The Thoracic Radiological Manifestations of COVID-19 in Adults

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Introduction

Key Words: COVID-19, CT Thorax, Chest Radiograph, Radiology

- The aim of this presentation is to discuss the radiological thoracic manifestations of COVID-19 in adults.

- SARS-CoV2, also known as COVID-19, is a pandemic and global health emergency as declared by the World Health Organization (1).

- Presentation of COVID-19 ranges from asymptomatic/mild symptoms such as cough and fever to acute respiratory distress syndrome (ARDS).

- Radiology is vital in the management of patients with COVID-19.

- Although definitive diagnosis is made via a RT-PCR test, radiology plays a vital role in the diagnosis, assessment of severity and management (2).

- Imaging is particularly important when COVID-19 is suspected despite a negative RT-PCR test.

Chest Radiographs

- Low sensitivity but readily available

- First-line investigation

Chest Radiograph Features:

1) Normal in early stages
2) Uni/multifocal consolidation in a peripheral distribution
3) ARDS like Pan-lobar consolidation (3)

Chest Computed Tomography (CT)

- The mainstay of radiological diagnosis
- Highly sensitive in assessing severity of disease, complications and management planning.

Typical CT chest features:

1) Ground glass opacification (GGO) is the earliest and commonest feature
   - Unifocal in early stages
   - Multifocal and bilateral in a peripheral and lower lobe distribution (2,4,5,6)
2) Crazy paving pattern
   - Thickening of inter and intralobular septa along with GGO (3,7)
3) Consolidation
4) Traction bronchiectasis

CHEST RADIOGRAPH

Fig 1: Normal Chest Radiograph (8).

