

Empyema as a Complication of Severe Covid-19 Infection

Dr Nandita Patel GMC 7560495

Dr Deepak Rao GMC 6083518

November 2020

PRINCESS ROYAL UNIVERSITY HOSPITAL

BROMLEY

PATIENT X

63 year old Caucasian Male

- Presented to the Emergency Department with an 8 day history of fever, cough and lethargy.

- No past medical history

- No regular medications

- Allergies: NSAIDS and opioids

- Independent with activities of daily living
- Works as a businessman
- Non-smoker

- No significant family history

INVESTIGATIONS

Observations

Heart Rate: 87
Blood Pressure: 123/60
Saturations: **50% On Air**
Respiratory Rate: 28
Temperature: 36.5

ABG on 15L non-rebreathe mask

pH 7.47
PaO2 7.98
PcO2 5.09
HcO3 27.7
Lac 1.0

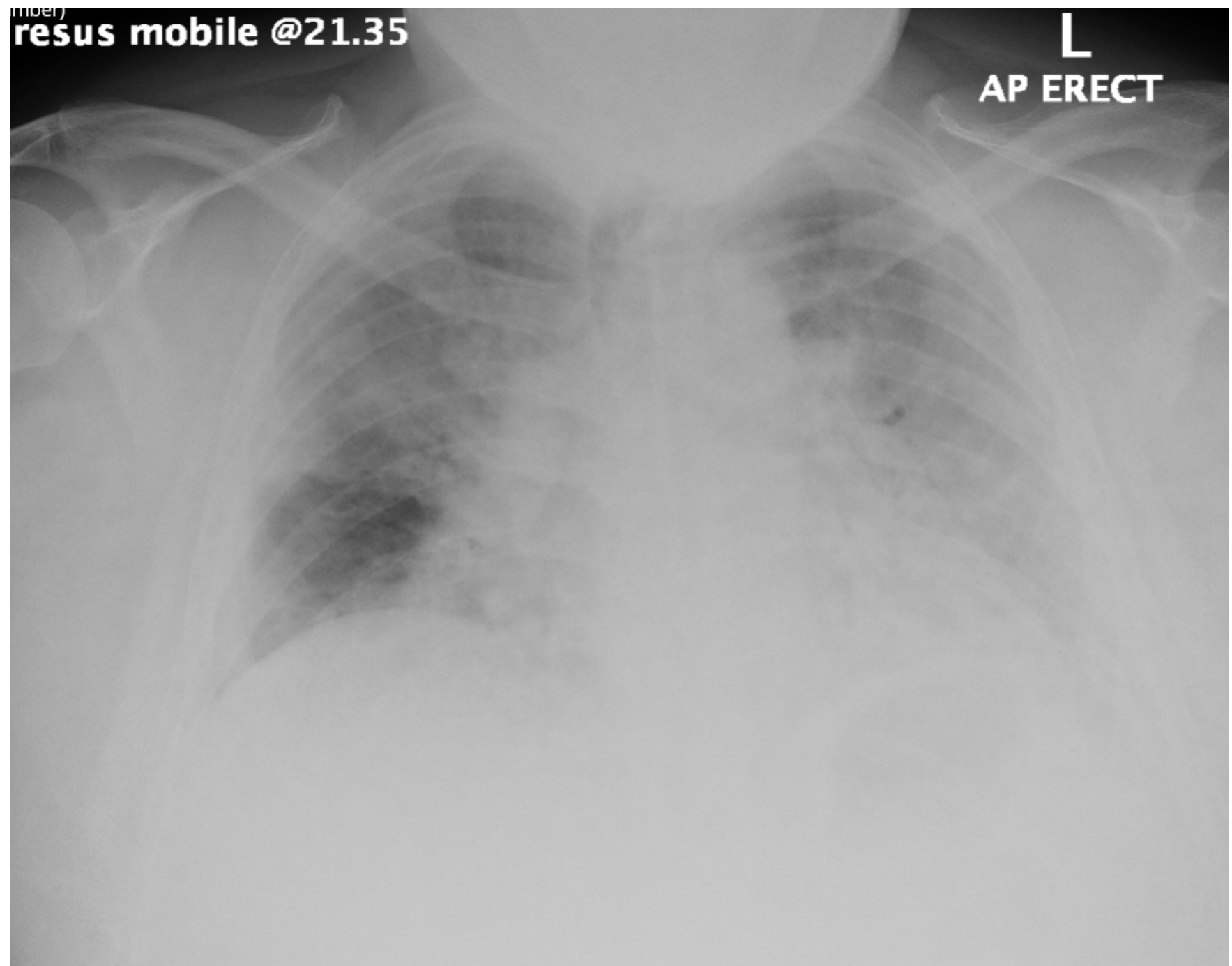
Blood Results

CRP 114 (1-5mg/L)
WBC 5.3 (3.7-9.5 x10⁹/L)
Hb 122 (133-167g/L)
Lymphocytes 0.9 (1-3.2x10⁹/L)
Ferritin 1932 (30-400 ug/L)
D-Dimer 1312 (0-500ng/ml)
LDH: 553 (0-240 U/L)
Renal Function: Normal

