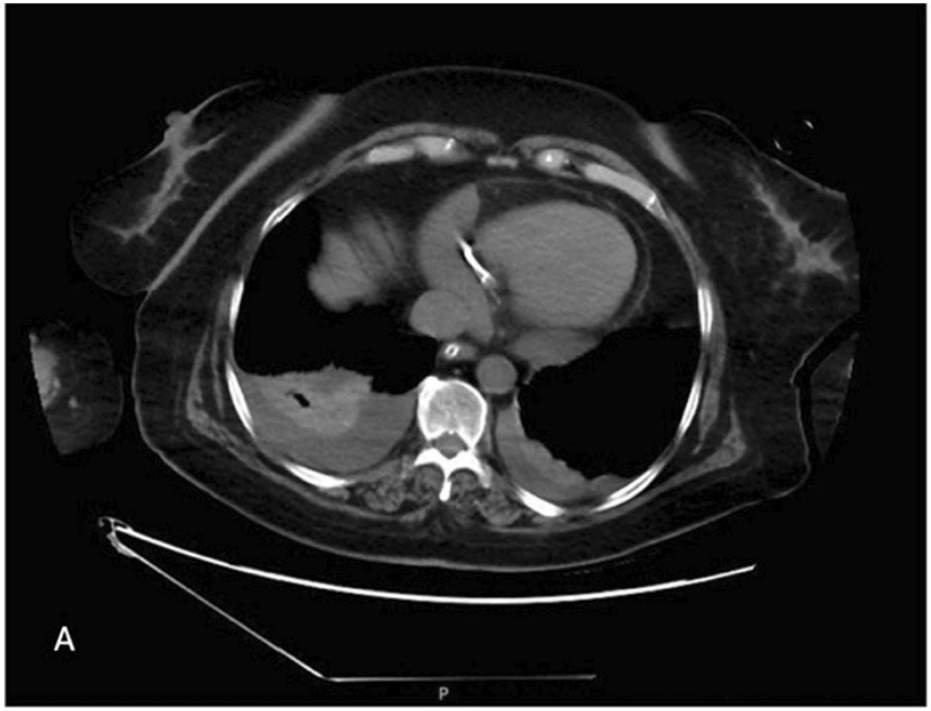
SPIROMETRY

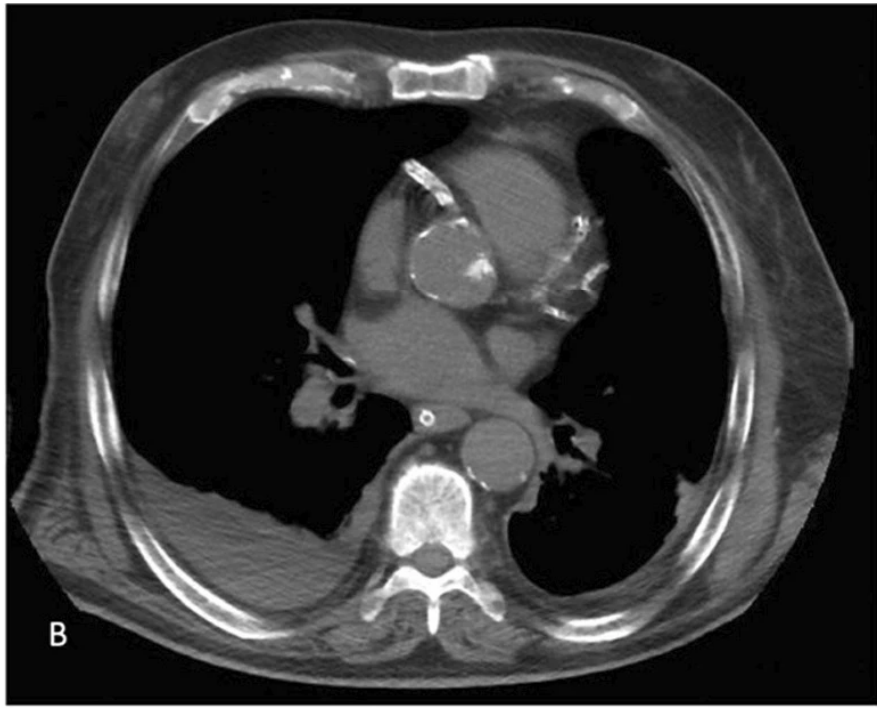
- DECREASES FVC ASSOCIATED CHF AF MI
- DECREASES PF ASSOCIATED WITH ALL CAUSES OF MORTALITY
- RESTRICTIVE SD
- DECREASE FVC CAN PRECED CLINICAL SIGNE
- ACCELERATED DECLINE LUNG FUNCTION