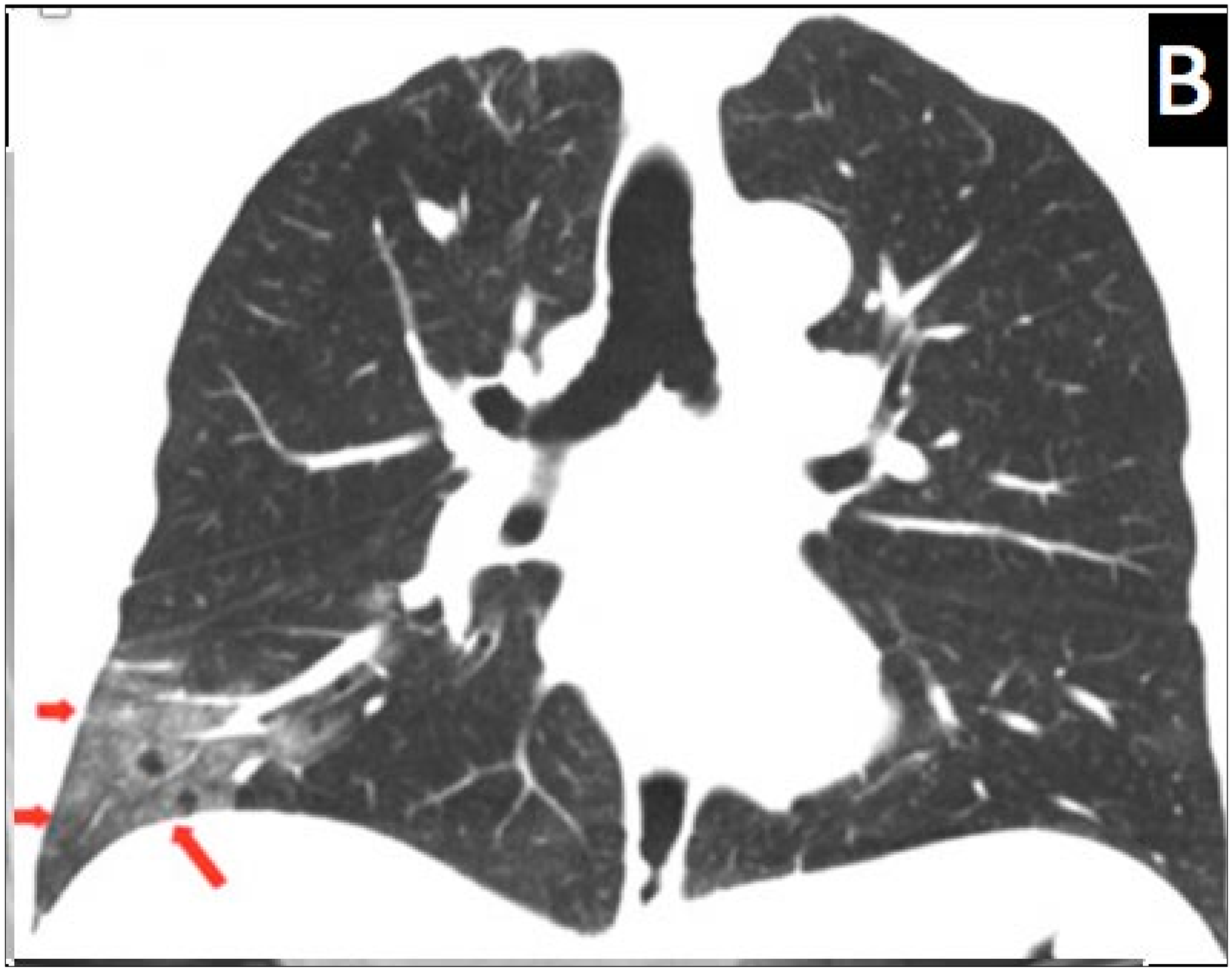

Fig 2: CT chest demonstrating GGO in early stages of COVID-19 (8).