COVID-19 PCR POSITIVE

ADMISSION CHEST X-RAY

- Bilateral infiltrates



CLINICAL COURSE

- Intubated in the emergency department due to hypoxia despite 15 litres of oxygen via non-rebreathe mask.
- Mechanically ventilated for 35 days and treated with multiple courses of antibiotics
- He did not receive any steroids or trial medications.

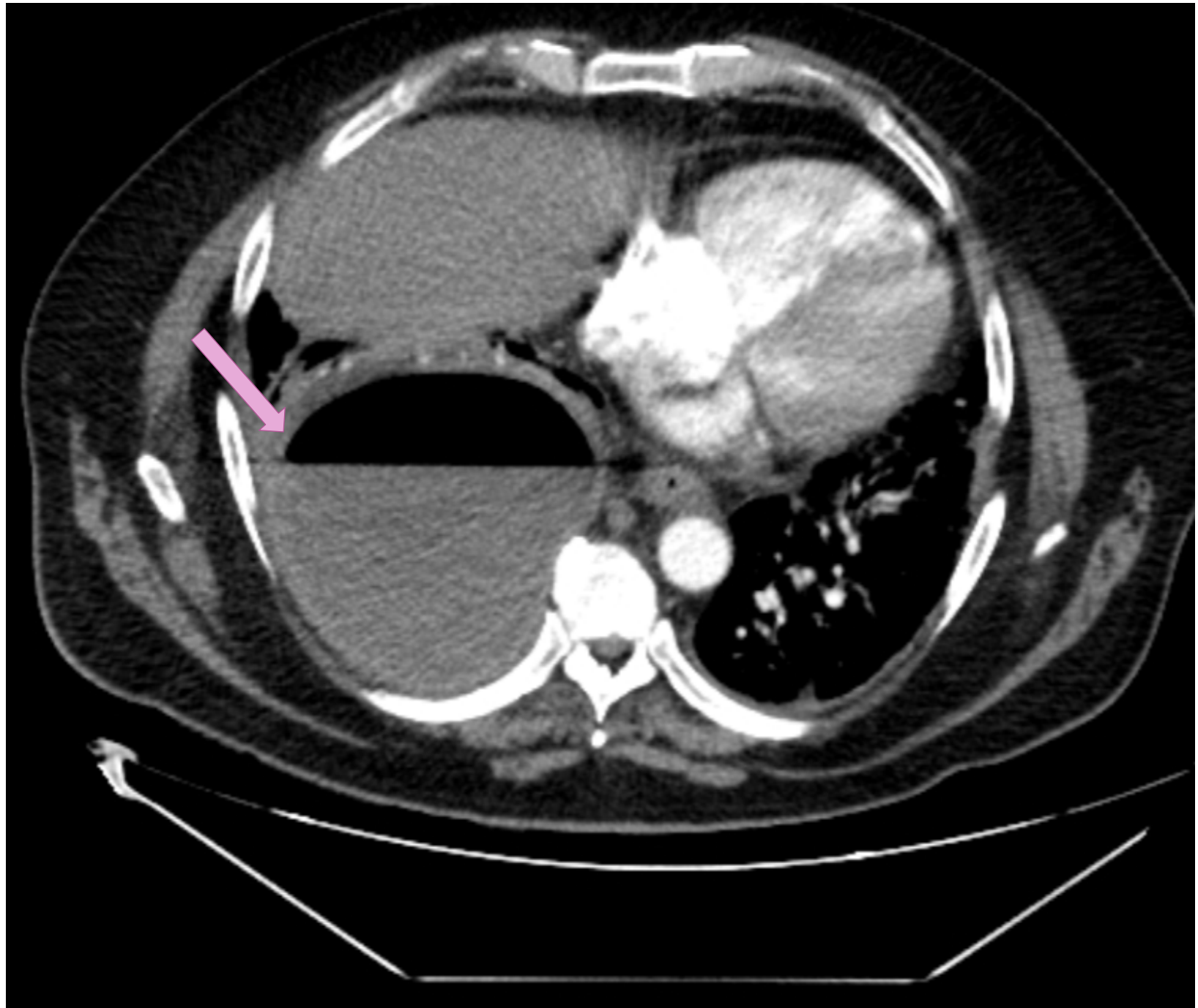
- Decannulated and transferred to the high dependency unit and continued to have **oxygen requirements, right sided chest pain** and **tachycardia**.