THORACIC CT

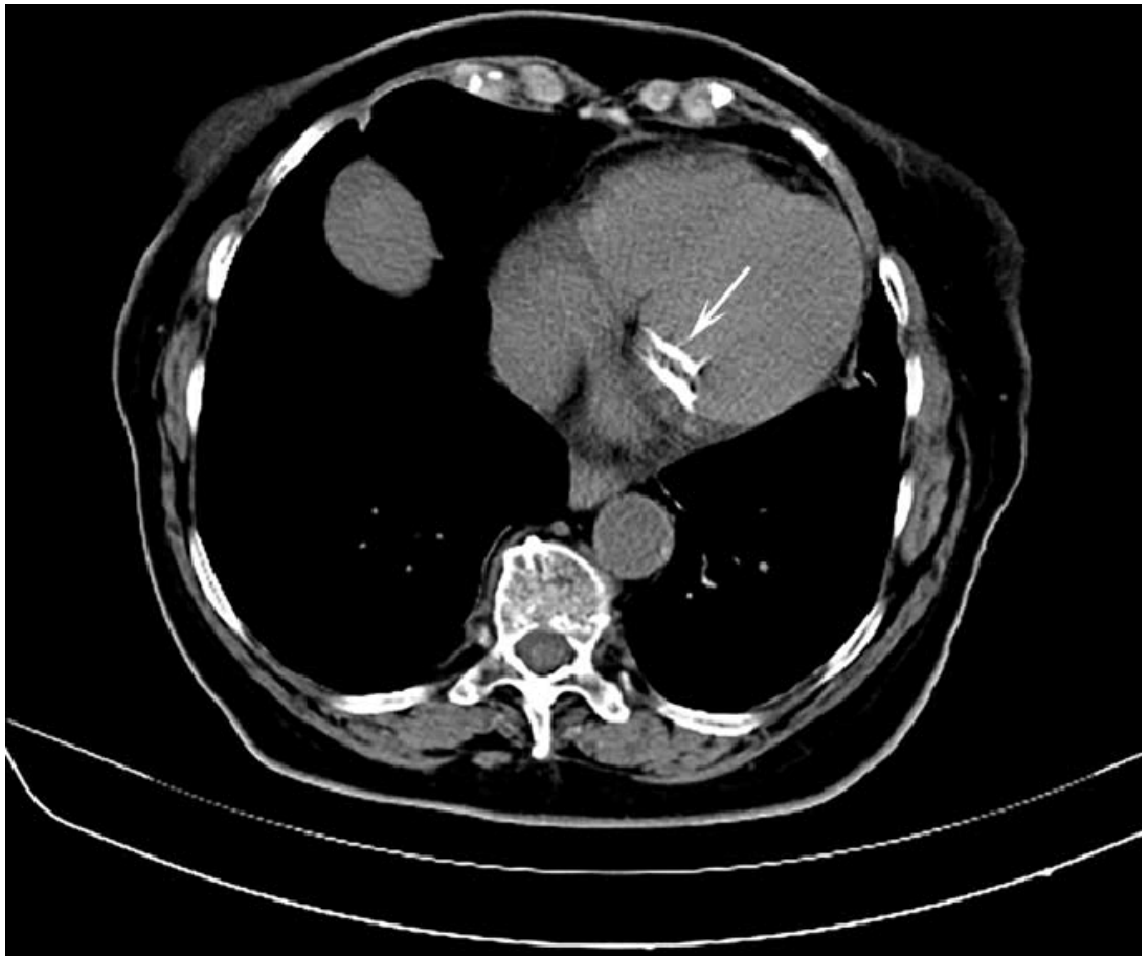


CORONARY ARTERY CALCIFICATION

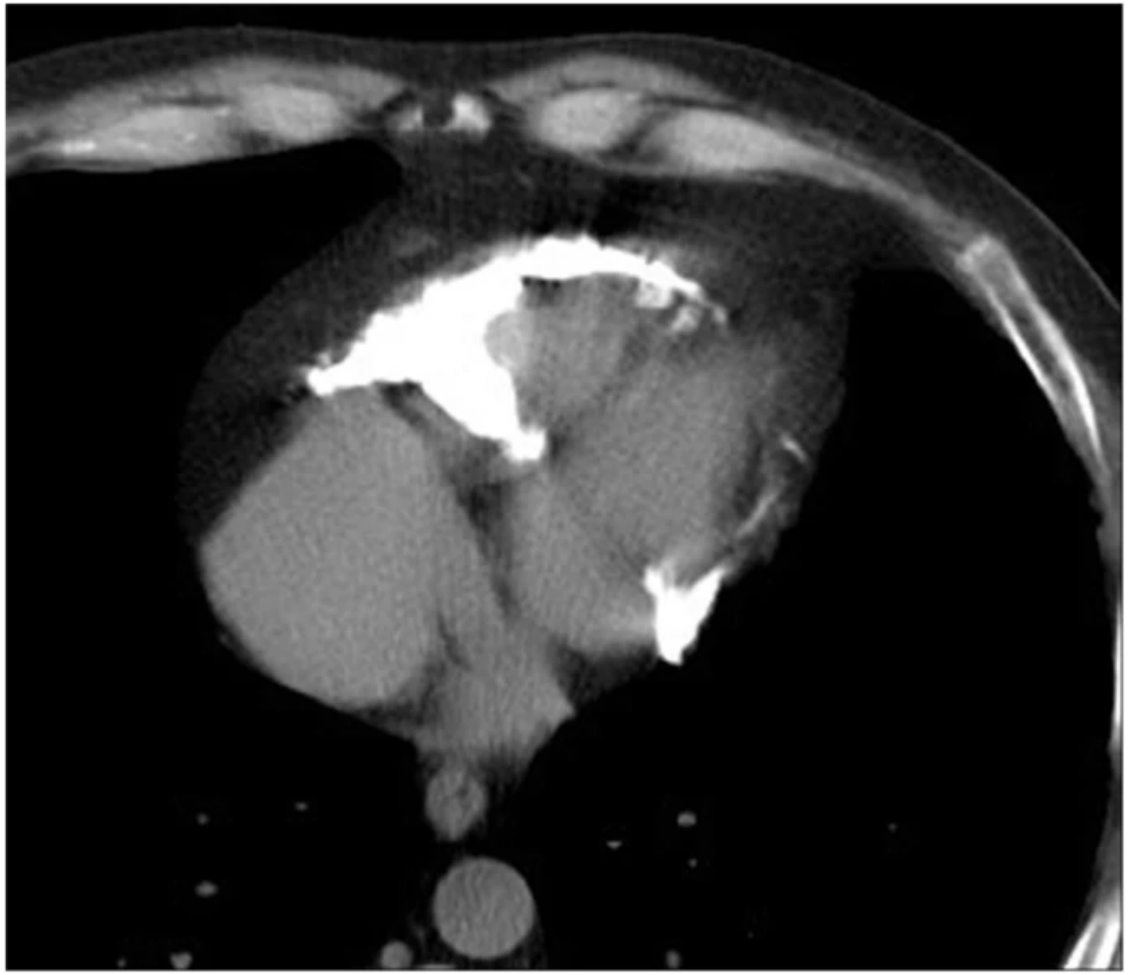




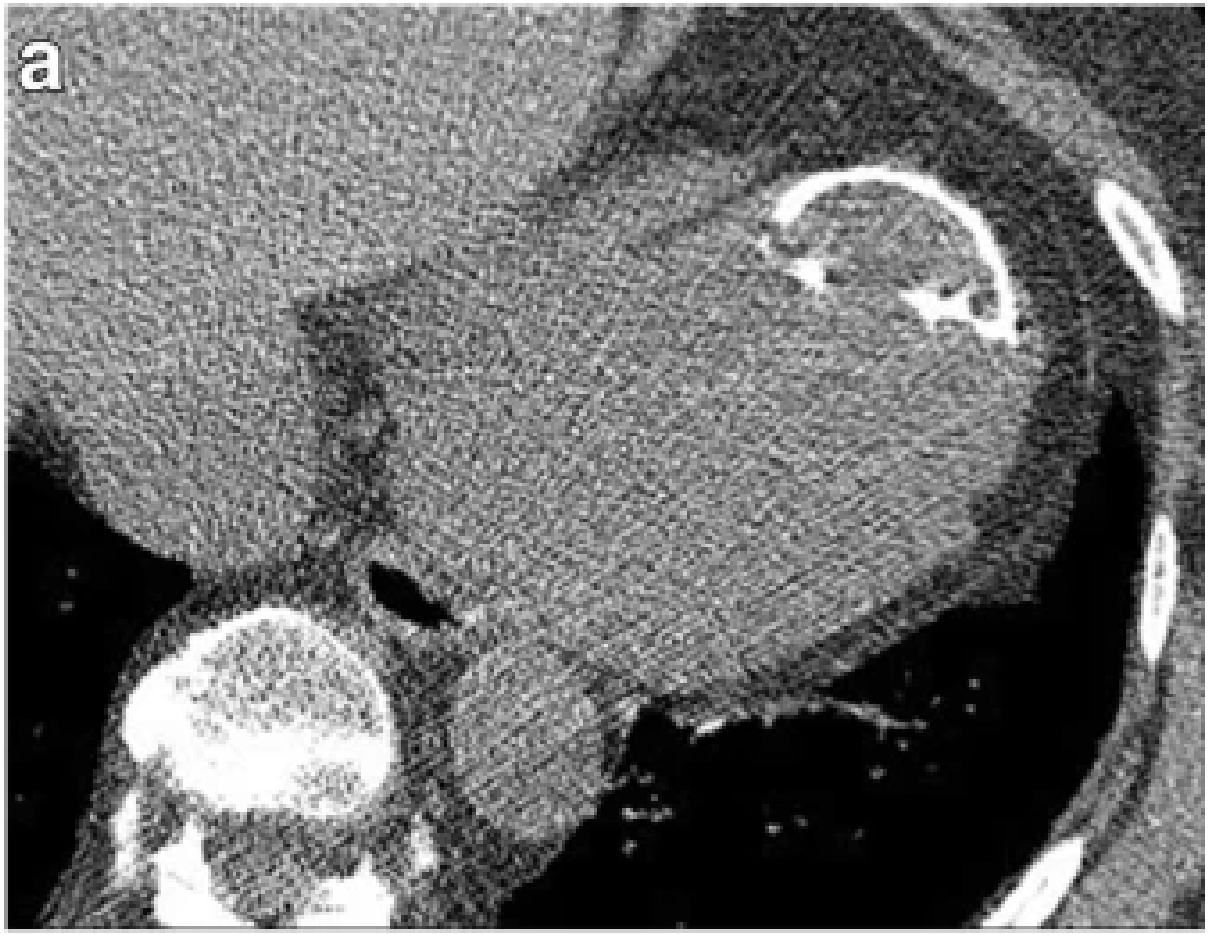
MITRAL CALCIFICATION



INCIDENTAL FIDING

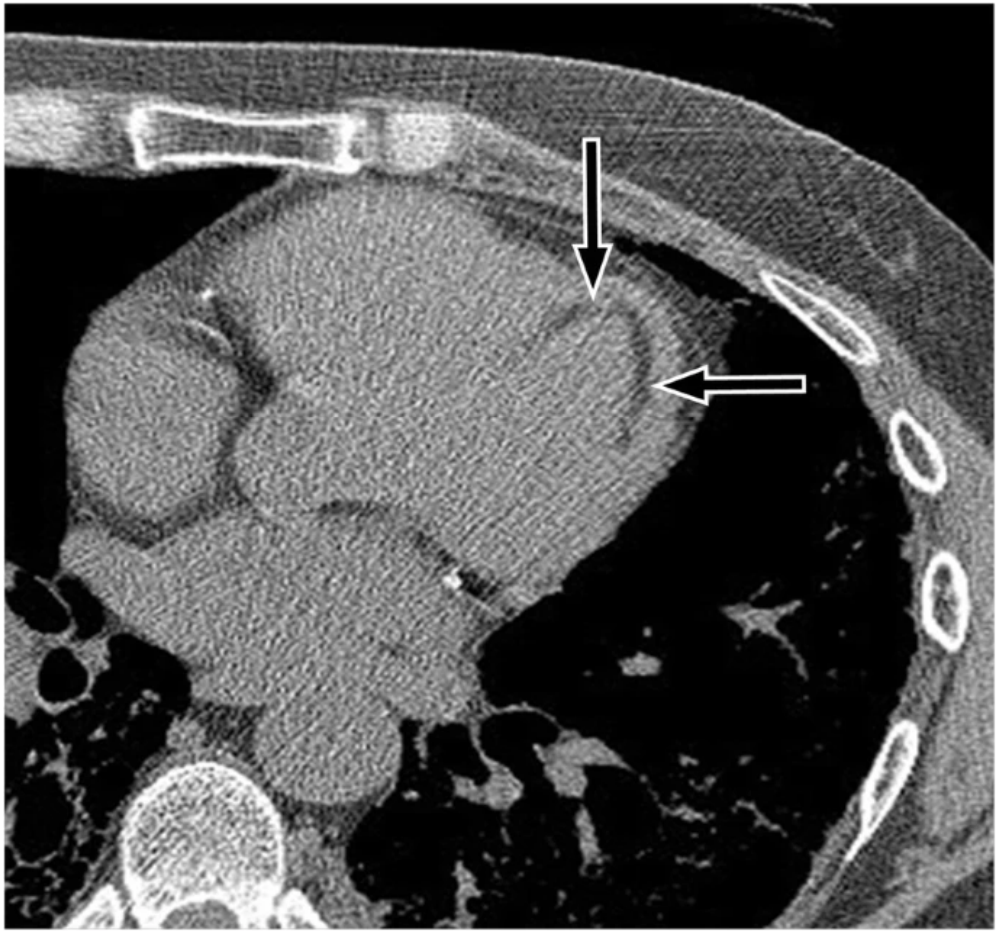


MYOCARDIAL CALCIFICATION

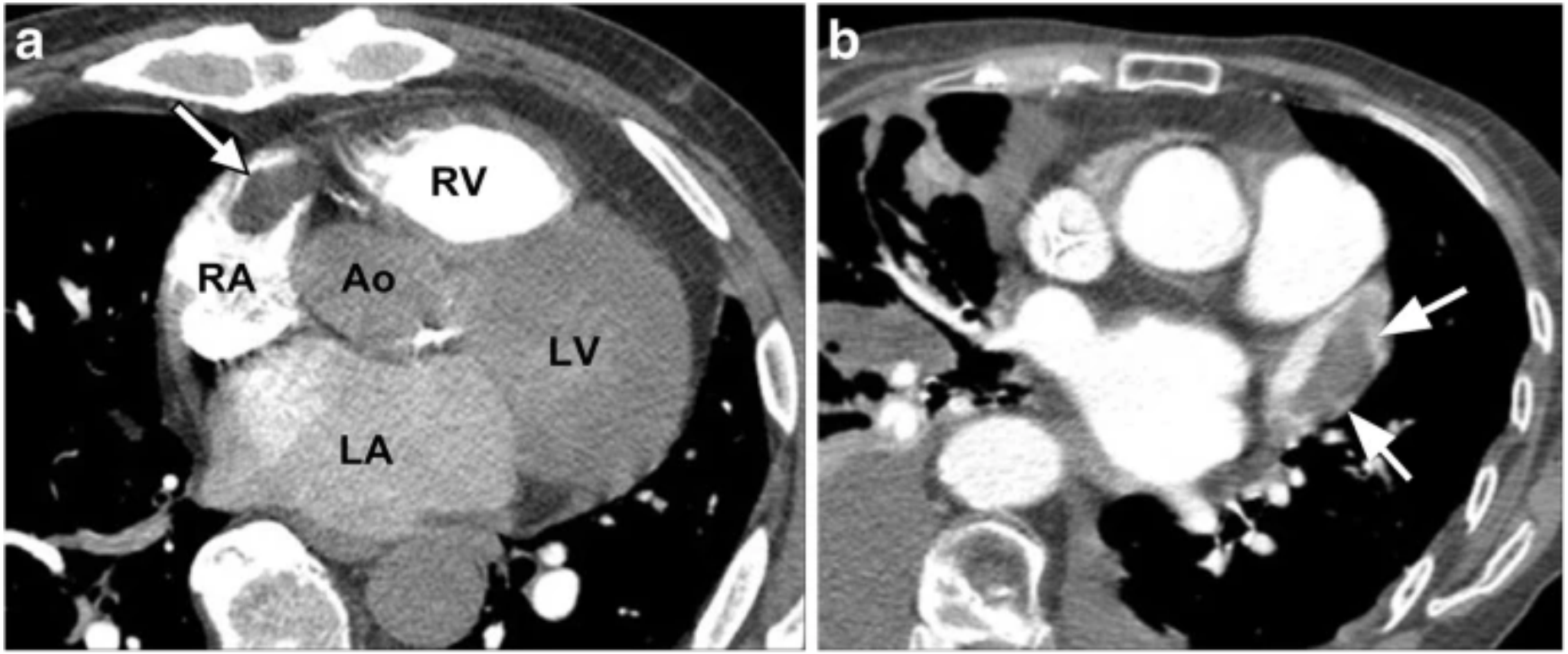