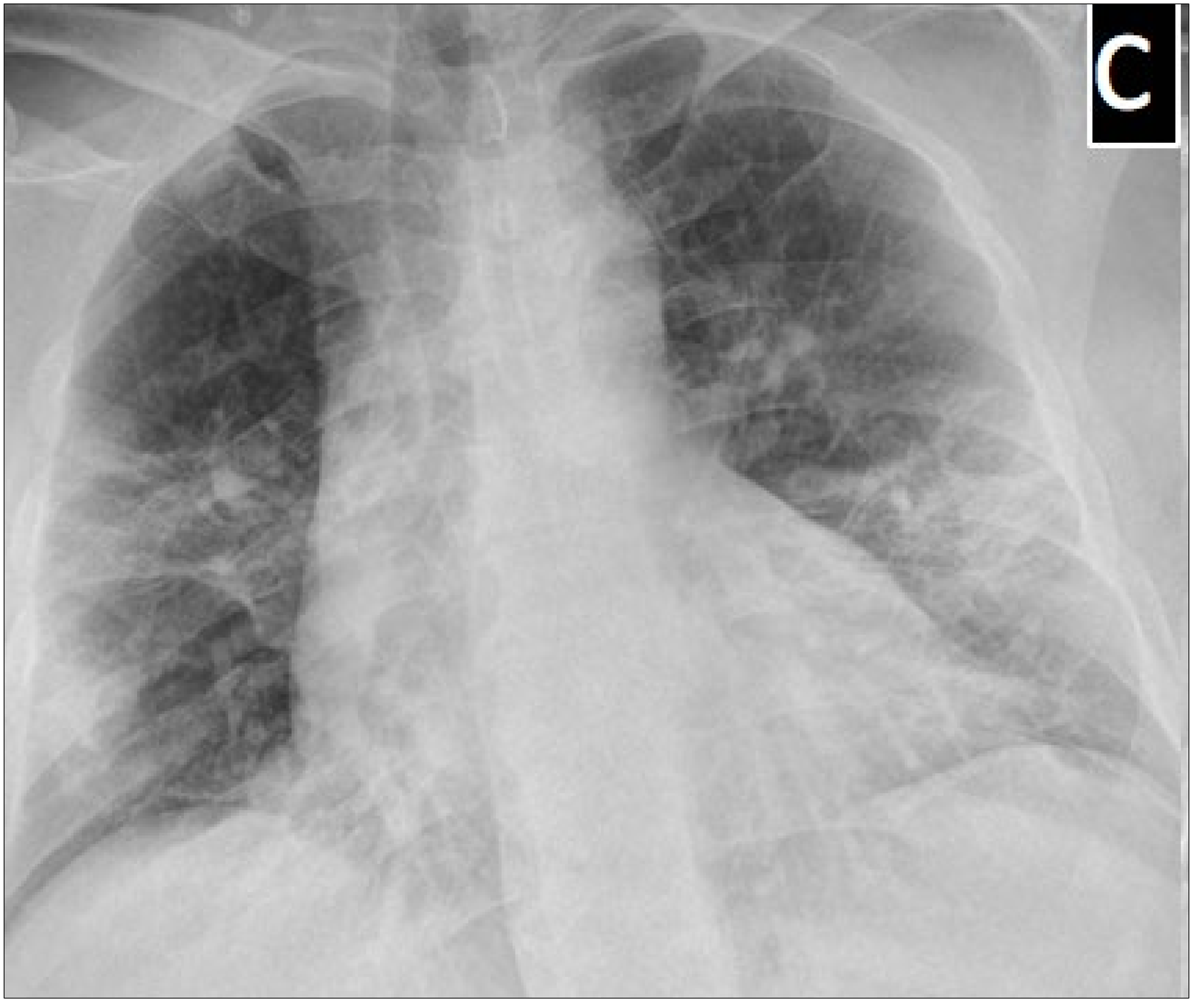

Fig 3: Chest radiographs demonstrating bilateral peripheral and pan-lobar consolidation (9).

