Pulmonary Vascular Disease

1. Pulmonary Embolization
2. Pulmonary Hypertension & Cor Pulmonale

Pulmonary Embolism

Pulmonary embolism is the occlusion of one or more pulmonary arteries by thrombi that originate typically in large veins of the lower extremities or pelvis.

The thrombi may originate in RV & rarely in veins of upper extremities.

Emboli other than clot are air, fat, amniotic fluid, septic foci & malignant tissue.

Risk Factors of PE

- **Conditions that impair venous return or that cause endothelial injury or dysfunction particularly in patients with an underlying baseline hypercoagulable state.**

- **Bed rest and confinement without walking, even for a few hours, are common precipitators.**

Pathophysiology of PE

When large emboli occlude major arteries, or when many small emboli occlude > 50% of the distal arterial system, RVP increases, causing acute RVF, shock, or sudden death.

Pulmonary infarction occurs in < 10%. This low rate has been attributed to the dual blood supply to the lung .

Clinical Features of PE

- **Symptoms :-** Larger emboli cause acute dyspnea and pleuritic chest pain and, less commonly, cough and/or hemoptysis. Massive PE presents with hypotension, tachycardia, syncope, or cardiac arrest.

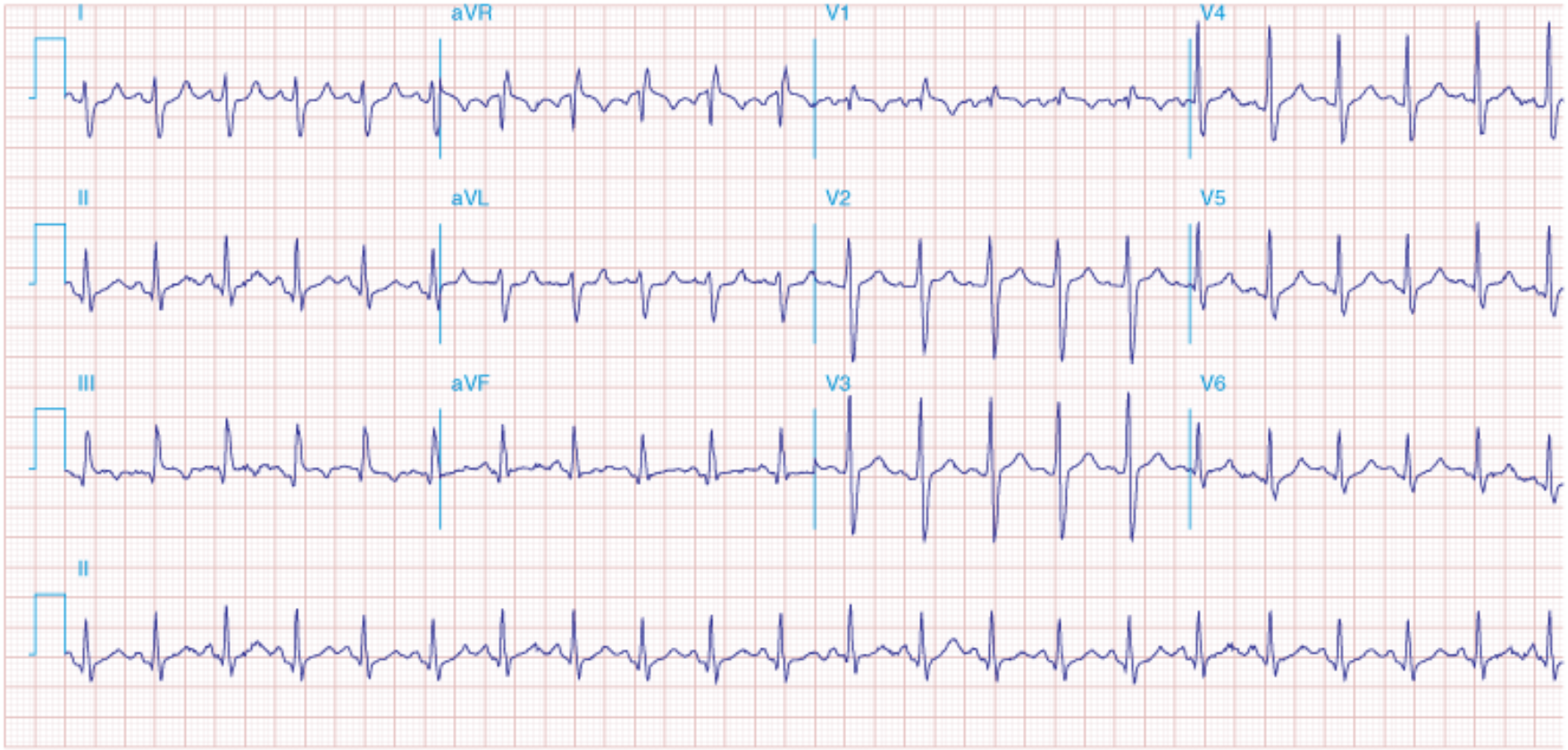
* **Signs :-** Dyspnea, Tachypnea, Low BP, loud P2, signs of RVF

