

Diagnostic challenges of incidental lung lesions on liver MRI during the COVID-19 pandemic

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DESCRIPTION

The COVID-19 pandemic has proved difficult to control in part due to inadequate detection.¹ Presentations vary greatly with some persons experiencing almost no symptoms.² To date, there are few descriptions of the infection on MRI and this gap in knowledge may contribute to missed opportunities to diagnose the disease. Here we describe the diagnostic challenges emerging from the detection of incidental lesions in the lung bases on liver MRI in a 49-year-old woman.

The patient presented to the emergency department with tachycardia, vertigo, fever and a non-productive cough. Blood tests revealed serum alanine transaminase of 69 IU/L and alkaline phosphatase of 323 IU/L. Reverse transcriptase PCR (RT-PCR) respiratory swab for 2019 novel coronavirus (2019-nCoV) RNA at the time of arrival was negative. Ultrasound of the liver showed hepatic steatosis and a hypoechocic lesion. A standard protocol liver MRI performed to further characterise the hepatic lesion diagnosed two liver haemangiomas and confirmed steatosis. The liver MRI also obtained limited slices of the lung bases which demonstrated non-specific areas of peripheral high signal on the T₂-weighted imaging with focal areas of restricted diffusion on diffusion-weighted imaging (DWI) in the left lower lobe (figure 1).

The day after her MRI the patient underwent a CT of the thorax, abdomen and pelvis for weight loss. The CT uncovered multiple ground glass opacities in a bilateral, multilobar and peripheral distribution, corresponding to the British Society of Thoracic Imaging classification of, classic/probable COVID-19 infection.³ Figure 2 shows the CT. Appropriate precautions were taken to avoid transmission and the patient had a repeat 2019-nCoV RNA respiratory swab which again produced a negative result.

This case provides early insight into a clinical dilemma that may arise more frequently in the later parts of the COVID-19 pandemic as the frequency

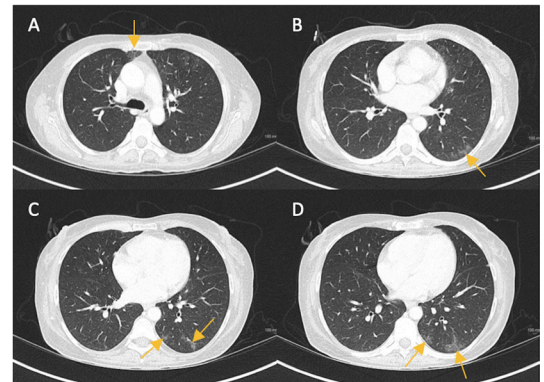


Figure 2 Chest CT showing the bilateral, patchy, ground glass appearance with a peripheral preponderance that is typical of severe acute respiratory syndrome coronavirus 2 infection. (A) Right apical lesion, (B) peripheral left lower lobe lesions, (C) left lower lobe lesions and (D) left lower lobe lesions.

of routine MRI and MRI for non-respiratory conditions increases. The lack of sensitivity of RT-PCR and the poor specificity of thoracic CT, which are currently the two most commonly used diagnostic tests for COVID-19 infection, make it difficult to draw definite conclusions about suspicious lesions on MRI.^{4,5}

At the time of writing this report, all published examples of pulmonary COVID-19 on MRI are descriptive.⁶⁻⁸ The limited available data primarily from thoracic MRI, however, suggest that on liver and abdominal imaging protocols, COVID-19 presents as lung lesions with: high T₁ signal due to

Learning points

- ▶ During the COVID-19 pandemic, consideration should be given that incidental lung lesions on MRI could represent COVID-19 infection, particularly in abdominal MRI where the lung bases can often be overlooked.
- ▶ As the frequency of routine MRI increases in the latter parts of the COVID-19 pandemic, it is likely that the finding of incidental lung lesions on MRI will rise.
- ▶ There is a need for more reliable diagnostic tests and better descriptors of COVID-19 infection on common abdominal MRI sequences so that the correct management decisions can be made when incidental lesions are detected such as in the case of the patient described here.

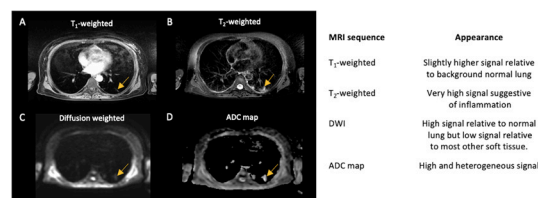


Figure 1 Liver MRI images of lung lesions. (A) T₁-weighted, (B) T₂-weighted, (C) diffusion-weighted imaging (DWI) and (D) apparent diffusion coefficient (ADC) map.



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partial alveolar collapse and higher tissue density, high T₂ signal caused by oedema or consolidation, high DWI signal because of increased cell density from the inflammatory reaction and partial collapse, and with a heterogeneous enhancement pattern after contrast administration. There remains a need to validate these descriptions with a large sample size and with comparison to a standard which at the present time could be RT-PCR or an ELISA quantitative serology test. In this way, the diagnostic value of MRI can be better assessed which could ultimately lead to more appropriate management decisions in future cases that present similarly to the patient described here.

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REFERENCES

- 1 Rajgor DD, Lee MH, Archuleta S, *et al*. The many estimates of the COVID-19 case fatality rate. *Lancet Infect Dis* 2020;20:776–7.
- 2 Rothe C, Schunk M, Sothmann P, *et al*. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *N Engl J Med* 2020;382:970–1.
- 3 (BSTI) BSoTI. Thoracic imaging in COVID-19 infection guidance for the reporting radiologist. Version 2 2020.
- 4 Ai T, Yang Z, Hou H, *et al*. Correlation of chest CT and RT-PCR testing in coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases. *Radiology* 2020;200642:200642.
- 5 Kim H, Hong H, Yoon SH. Diagnostic performance of CT and reverse transcriptase-polymerase chain reaction for coronavirus disease 2019: a meta-analysis. *Radiology* 2020;201343:201343.
- 6 Manna S, Wruble J, Maron SZ, *et al*. COVID-19: a multimodality review of radiologic techniques, clinical utility, and imaging features. *Radiology: Cardiothoracic Imaging* 2020;2:e200210.
- 7 Inciardi RM, Lupi L, Zaccone G, *et al*. Cardiac involvement in a patient with coronavirus disease 2019 (COVID-19). *JAMA Cardiol* 2020. doi:10.1001/jamacardio.2020.1096. [Epub ahead of print: 27 Mar 2020].
- 8 Kim I-C, Kim JY, Kim HA, *et al*. COVID-19-related myocarditis in a 21-year-old female patient. *Eur Heart J* 2020;41:1859.

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