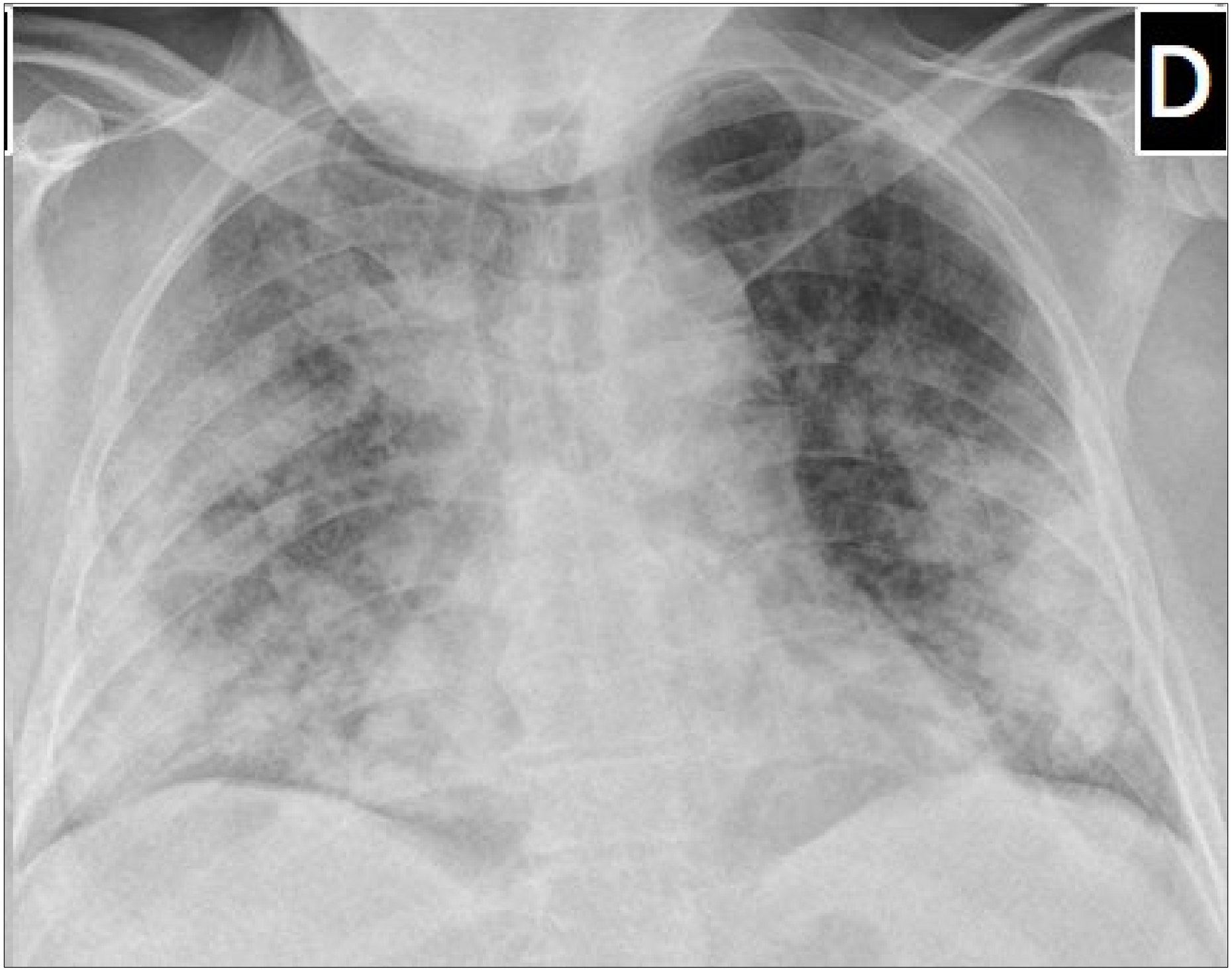

Fig 4: Chest radiograph demonstrating bilateral peripheral and pan-lobar consolidation (9).