INCIDENTAL FIDING

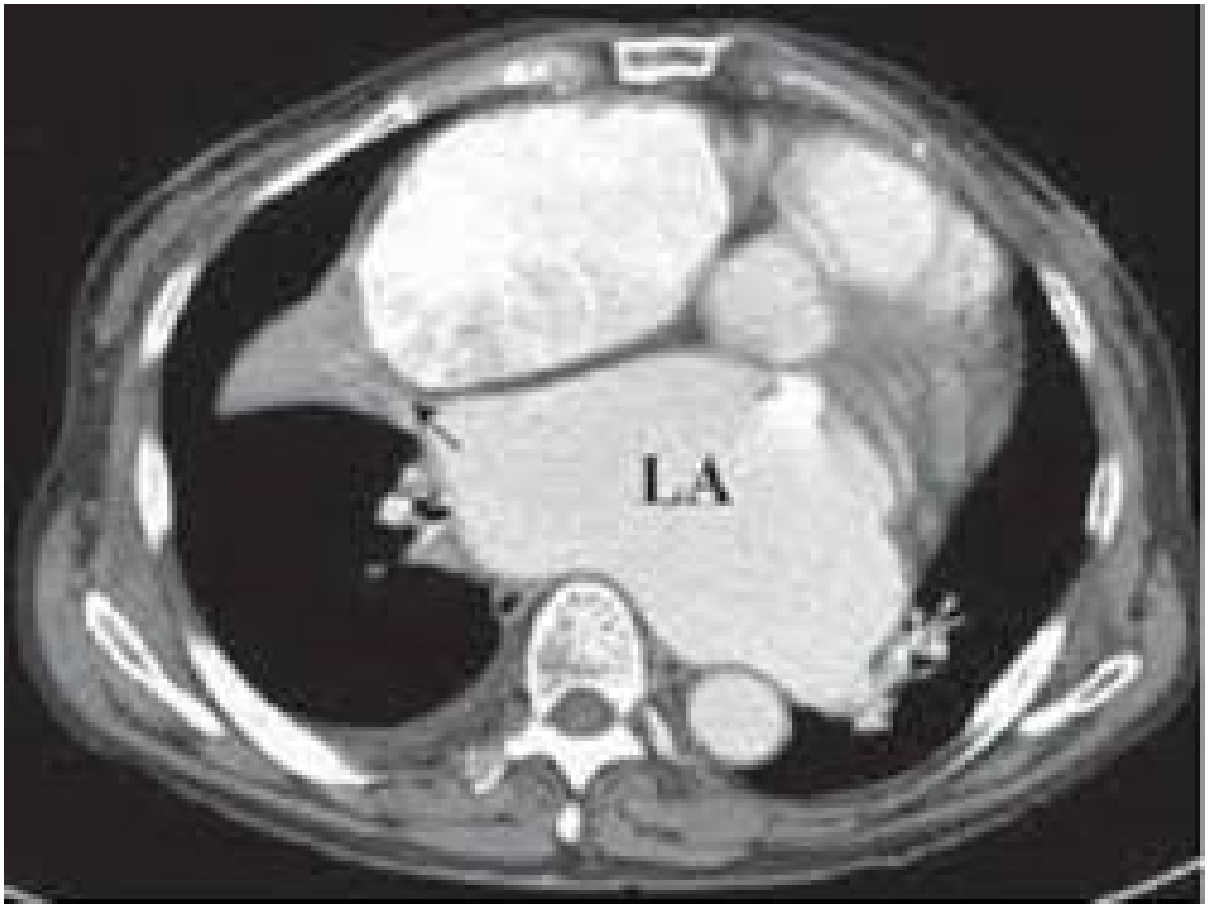
OLD MI



FILLING DEFECTS IN THE CARDIAC CHAMBERS



LEFT ATRIUM ENLARGEMENT



ECH THORACIC

- PLEURAL EFFUSION 90%
- PNO 90-100%
- ALVEOLO INTERSTITIAL SD 80%
- IVC

BNP IN COPD

- CONCORDANCE ELEVATION WITH COPD GRADE
- STRONG NEGATIVE PREDICTIVE VALUE
- 100>DOSAGE<500PG/ML
