



Learning points

- Management of pulmonary oedema
- Discuss the role of NIV in these patients

The Case:

- A 75F with end stage renal failure on dialysis presented with acute SOB
- Previous MI with stents 8 years ago
- No chest pain
- Had dialysis 2 days ago, completed full session, next due the following day
- No fever, no cough, no infective symptoms
- No history of VTE
- Chest - bibasal crackles, bilateral wheeze, requiring 40% O₂
- HR 100 SR, BP 200/90, ECG - old LBBB, no new changes
- VBG: pH 7.20, pCO₂ 7.0, pO₂ 10, bicarb 18, Lactate 1.9, BE -9.0

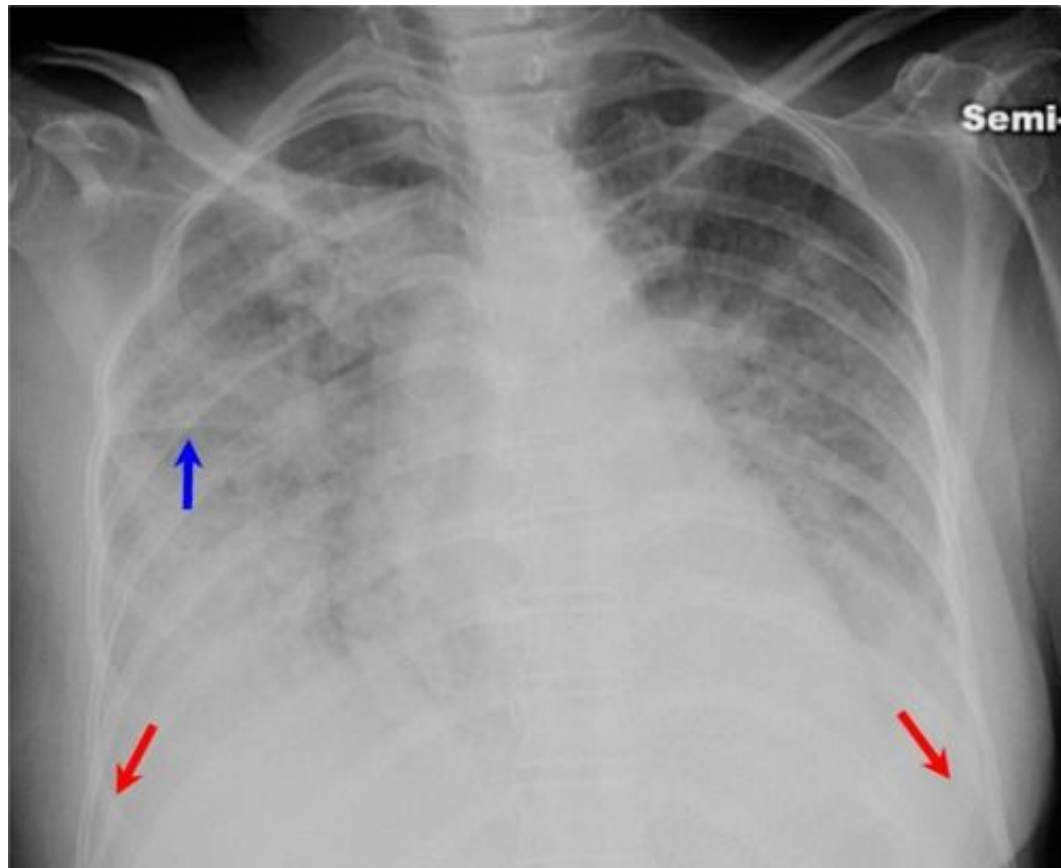
Initial thoughts:

- Pulmonary oedema
- ??Precipitating MI

CXR Changes in Pulmonary oedema

- A** - Alveolar oedema
- B** - 'Batwing' appearance, Kerley B lines
- C** - Cardiomegaly
- D** - Diversion to upper lobes, diffuse interstitial thickening
- E** - Effusions

[Radiology masterclass](#)



Ultrasound appearances

Initial management:

- Oxygen - sats 88-92% as retaining
- Optimise position - sit up rather than supine / slumped
- Nebulisers for wheeze (was probably cardiac wheeze and so did not help)
- Furosemide - can still use in dialysis patients, this lady still passed some urine normally
- Catheterise to monitor output
- Plan to review and repeat gas following initial treatment



Reviewed again

- No improvement
- Repeat gas worse
- pH 7.10, pCO₂ 9
- Plan to start on GTN and NIV

[RCEM Learning - Pulmonary oedema](#)

Pulmonary oedema management

- Like with everything, we should target the underlying cause
- Medical:
 - Nitrates (GTN)
 - Diuretics (Furosemide)
- Ventilation:
 - Appropriate positioning of the pt
 - CPAP / BiPAP
- CPAP / NIV should be considered early for cardiogenic pulmonary oedema

Non invasive ventilation

- As outlined in the RCEM learning module, cardiogenic pulmonary oedema can occur from either:
 - Pump failure
 - Diastolic failure - present hypertensive as the left ventricle is unable to relax
- Our patient was hypertensive with BP 220 systolic prior to starting GTN
 - GTN vasodilates and thus reduces pre-load on the heart, and at higher doses also afterload. It improves coronary perfusion and therefore oxygenation.
- Non invasive ventilation (CPAP / BiPAP)
 - Positive pressure ventilation increases alveolar recruitment, mitigates the right to left shunt and will also reduce pre-load due to higher intrathoracic pressures.
- There is a comprehensive NIV guide on EMBeds [here](#).
- [Video overview](#) of CPAP for pulmonary oedema

Back to our Case:

- GTN was started according to protocol:
 - 50mg in 50ml, start 1ml/hour and titrate according to BP
- NIV was started at 12/5 and increased to 20/5 over a 20 minute period
- Her breathing improved significantly and her repeat gas had normalised
- She was admitted to MAU initially but was transferred to ICU the following day for renal replacement (due dialysis) but was too unstable to transfer for this.
- Trop 57 → 14,000. Treated medically for NSTEMI as precipitant of pulmonary oedema

Prognosis

- Unfortunately poor for this group of patients
- [This paper](#) is a great overview of cardiogenic pulmonary oedema and quotes a 26% mortality rate for acute presentations, 50% at 1 year and 85% at 6 years
- Where appropriate we should take the opportunity to discuss escalation plans with these patients and their families