CHEST CT

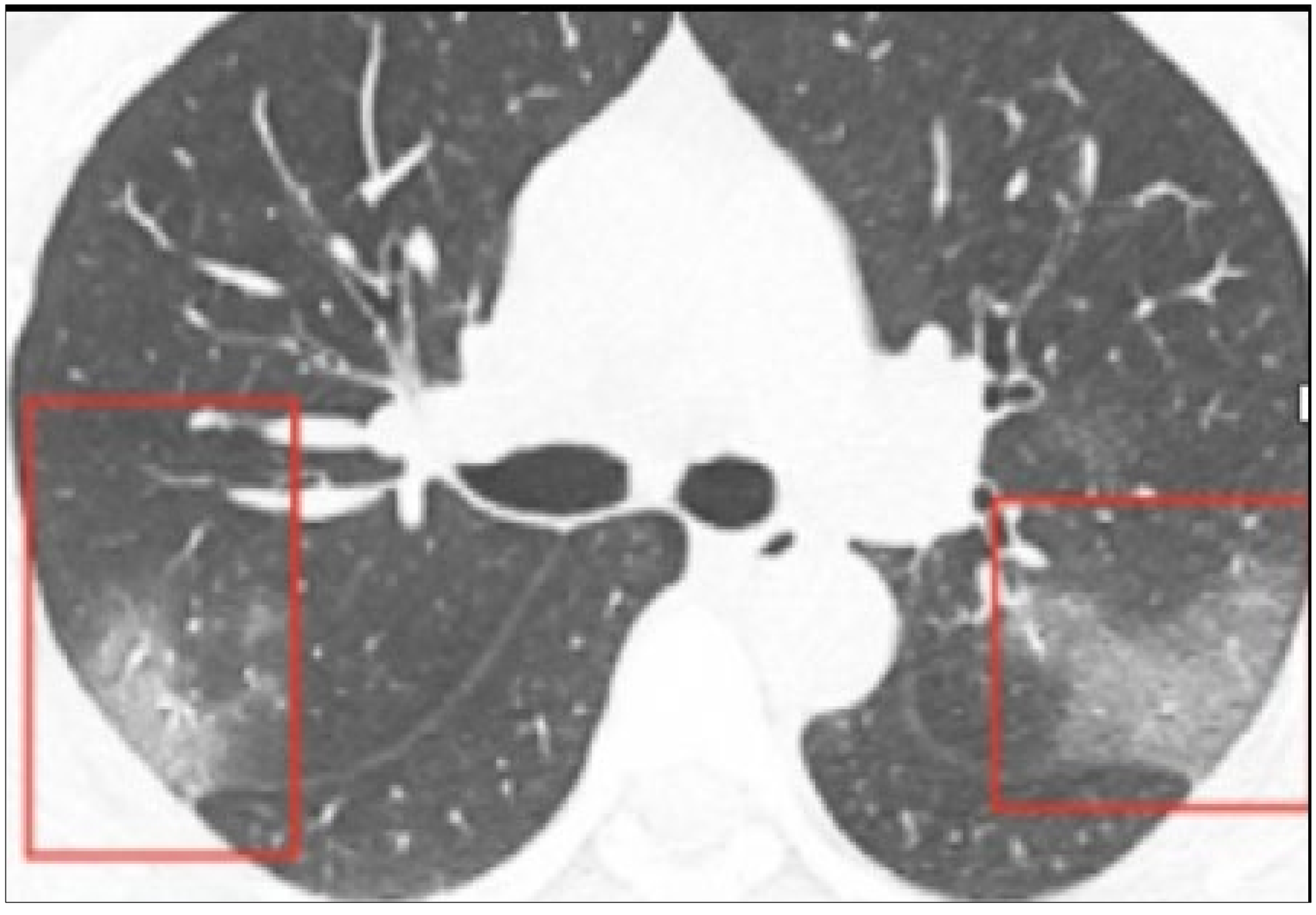

Fig 5: Axial CT chest image demonstrating bilateral peripheral GGO in the posterior upper lobes (4).