DIFFERENTIAL DIAGNOSES

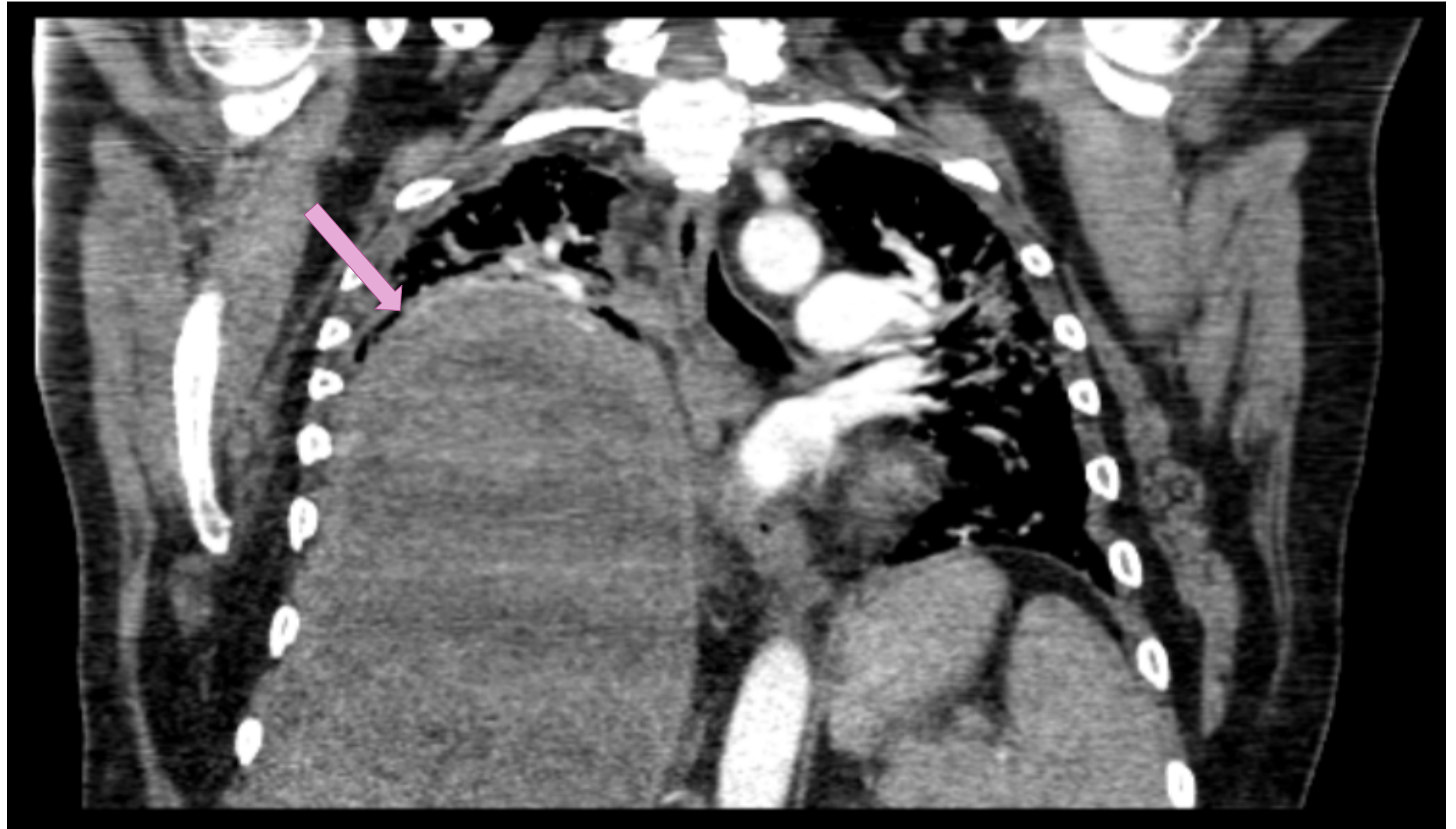
- Pulmonary Embolus
- Hospital Acquired Pneumonia
- Pericardial Effusion
- Pleural Effusion
- Empyema
- Pericarditis

