

Classic case of Unilateral pulmonary edema (UPE) secondary to Mitral Regurgitation (MR)

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Case Presentation

Presenting complaint:

- 86 year old female admitted from Respiratory clinic due to recent episodes of haemoptysis and findings on CT on a background of pulmonary nodule surveillance and right basal pneumonitis

Past Medical & Surgical history:

- CCF (EF 55%) PPM in situ
- Atrial Fibrillation
- HTN

Medications:

Cardiacor

Frusemide 40mg od

Atorvastatin

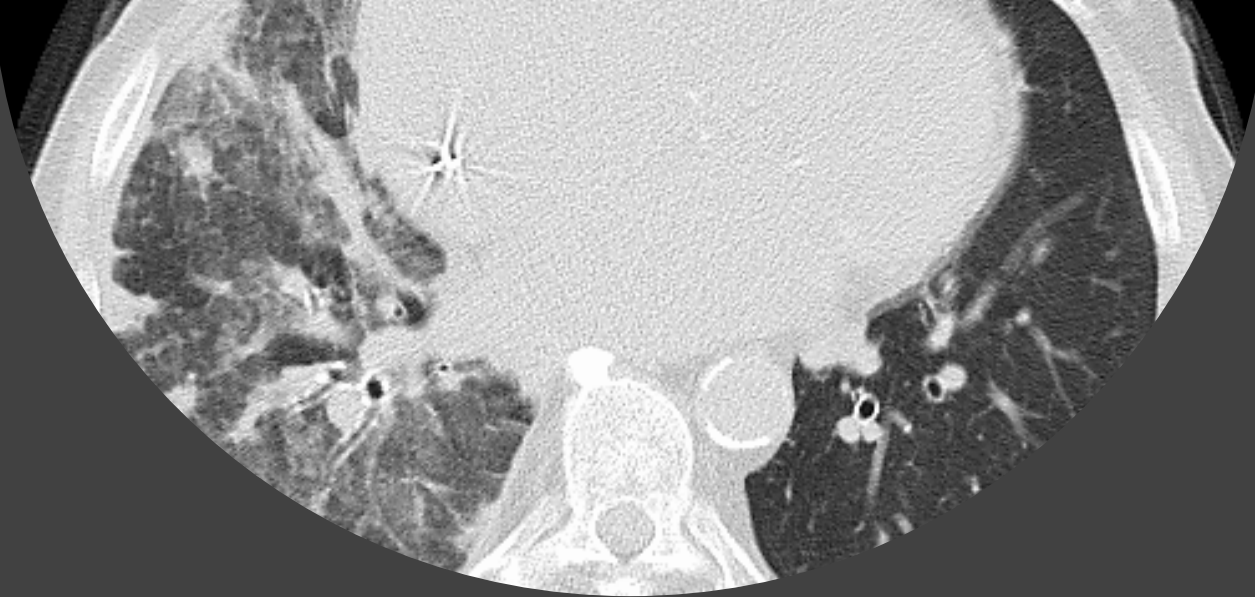
Warfarin

History of presenting complaint:

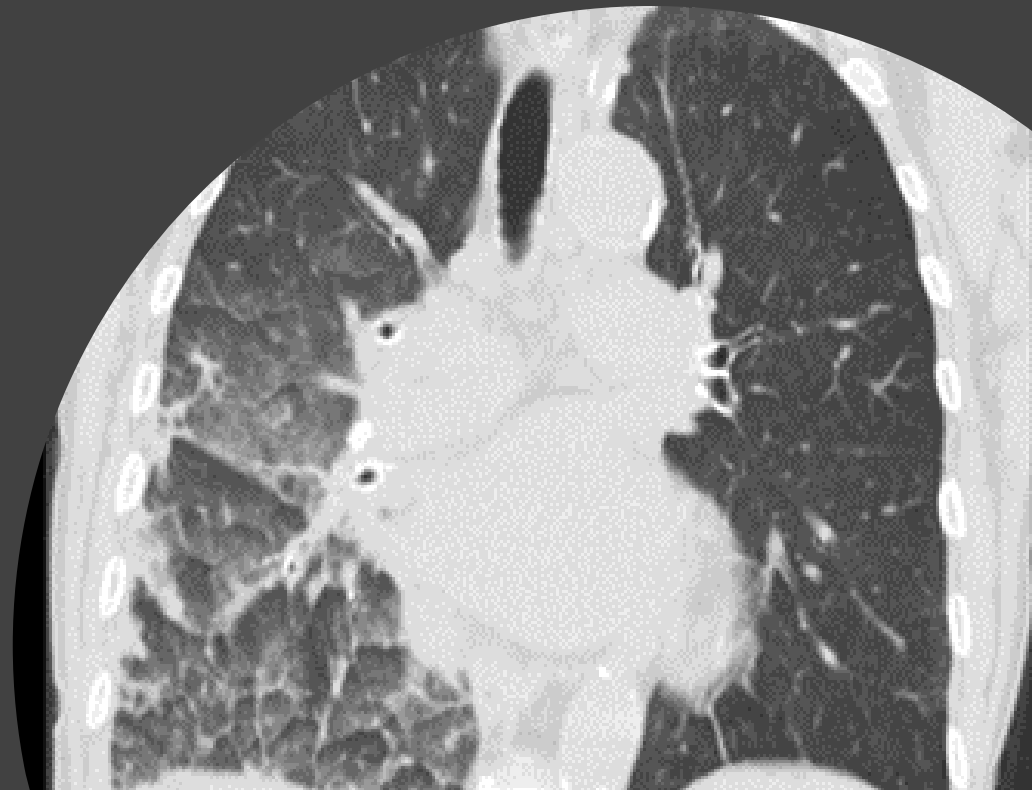
Recent episodes of haemoptysis and weight loss but unable to quantify amount

No other symptoms to suggest infection

- **CT Thorax** = Right lower lobe septal thickening with groundglass attenuation with nodular areas of consolidation.



- Pulmonary veins are expanded and foci of calcification are present. The appearance is probably most in keeping with mitral regurgitation into the right lower lobe.



Differential Diagnosis

Unilateral edema with
ipsilateral pathology

Severe MR

Re-expansion pulmonary
edema

Pulmonary vein occlusion

congenital or surgical right-
to-left shunt

Examination:

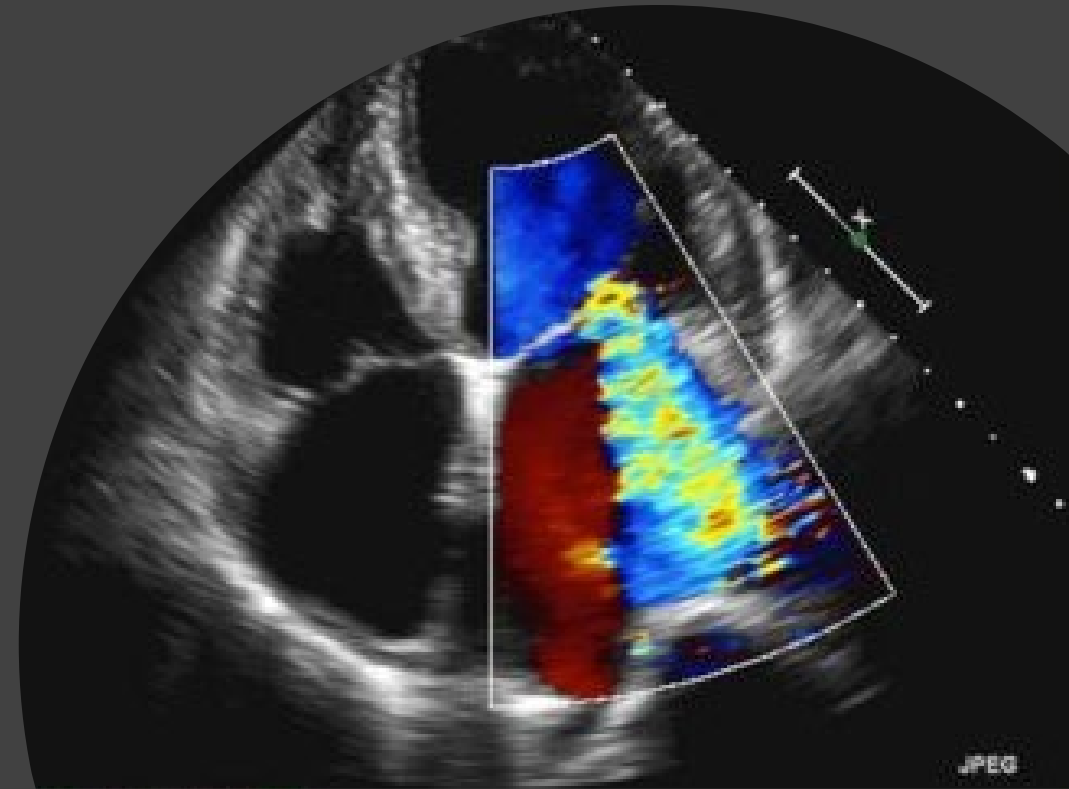
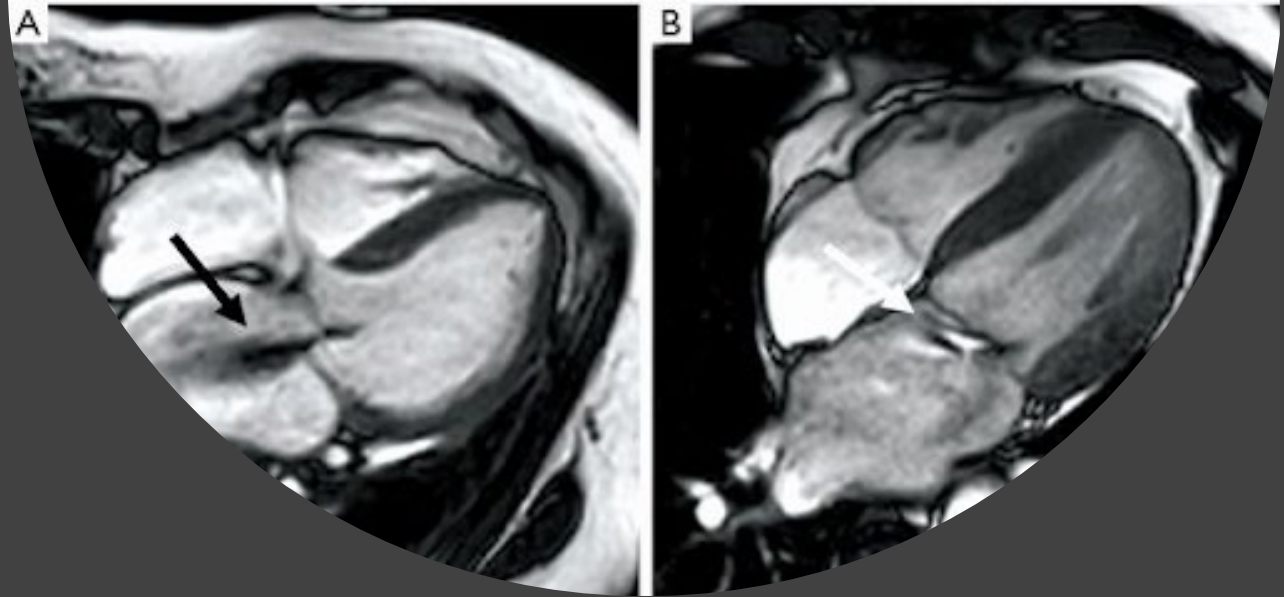
- *Resp:* crackles right midzone
- *CVS:* S1+S2 nil murmur
- *Abdo:* SNT, BS normal
- *Neuro:* PEARL, GCS 15, normal power tone and sensation though all limbs, nil cerebellar signs

Investigations:

- *Routine Labs=* **Hb 11.7, PLTS 251, LFTS normal, WCC & CRP normal, BNP 2883**

Diagnosis

- Cardiology felt that her clinical picture was in keeping with volume overload secondary to known CHF.
- *Echocardiogram* = normal systolic LV function EF 55%, mitral valve showed some calcium deposition keeping with moderate mitral regurgitation with bilateral dilatation of the.