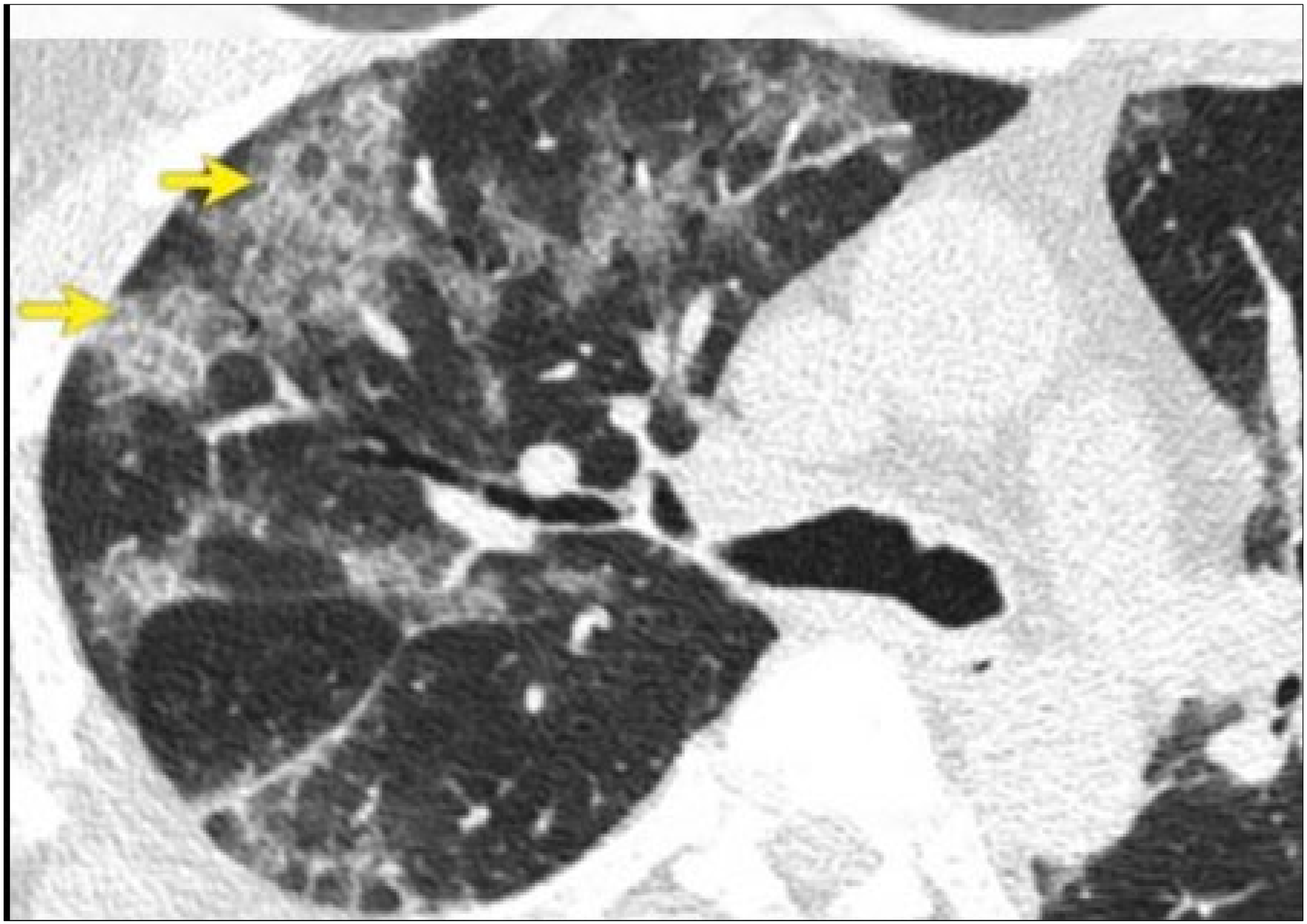

Fig 6: Axial CT chest image demonstrating a crazy paving pattern of GGO and septal thickening peripherally in the right upper lobe (3).