CTPA

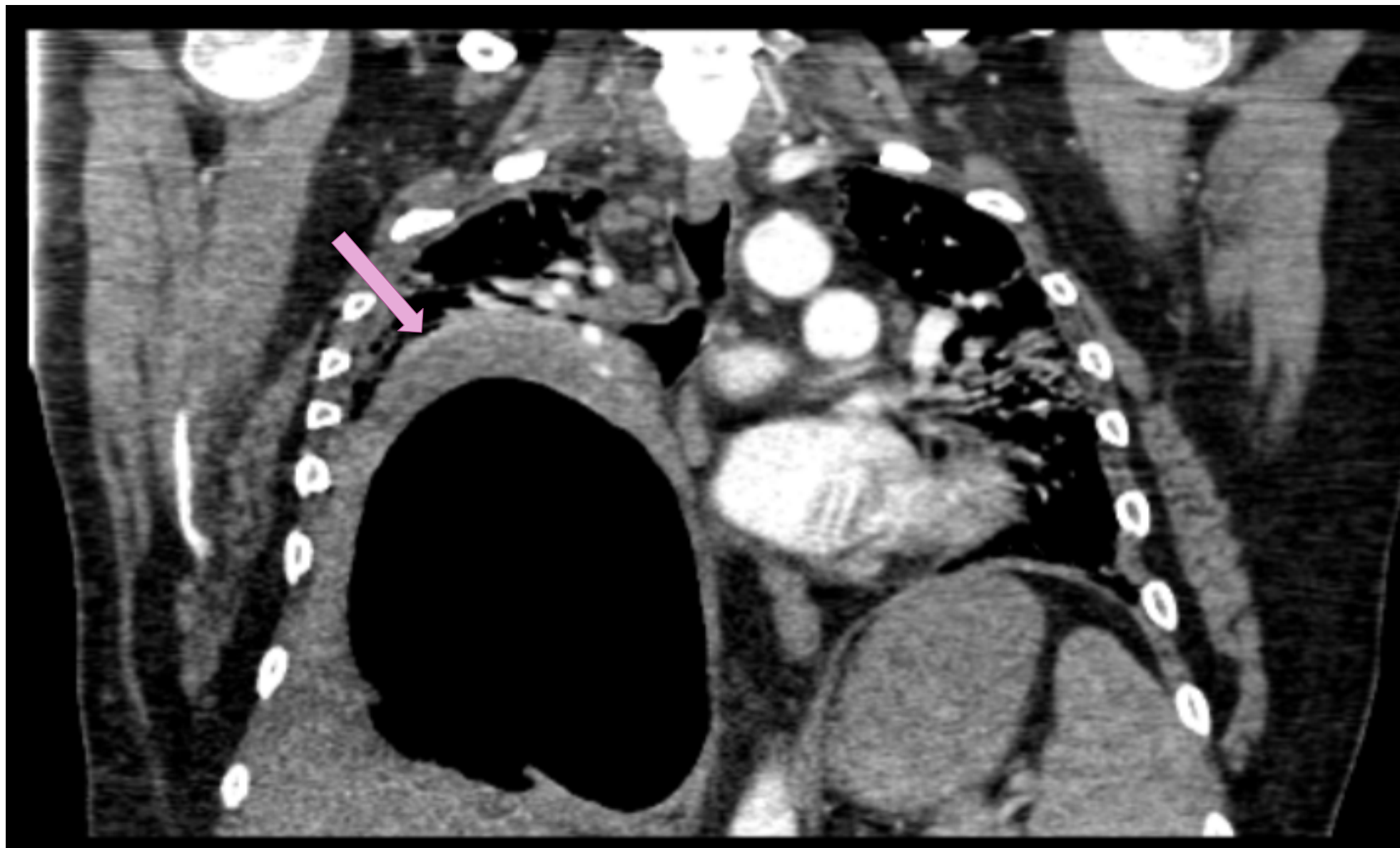
- Large pleural cavity in the right posterior hemithorax with an air fluid level.
- Possibility of a bronchopleural fistula.