Diagnosis of PE

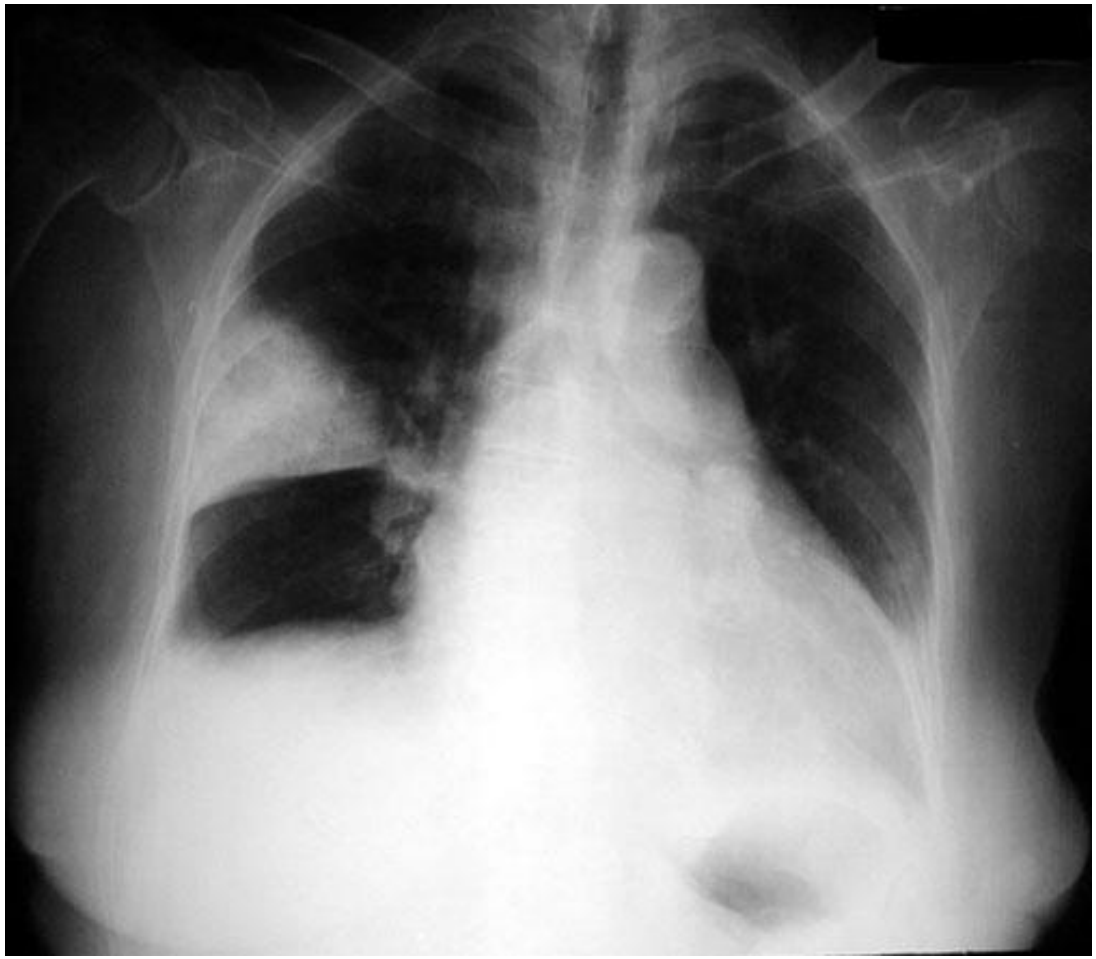
- **Think about the possibility of PE**
- **Pulse oximetry**
- **Chest X – ray : atelectasis, focal infiltrates, an elevated hemidiaphragm, and/or a pleural effusion.**
- **ECG : Non specific changes, tachycardia, S1 Q3 T3 , new RBBB**