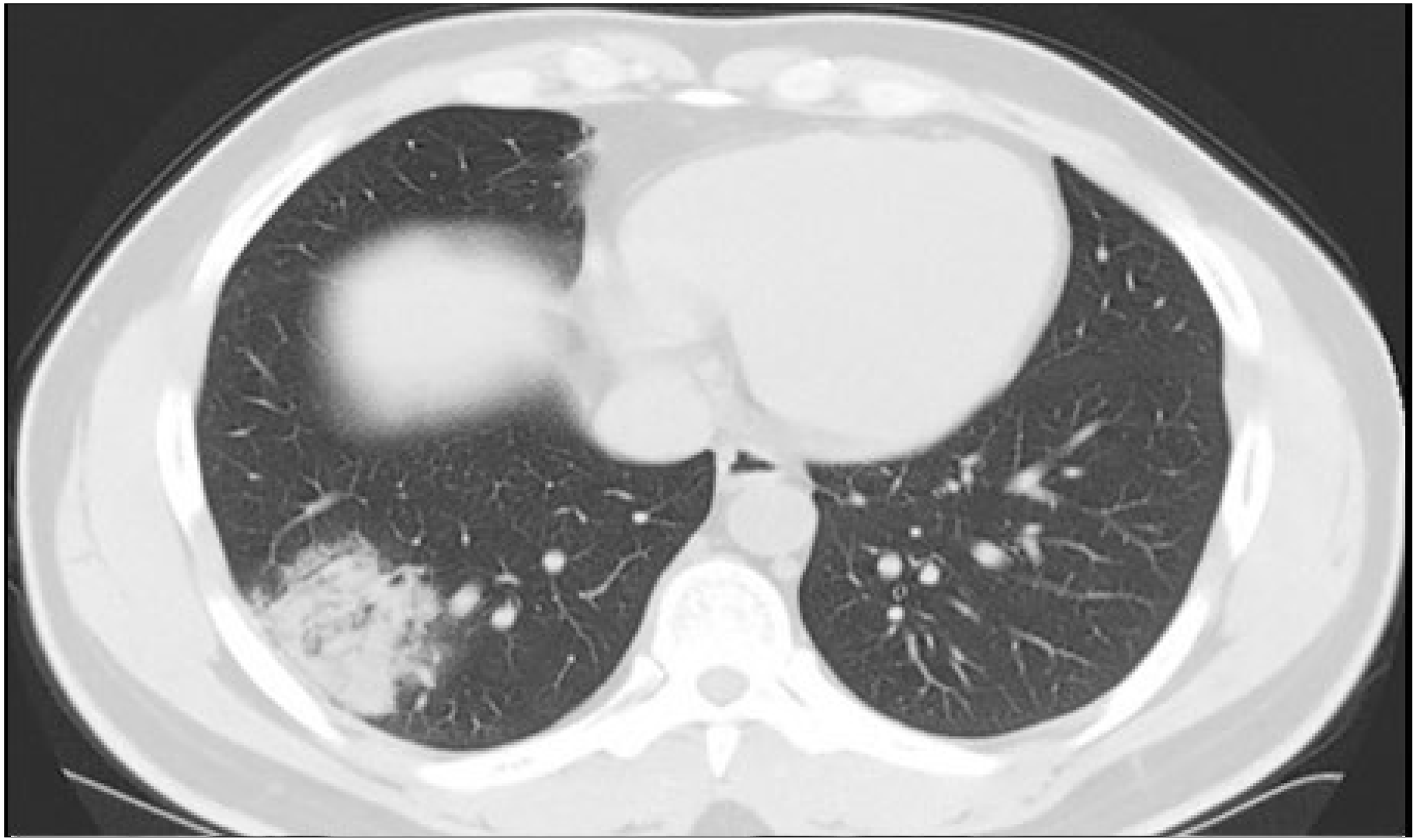

Fig 7: Axial CT chest image demonstrating peripheral unifocal consolidation in the posterior right lower lobe (5).