- PRO-BNP >125PG/ML AGE RELATED

ETIOLOGY OF BNP ELEVATION

Diseases	Screening*	Diseases severity / risk stratification / monitoring of therapy	Prognosis
Heart failure†	+	+	+
Acute coronary syndrome	+	+	+
Cardiac procedures	+	+	+
Pulmonary embolism	+	+	+
Pulmonary hypertension	+	+	+
Chronic lung diseases	+	+	-
Valvular heart diseases	+	+	+
Cardiac dysrhythmia	+	+	N / A
Cardiac inflammatory or infectious diseases	+	+	+ / -
Cardiogenic syncope	+	N / A	N / A
Sleep apnea	+	+	N / A
Hypertension	+	+	N / A
Sepsis	+	+	+
Renal failure	+	+	+
Cirrhosis of liver	+	+	+
Hyperthyroidism	+	+	N / A
Intracranial pathologies	+	+	+
Epilepsy / Seizures	+	-	-
Carbone monoxide poisoning	+	N / A	N / A

BNP/COPD

Baseline NT-proBNP in COPD is an independent predictor of respiratory exacerbations, even in individuals without overt cardiac disease.

HIGH TROPONINE

- Sepsis
- Kidney Failure or Chronic Kidney Disease
- Heart Failure
- Chemotherapy-related damage to the heart
- Pulmonary Embolism
- Myocarditis
- AECOPD

CAUSES OF HIGH TROPONINE IN COPD

- NEUTROPHILS
- HYPOXIA
- RIGHT VENTRICULAR DILATION
- PULMONARY HYPERTENSION
- UNDIAGNOSTED CAD
- OXIDATIVE STRESS
- AUTONOMIC DYSFUNCTION
- Hypercoagulability
- Endothelial dysfunction
- Dynamic hyperinflation
- High doses of bronchodilators
- ARTERIAL STIFNESS[PWV]