* **ECHO , Scan, V/Q, D- diamer , Angio**

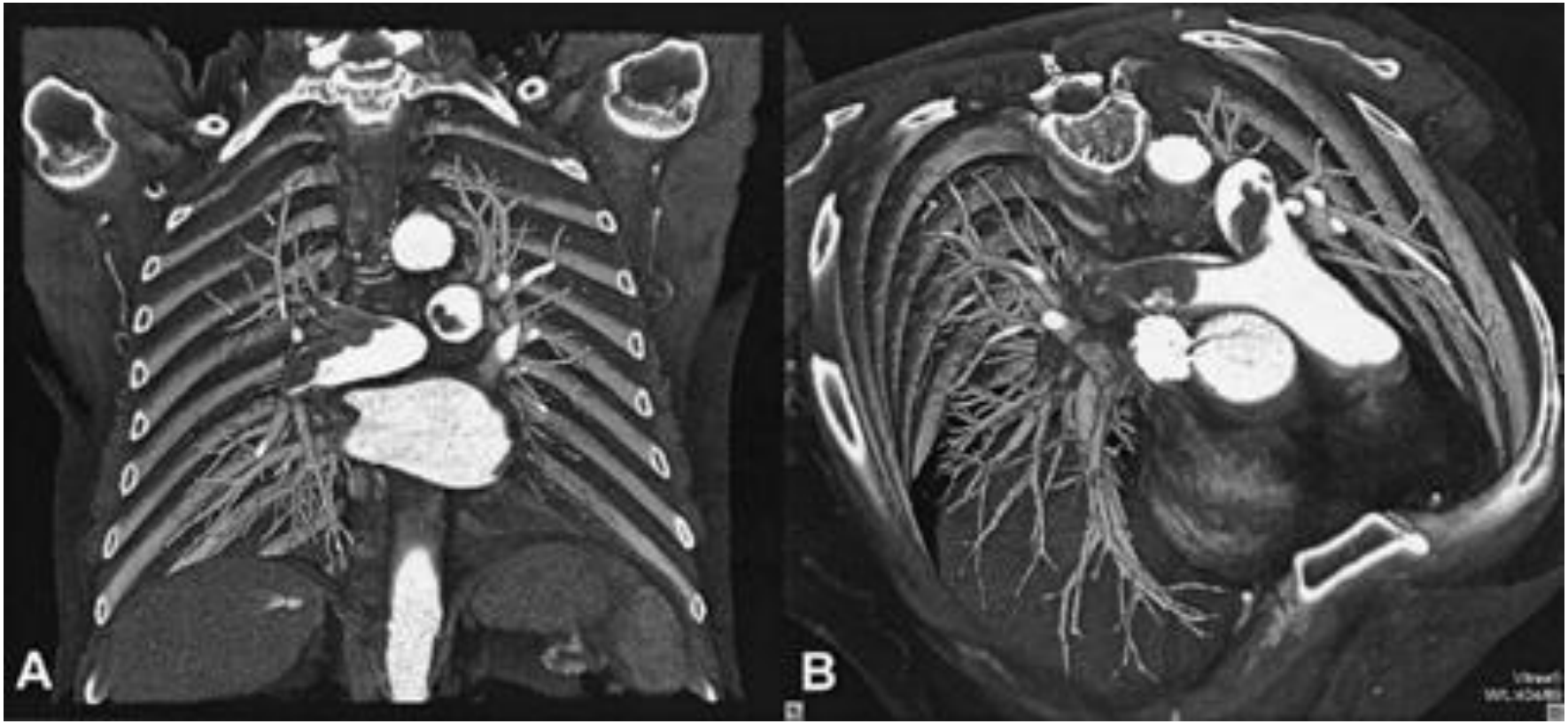
ECG of PE (S1 Q3 T3)