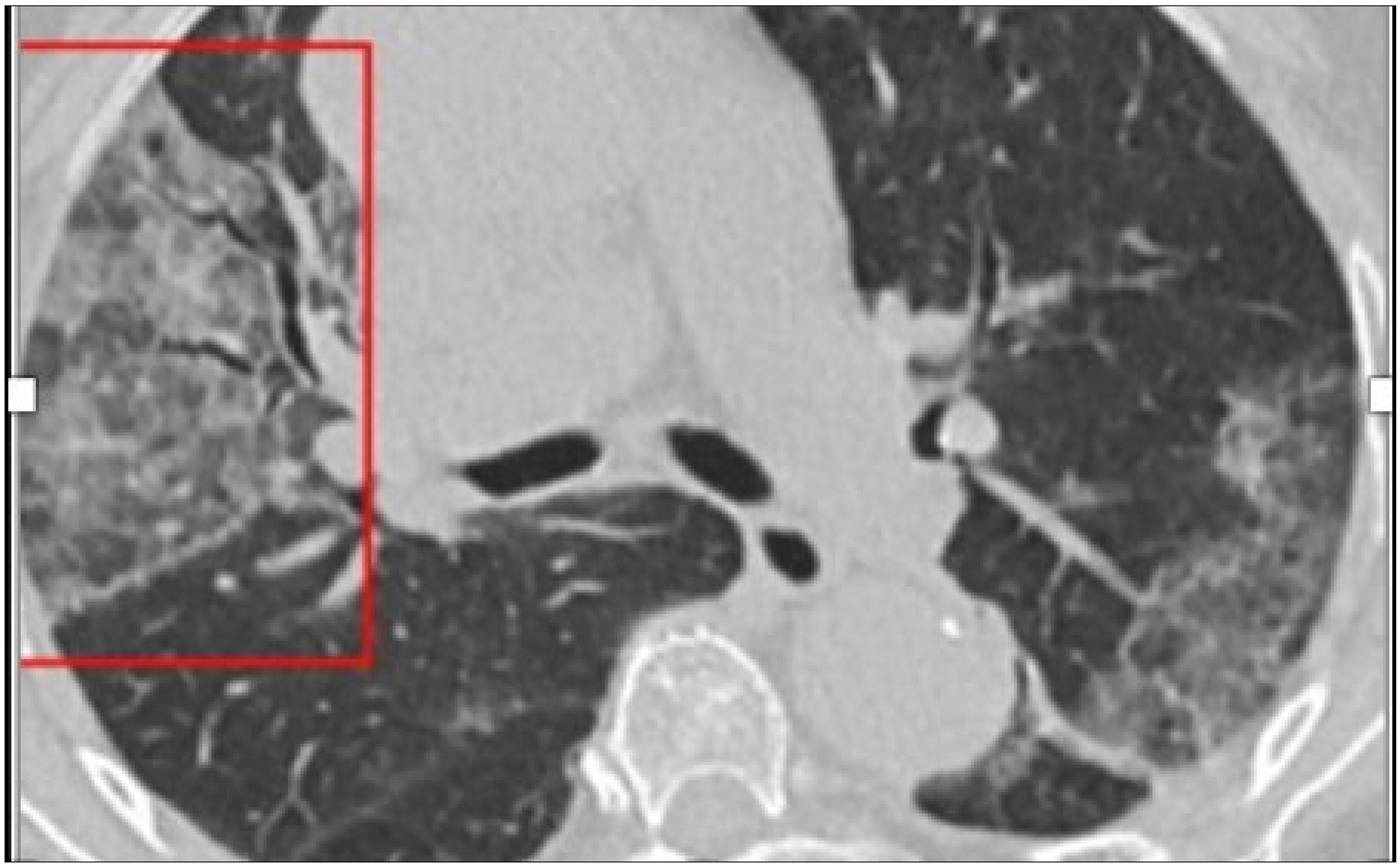

Fig 8: Axial CT chest image demonstrates reticular pattern, GGO, traction bronchiectasis and vascular dilatation (2).

Conclusion

- Radiology plays a vital role in diagnosis and management of patients with COVID-19.

- Chest radiographs have a limited diagnostic role but are useful in disease follow-up, as they are readily available.

- CT chest is the investigation of choice and adequately demonstrating the various disease manifestations, the extent and severity of disease.

References

1. Coronavirus disease 2019 (COVID-19) Situation Report-39 [Internet]. World Health Organization. 2020 [cited 2020 Jun 01]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200228-sitrep-39-covid-19.pdf?sfvrsn=5bbf3e7d_4

2. Ye Z, Zhang Y, Wang Y, Huang Z, Song B. Chest CT manifestations of new coronavirus disease 2019 (COVID-19): a pictorial review. European Radiology [Internet]. 2020 [cited 2020 Jun 05]. Available from: https://doi.org/10.1007/s00330-020-06801-0

3. The Radiology Assistant: COVID-19 Imaging findings [Internet]. Radiology Assistant. 2020; [cited 2020 Jun 03]. Available from: https://radiologyassistant.nl/chest/lk-jg-1

4. Lei J, Li J, Li X, Qi X. CT Imaging of the 2019 Novel Coronavirus (2019-nCoV) Pneumonia. Radiology [Internet]. 2020 [cited 2020 May 29]; 295(1): 18-18. Available from: https://doi.org/10.1148/radiol.2020200236

5. Fang Y, Zhang H, Xu Y, Xie J, Pang P, Ji W. CT Manifestations of Two Cases of 2019 Novel Coronavirus (2019-nCoV) Pneumonia. Radiology [Internet]. 2020 [cited 2020 Jun 01]; 295(1): 208-209. Available from: https://doi.org/10.1148/radiol.2020200280

6. Kay F, Abbara S. The Many Faces of COVID-19: Spectrum of Imaging Manifestations. Radiology: Cardiothoracic Imaging [Internet]. 2020 [cited 2020 May 28]; 2(1): e200037. Available from: https://doi.org/10.1148/ryct.2020200037

7. Zu Z, Jiang M, Xu P, Chen W, Ni Q, Lu G et al. Coronavirus Disease 2019 (COVID-19): A Perspective from China. Radiology [Internet]. 2020[cited 2020 Jun 03]; 200490.Available from: https://doi.org/10.1148/radiol.2020200490

8. Ng M, Lee E, Yang J, Yang F, Li X, Wang H, et al. Imaging Profile of the COVID-19 Infection: Radiologic Findings and Literature Review. Radiology: Cardiothoracic Imaging [Internet]. 2020 [cited 2020 May 29];2(1):e200034.Available from:

https://doi.org/10.1148/ryct.2020200034

9. Bickle I. COVID-19 pneumonia - progression and regression |Radiology Case | Radiopaedia.org [Internet]. 2020 [cited 2020 Jun 02]; Available from: https://radiopaedia.org/cases/covid-19-pneumonia-progression-and-regression?lang=gb