Treatment

- The patient was commenced on IV diuresis-60mg BD of Furosemide and improved clinically.
- She was discharged on an increased dose of PO Furosemide 60mg BD.
- She will undergo an outpatient Transoesophageal Echocardiogram to the investigate the Mitral valve further.
- Prior to discharge she underwent an interval CT Thorax:

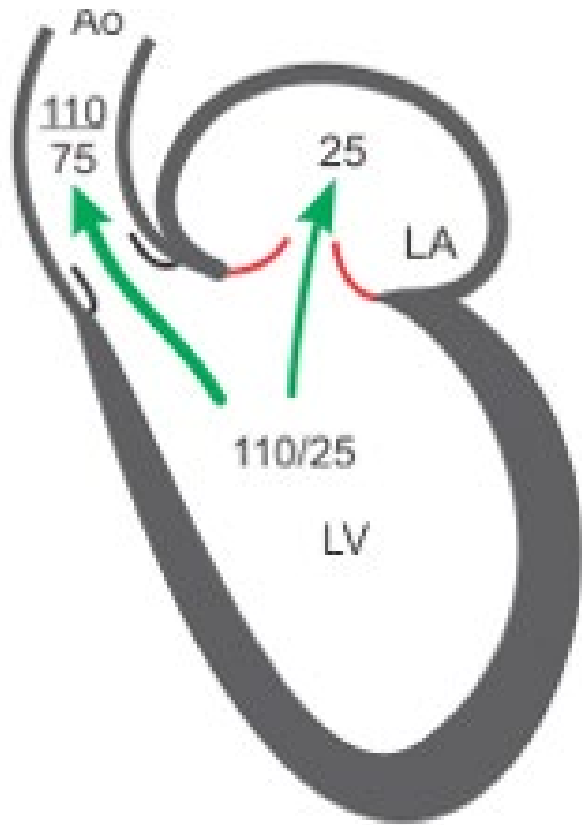
- Interval significant improvement on right sided ground-glass opacification and interlobular septal thickening post treatment.



Discussion

- Pulmonary edema is one of the most commonly encountered pathologic processes in chest radiology.
- The aetiology of pulmonary edema can be divided into cardiogenic and non-cardiogenic.

Cardiogenic	Non-Cardiogenic
Heart Failure	Hypovolaemic shock
Cardiac arrhythmias	Acute lung re-expansion
Fluid overload secondary to kidney failure	Aspiration
Obstructing valvular lesions	ARDS
Cardiomyopathy	Head Trauma
	Sepsis