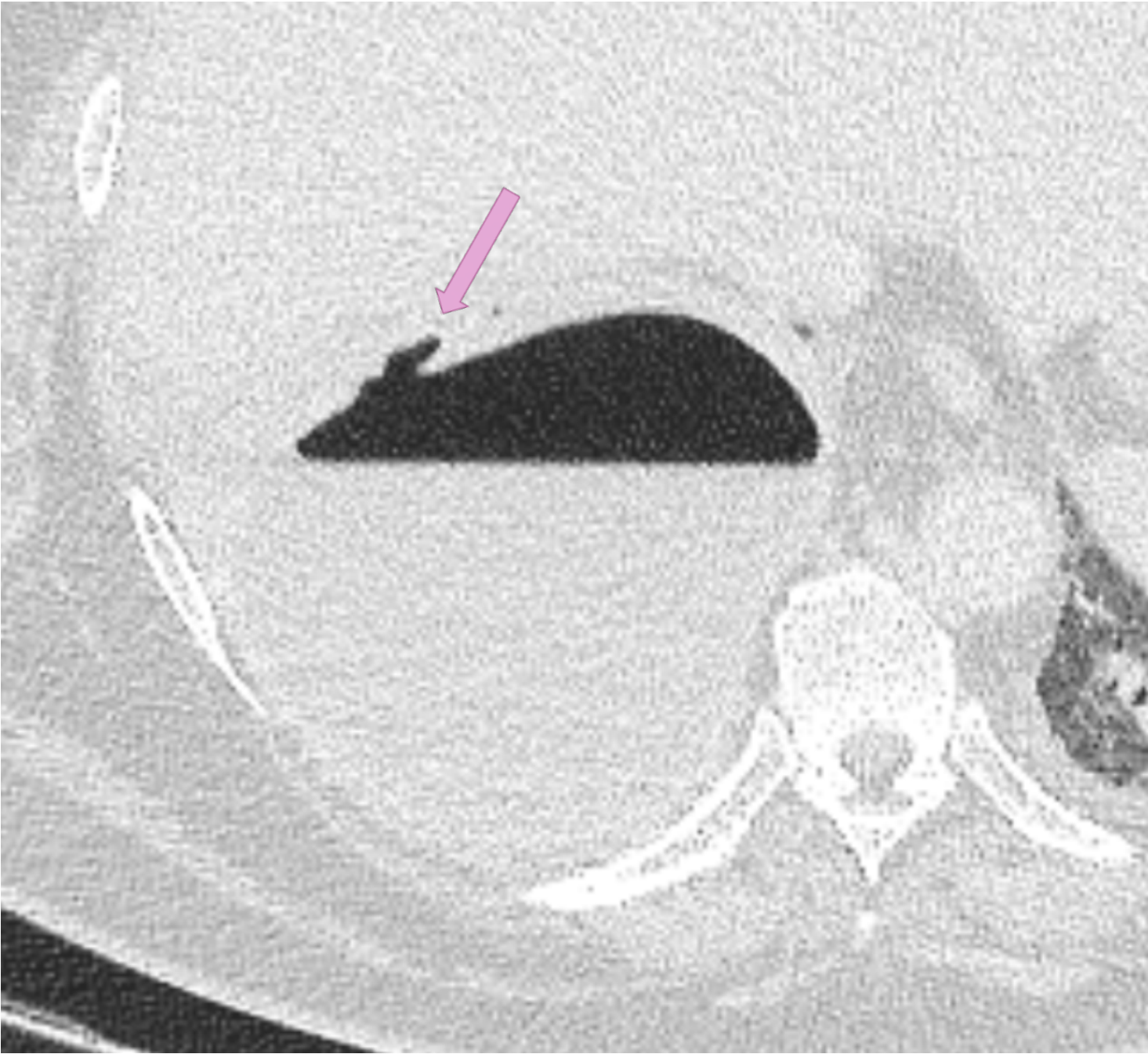
CTPA –
CORONAL
VIEW (1)



CTPA –
CORONAL
VIEW (2)