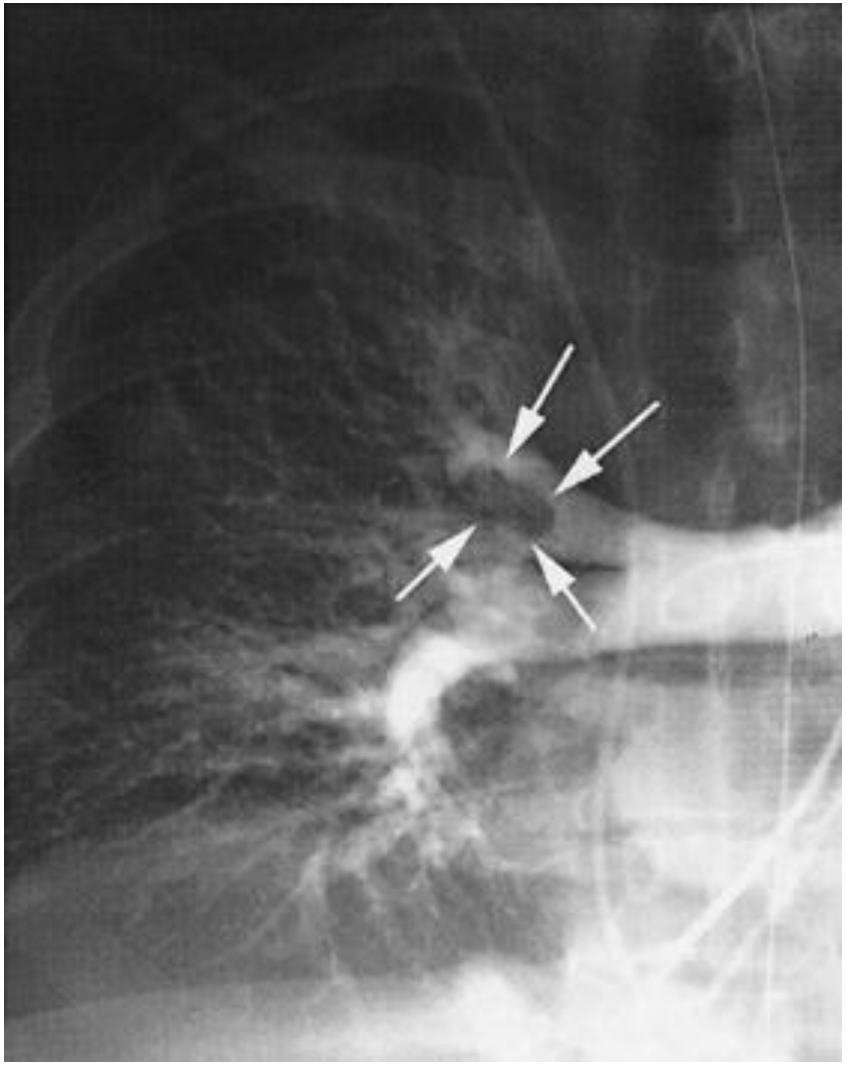
CXR – Pulmonary infarction



CT Scan of PE



Angiogram PE



Angiogram PE

PE Treatment

- **O2, IV fluid & Vasopressors**
- **Thrombolytic therapy with tissue plasminogen activator (tPA), urokinase or streptokinase (250,000 units over 30 min followed by continuous infusion of 100,000 units/h for 24 h).**

PE Treatment – (cont.)

- **anticoagulation is required acutely to prevent residual clots from extending and embolizing . Heparin followed by warfarin.**
- **Emboloctomy & Inf. V.C. filter**
- **Measures to prevent recurrence.**

Pulmonary Hypertension

Definition :- A mean pulmonary artery pressure of more than 25 mm at rest or 30 mm on exercise.

Causes :-1. Collagen vascular disease

2. Mitral valve disease

3. Systemic – pulmonary shunt

4. Chronic lung disease

5. Idiopathic PH

Idiopathic (primary) Pulmonary Hypertension

- **Most frequently seen in young women.**
- **Cause is unknown ? Recurrent emboli**
- **weakness , fatigue, edema , ascites , dyspnea , peripheral cyanosis & syncope.**
- **Symptoms & Signs of RVF *but not* of LVF.**

PHT – Clinical Features

Signs :-

- **Right ventricular lifting impulse along the lower left sternal border. .**
- **A-wave detected on examination of the jugular venous pulse in the neck.**
- **Closely split S2 & palpable P2**