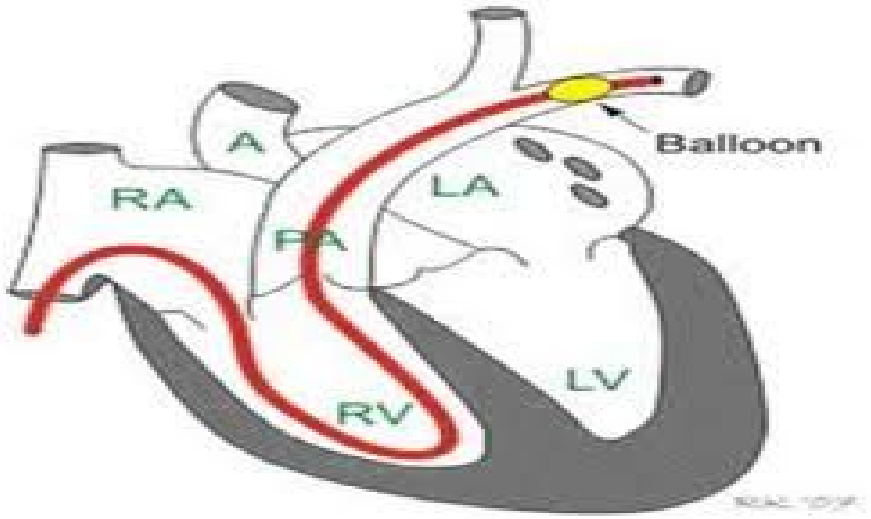
TROPONINE IN COPD

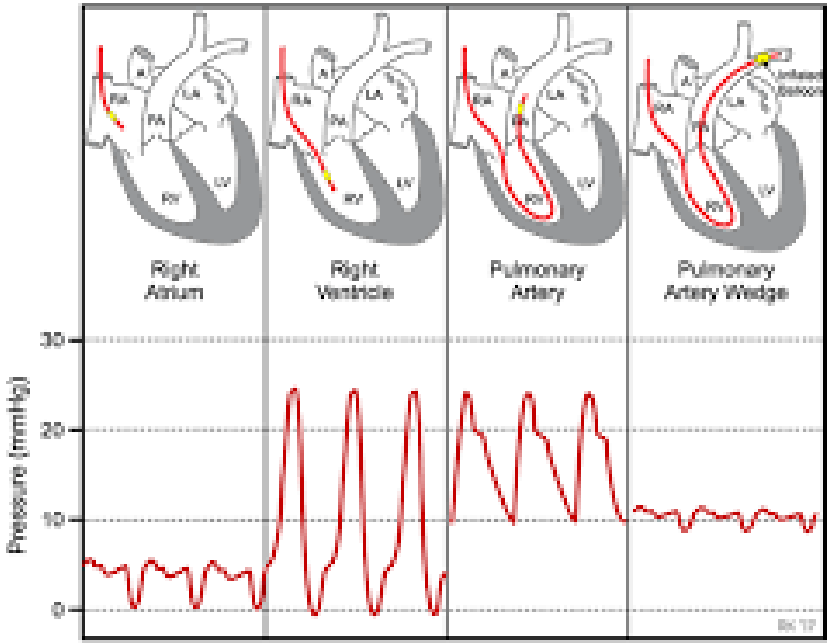
- COMMELY FOUND IN STABLE COPD
- REGARDLESS TO COPD SEVERITY
- PREDICTS AECOPD
- POOR OUTCOME HIGH MORTALITY
- SHAPE OF ELEVATION

CPET/VO2MAX

- **Cardiac limit**
- **Ventilatory limit**
- **Metabolic limit**

RIGHT HEART CATHETRISATION





CHD/COPD/THERAPY

- **BETA BLOKERS/IVABRADINE**
- **ASPIRINE**
- **ACE & ARBS**
- **LABA / LAMA INITIATION IMPROVES CARDIAC FUNCTION**
- **CORTICOSTEROIDS**
- **Revascularization is associated with worse long-term results**
- **SACUBITRIL (Neprilysin Inhibitor)**

HOW DO CORTICOSTEROIDS IMPACT THE CARDIOVASCULAR SYSTEM?

- High Blood Pressure
- DYSLIPIDEMIA
- Fluid Retention
- Myocardial Infarction
- Arrhythmias
- High Cholesterol
- Sudden Cardiac Death

CORTICOTHERAPY

- **IMPROVES CARDIAC PERFORMANCE IN CERTAIN HF CASES**
- **IMPROVE DIURESIS IN REFRACTORY CASES**
- **MI DECREASE MORTALITY**
- **[OLD STUDIES]: Promotes early infarct expansion.**

HOME MESSAGE

- EARLY IDENTIFICATION OF COPD
- EARLY IDENTIFICATION OF HERAT ABNORMALITIES
- NEVER SAY COPD IS A LOCAL DISEASE
- FREQUENT EXACERBATOR, ACCELERATED DECLINE IN PERFORMANCE 6MWT IN MILD TO MODERATE COPD

Let's go!