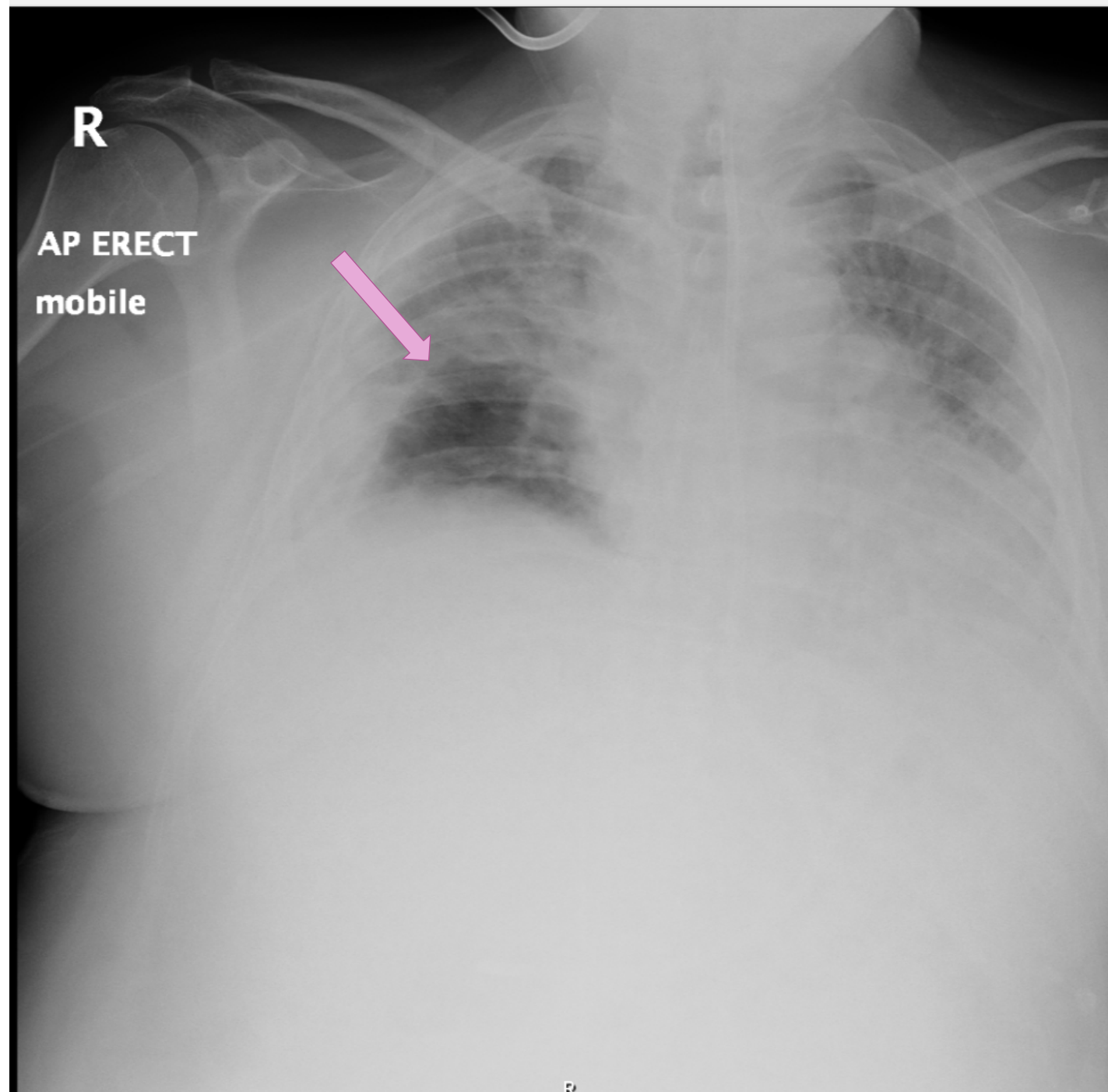


POSSIBLE SITE OF
BRONCHOPLEURAL
FISTULA



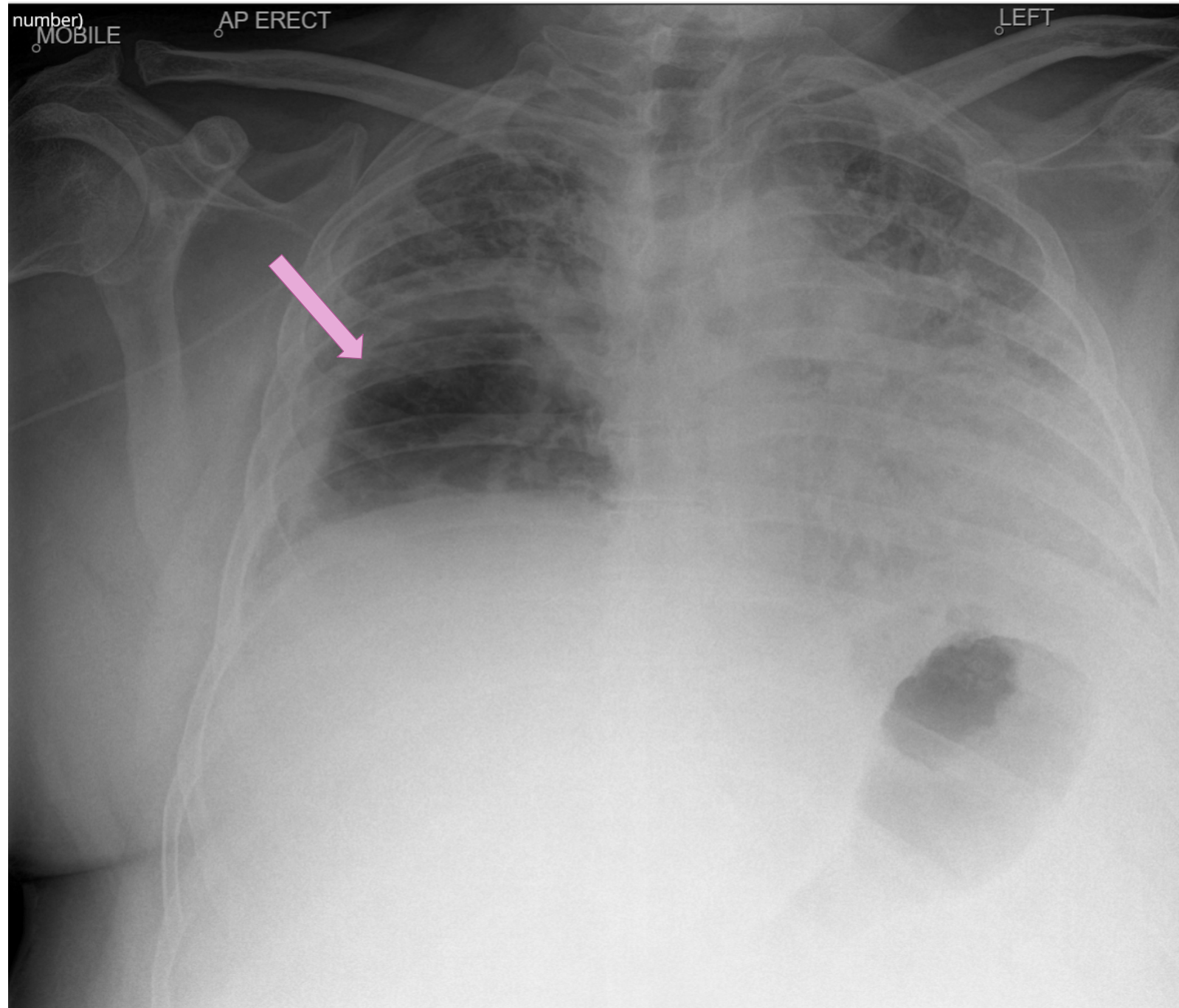
CHEST X-RAY FROM THE PREVIOUS WEEK

- Performed 9 days prior to the CTPA and shows an area of reduced opacification correlating to the cavity in the right hemithorax.
- Chest x-ray was reported as an area of improved consolidation.



CXR EARLIER THAT WEEK

- Performed 4 days prior to the CTPA and shows a further enlarged cavity compared to the chest x-ray prior to this.