* **Ejection click**

* **S4**

Idiopathic PHT

* Enlarged pulmonary arteries on chest radiograph.
- Echocardiography is often diagnostic
- Secondary PH should be excluded before making the diagnosis of PPHT

CXR – Prominent PA

Idiopathic PHT

- **Pulmonary function tests help to exclude other disorders.**
- **death in 2-8 years**
- **Treatment :- oral anticoagulation , O2 , Diuretics , calcium channel blockers phosphodiesterase-5 inhibitors, such as sildenafil. IV Epoprostenol**

* **Pulmonary transplantation**

Pulmonary Heart Disease (Cor Pulmonale)

- **Definition:-**

  RVH and eventual failure resulting from pulmonary disease with hypoxia or from pulmonary vascular disease (pulmonary hypertension). Its clinical features depend on both the primary underlying disease and its effects on the heart.

Cor-pulmonale / Causes` ` `

- **Chronic obstructive lung disease**
- **Pneumoconiosis**
- **Pulmonary fibrosis**
- **Kyphoscoliosis**
- **Idiopathic pulmonary hypertension**

* **Repeated episodes of subclinical or clinical pulmonary embolization,**

- **Pickwickian syndrome**
- **Schistosomiasis```**

Cor-pulmonale / Clinical features

- **Symptoms:-**

  chronic productive cough , dyspnea ,

  wheezing, easy fatigability , weakness oedema and right upper quadrant pain.

