MRI appearance of COVID-19 pneumonia: an incidental finding

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Abstract

COVID-19 (coronavirus disease 2019) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first cases was reported in Wuhan, China on December 31st, 2019 and has rapidly spread globally.1 The main mode of transmission is person to person spread via respiratory droplets during close contact. Clinical symptoms are often nonspecific and include mainly fever and dry cough, which may be accompanied by dyspnea, fatigue, myalgia and headache.2 While most of the cases result in mild to moderate symptoms, some progress to severe pnemonia and acute respiratory distress syndrome (ARDS) leading to death. The gold standart method of diagnosis is real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) test on respiratory specimens, most frequently nasopharyngeal swabs.3,4 However, the sensitivity of the rRT-PCR test depends on specimen collection or viral burden at the time of sampling and the initial tests may be negative.5 Therefore, radiological imaging, particularly chest computerized tomography (CT) which is a very sensitive imaging modality, plays an important role in the diagnosis of COVID 19 pneumonia. On chest CT, the typical and the earliest finding is the unilateral or bilateral ground glass opacity (GGO) with peripheral distribution predominantly in the lower lobes. With the progression of the disease, extention of the GGOs with multilobar involvement, with or without associated consolidation and/or reticualtion (crazy paving patern) is seen.6 Considering the rapid spread of the infection, COVID-19 pnemonia can be encountered incidentally on any radiological imagings which are performed for other reasons. In our patient, COVID-19 pneumonia was recognised incidentally on contrast enhanced MRI of the abdomen. He was a 47 year old male with a known history of primary malignant disease, who underwent MRI in our outpatient clinic for the evaluation of any suspicious metastatic lesions. At the time of imaging, he had no clinical findings suggesting COVID 19 pneumonia and no history of close contact to a patient with positive COVID 19 test. A patchy inhomogenous peripheral pulmonary infiltration in the right lower lobe which was partially covered on multiple sequences was demonstrated. It was isointense on unenhanced T1w images and hyperintense on T2w images (figure1). There was no diffusion restriction (figure 2). Following intravenous contrast administration, the infiltration showed mild enhancement which is more prominent at the periphery of the lesion (Figure 3).

Probably it corresponds to the reversed halo sign (atoll sign) shown on the targetted chest CT, which refers to complete or incomplete ring-like consolidation surrounding a GGO. It is a nonspecific pattern of organising pneumonia and has also been reported in patients with Covid-19. The mechanism of this sign is not clear. While some authers think that it depicts disease progression that make consolidation developed around GGO, others argue that it is related with absorption in the lesion leaving a decreased attenuation in the center. On the targetted chest CT, typical multifocal, patchy, peripherally located GGOs were demonstrated (figure 4).

Diagnosis was confirmed by rRT-PCR test of an upper airway smear. Although MRI is not an effective imaging modality for the evaluation of pulmonary parenchyma due to the low proton content of the lungs and possible respiratory and cardiac pulsation artefacts, it has been shown to be an important imaging modality that can be used, particularly in the follow-up of patients who require dynamic imagings to avoid exposure to ionising radiation.7 To our knowledge, there are limited number of reports on the MRI findings of COVID-19 pnemonia. In a retrospective case study, Vasilev et al., concluded that MRI can be effectively used to detect COVID 19 pneumonia especially in young people and in the follow up imagings to avoid ionising radiation.8 Marcel et al., reported a case with COVID 19 pneumonia recognized incidentally on contrast enhanced MRI of the liver, similar to our patient.9

In conclusion, COVID 19 pneumonia can be incidentally established as peripherally located mild contrast enhancing consolidations on MRIs, for example MRI of the upper abdomen or thoracal spine. Therefore radiologists shoud be aware of suspicious findings of COVID 19 pneumonia in all radiological imaging modalities to allow early recognation of these asypmtomatic carriers and prevent further transmission of the infection.

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Figure1: *MRI of a patient with COVİD 19 pneumonia, shows right lower lobe infiltration which is isointense on precontrast T1w image (a) and hyperintense on T2w images (b) There was no diffusion restriction*

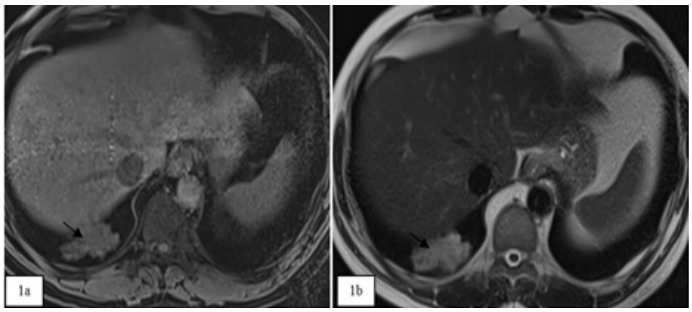


Figure 2: *Diffusion weighted imaging (DWI) (a) and apparent diffusion coefficient map (b) show no restricted diffusion*

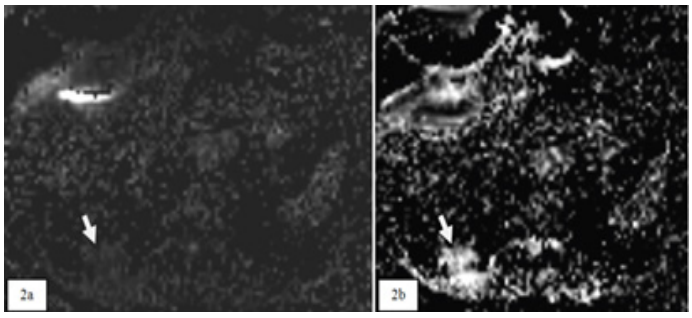


Figure 3: *contrast enhanced T1w image (a) and substracted image 4 minutes after contrast injection (b) show mild enhancement (compared to the precontrast T1w, 1a) more prominent at the periphery of the lesion which probably corresponds to the reversed halo sign (atoll sign) (figure 4a)*

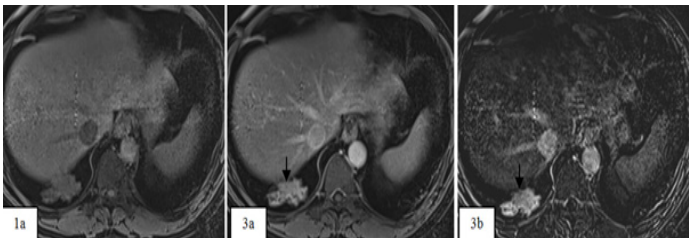
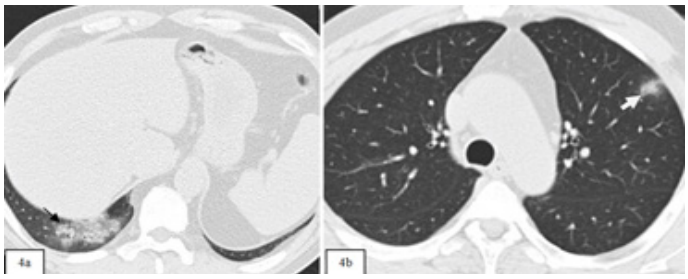


Figure 4: *The targetted chest CT shows typical multifocal patchy peripherally located GGOs (a, b) and the reversed halo sign (atoll sign)*



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