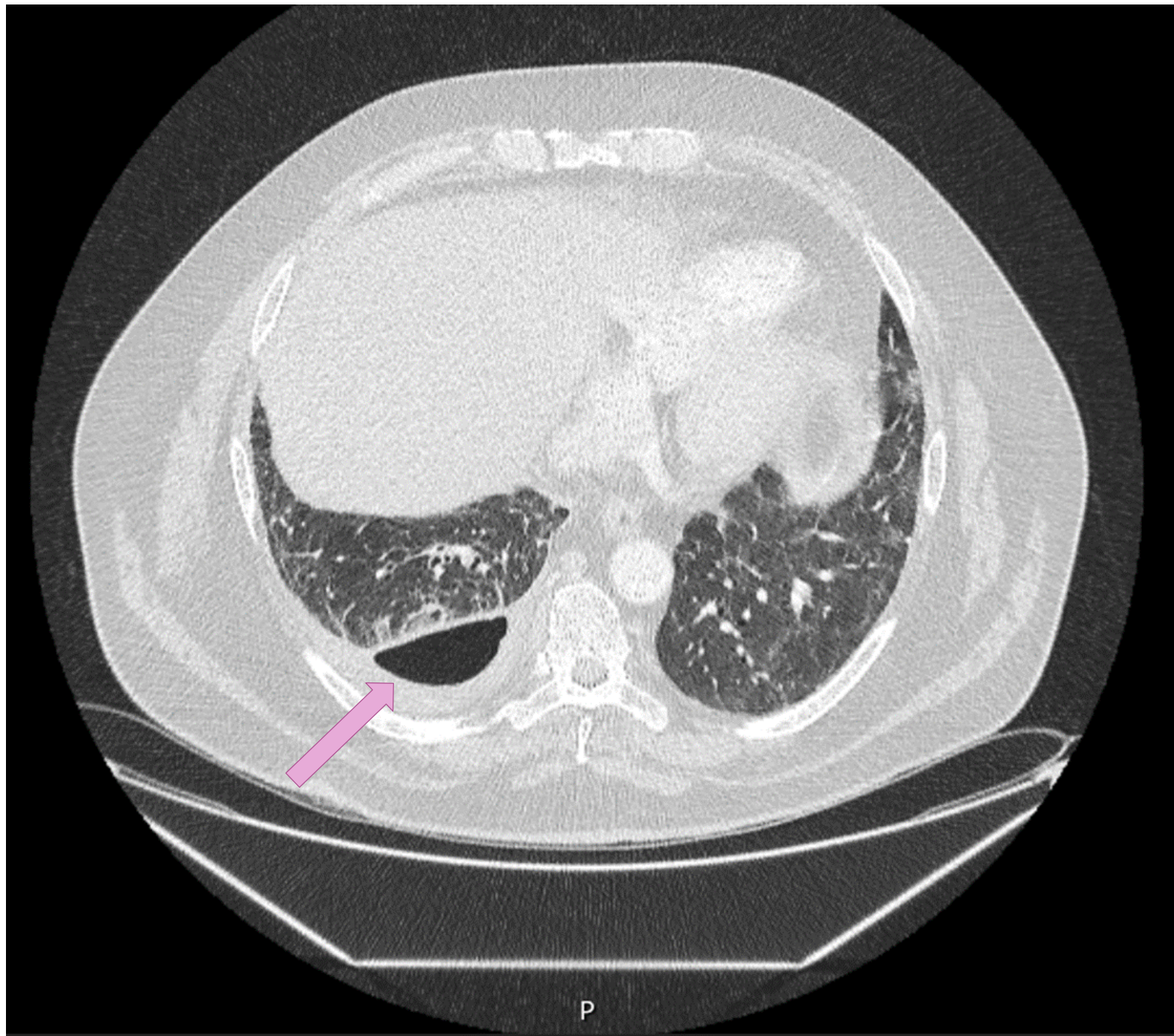


MANAGEMENT

- Insertion of 20 French chest tube which immediately drained 700ml of malodorous pus.
- Remained in situ for 21 days.
- Concomitant treatment with Intravenous Tazocin and Metronidazole for 3 weeks.
- Close monitoring for 72 hours post drain removal and discharged home with 3 weeks of oral Augmentin.
- Pleural Clinic follow up
- Safely discharged and has now recovered fully.

CT THORAX POST DRAIN REMOVAL

- There has been a marked reduction in the size of the previous empyema with a small residual hydropneumothorax.
- This was monitored with a follow up chest x-ray and has resolved.



DISCUSSION

- In some studies, microscopic analysis of lung tissue of deceased patients from Covid-19 have shown pneumocyte necrosis and diffuse alveolar damage in **all** patients. [1]
- This increases the likelihood of empyema and bronchopleural fistula. [2]
- Other documented cases of empyema in Covid-19 patients have been in the context of immunosuppression secondary to therapy such as Tocilizumab. [3][4]
- This is to our knowledge, the first case of empyema complicated by bronchopleural fistula, in an immunocompetent patient recovering from Covid-19 infection.

LEARNING POINTS

- Covid-19 leads to pneumocyte necrosis and features of diffuse alveolar damage, as well as microthromboses which increase the risk of empyema. [1][5]
- Patients who have required invasive mechanical ventilation are more at risk of more extensive parenchymal damage and are therefore are at higher risk of empyema. [6]
- Chest X-ray changes can be subtle but focal, demarcated areas of clearing should raise suspicion of cavities and possible empyema in a patient with Covid-19 infection.
- Prompt recognition and management can be life saving.

REFERENCES

- [1] Carsana L, Sonzogni A, Nasr A, Rossi RS, Pellegrinelli A, Zerbi P, et al. Pulmonary post-mortem findings in a series of COVID-19 cases from northern Italy: a two-centre descriptive study. *Lancet Infect Dis*. 2020 Oct;20(10):1135–40.
- [2] McCauley L, Dean N. Pneumonia and empyema: causal, casual or unknown. *J Thorac Dis* 2015;7(6):992-998. doi: 10.3978/j.issn.2072-1439.2015.04.36
- [3] Zavin A, Amith Shenoy M, Bender M. SPONTANEOUS ENTEROCOCCUS FAECALIS EMPYEMA IN A PATIENT WITH COVID-19. *Chest*. 2020 Oct;158(4):A774.
- [4] Placik DA, Taylor WL, Wnuk NM. Bronchopleural fistula development in the setting of novel therapies for acute respiratory distress syndrome in SARS-CoV-2 pneumonia. *Radiol Case Rep*. 2020 Nov;15(11):2378–81.
- [5] Ackermann M, Verleden SE, Kuehnel M, Haverich A, Welte T, Laenger F, et al. Pulmonary Vascular Endothelialitis, Thrombosis, and Angiogenesis in Covid-19. *N Engl J Med*. 2020 Jul 9;383(2):120–8.
- [6] Kommos FKF, Schwab C, Tavernar L, Schreck J, Wagner WL, Merle U, et al. The pathology of severe COVID-19 related lung damage — mechanistic and therapeutic implications. *Dtsch Aerzteblatt Online* [Internet]. 2020 Jul 20 [cited 2020 Nov 13]; Available from: <https://www.aerzteblatt.de/10.3238/arztebl.2020.0500>