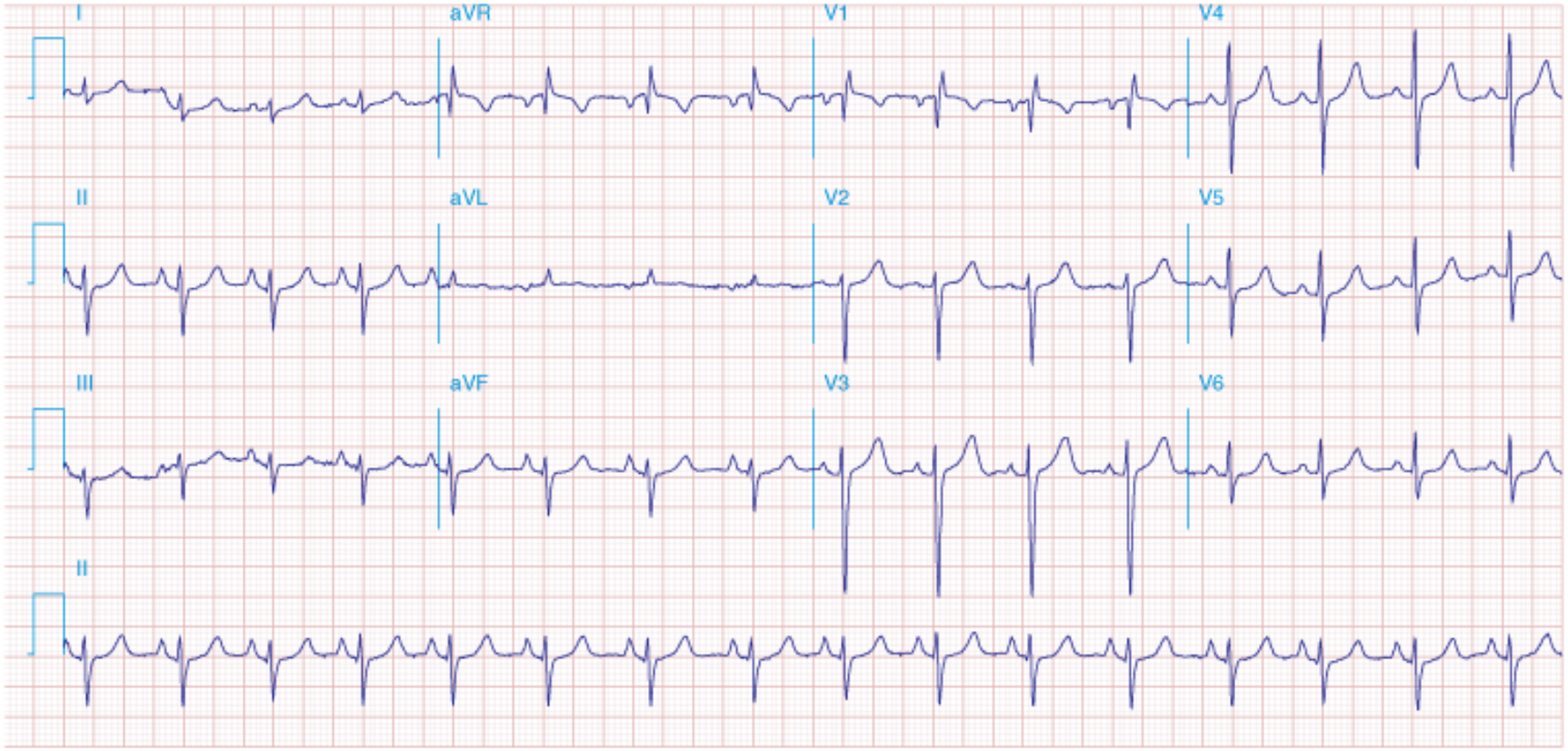
- **Signs :-**

  cyanosis, clubbing, distended neck veins, RV heave or gallop (or both), prominent lower sternal or epigastric pulsations, an enlarged and tender liver, and dependent oedema.

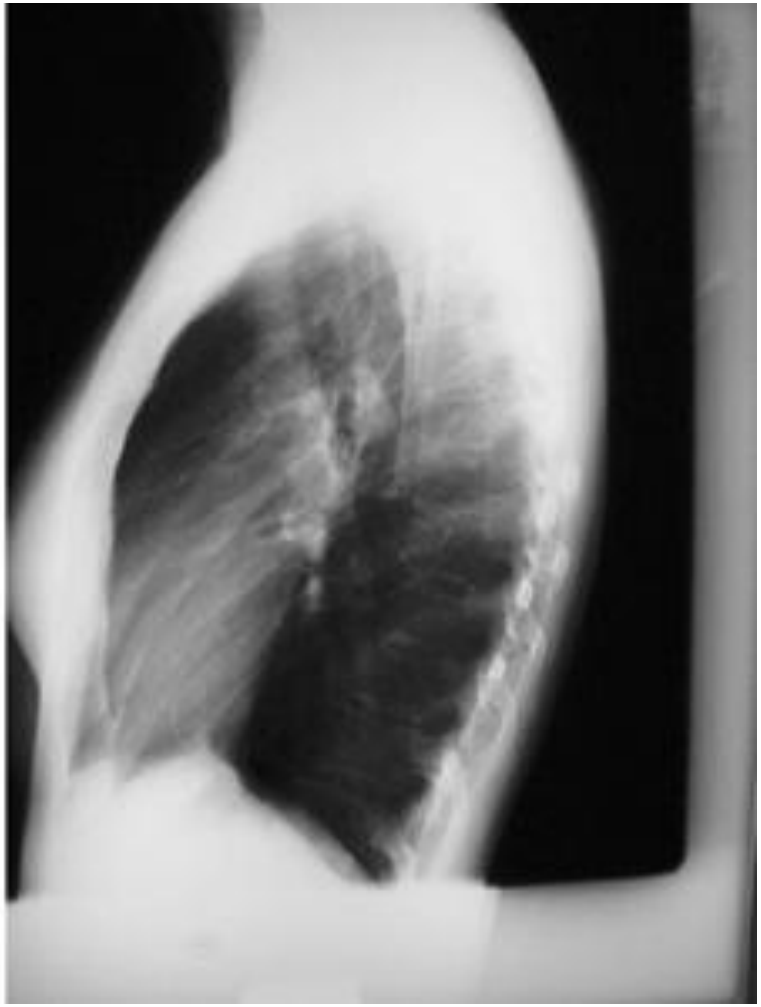
Cor-pulmonale / Investigation

- Hypoxia (O2 below 85%)
- Polycythemia
- ECG :- RAD, P-pulmonale, low voltage, deep S in lateral chest leads, RVH, supraventricular arrhythmia
- CXR :- Prominent RV & PA
- Pulmonary function test & Echo

Cor-pulmonale / ECG



CXR – Cor pulmonale



Cor-pulmonale / Treatment

- **treatment of chronic pulmonary disease.**
- **Oxygen, salt and fluid restriction, and diuretics (thiazides & Spirnolacton)**

  Digoxine is of doubtful value
- **Phlebotomy if PCV exceeds 65%**
- **Prognosis :- Once congestive signs appear, the average life expectancy is 2-5 years, but survival is significantly longer when uncomplicated emphysema is the cause**