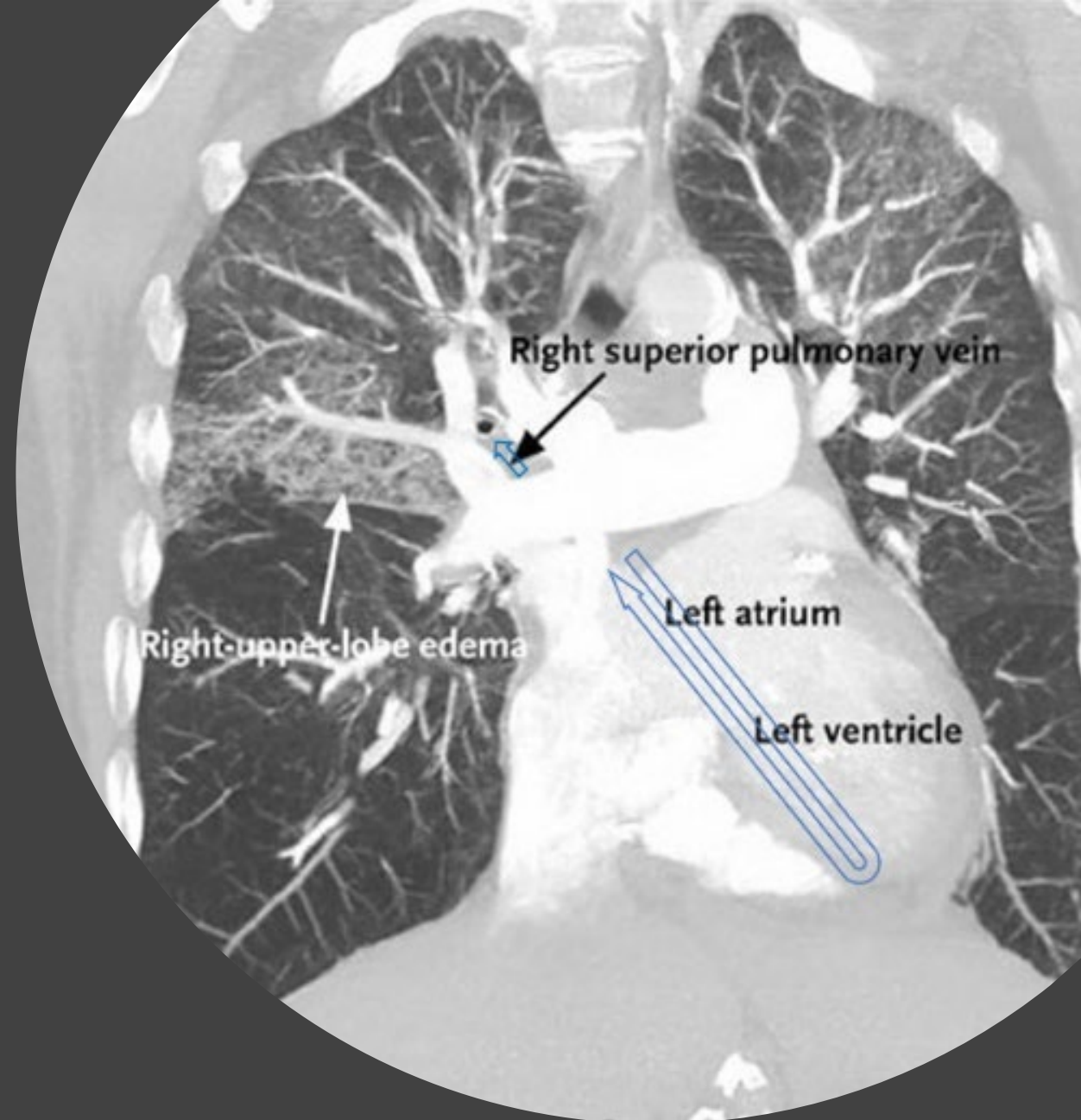
Mitral Regurgitation

Discussion

- Cardiogenic pulmonary edema (increased hydrostatic pressure) produces a non-inflammatory type of edema by the disturbance in Starling forces.
- Clinical features include;
 - dyspnoea
 - tachypnoea
 - orthopnoea
 - tachycardia
 - hypoxemia
- UPE accounts for only 2% of cardiogenic pulmonary edema and has a strong association with severe mitral regurgitation [1,2]

Discussion

- MR occurs when the mitral valve fails to close completely during ventricular systole.
- UPE is more common on the right, this is because the mitral regurgitation jet is predominantly directed towards the upper right pulmonary vein thus causing a larger increase in mean capillary pressure on the right side. [3]
- Incompetent valves lead to blood being directed retrogradely into the left atrium. This, overtime causes the left atrium to be become dilated and blood to reenter the pulmonary veins, leading to pulmonary edema. [4]



Discussion

- There are several theories on the mechanism of UPE however the direction of regurgitation was the most probable cause in this case.
- Haemoptysis is an uncommon symptom of CHF. It is hypothesised that the reason for haemoptysis in MR is due to the pressure change within the left atrium being directed back into the pulmonary circulation, leading to blood leakage from the capillaries. [5,6] – of course the patient was also taking Warfarin which may have exacerbated this.

Discussion

- UPE is often misdiagnosed as pneumonia, aspiration, or alveolar haemorrhage and thus lead to a false diagnosis of pneumonia and so delay management.
- The mortality rate of UPE is twice as high as that of bilateral pulmonary oedema due to initial misdiagnosis and delayed treatment. [7]
- The absence of fever, a history of sudden onset of dyspnoea, and elevated levels of B-natriuretic peptide, may help to differentiate UPE from other diagnoses.
- This case presents a good example of these findings.

Conclusion

- Unilateral cardiogenic pulmonary edema is a rare manifestation.
- As it is rare is often mistaken for pneumonia, alveolar haemorrhage aspiration or other causes of unilateral infiltrate on CXR.
- It is associated with a mortality rate higher than that of bilateral cardiogenic pulmonary edema.
- A delay in diagnosis and ultimately treatment can lead to poorer outcomes thus immediate and accurate diagnosis is crucial.

References

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Thankyou

- Any questions please do not hesitate to contact me at ptansey@tcd.ie