AJR: Novel coronavirus (COVID-19) imaging features overlap with SARS and MERS

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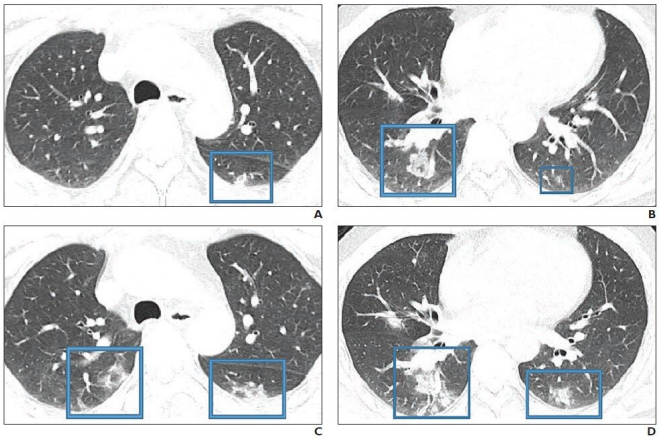

A and B, Initial CT images obtained show small round areas of mixed ground-glass opacity and consolidation (rectangles) at level of aortic arch (A) and ventricles (B) in right and left lower lobe posterior zones.C and D, Follow-up CT images obtained 2 days later show progression of abnormalities (rectangles) at level of aortic arch (C) and ventricles (D), which now involve right upper and right and left lower lobe posterior zones. Credit: *American Journal of Roentgenology* (AJR)

Although the imaging features of novel coronavirus disease 2019 (COVID-19) are variable and nonspecific, the findings reported thus far do show "significant overlap" with those of severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS), according to an ahead-of-print article in the *American Journal of Roentgenology* (*AJR*).

COVID-19 is diagnosed on the presence of pneumonia symptoms (e.g., dry cough, fatigue, myalgia, fever, dyspnea), as well as recent travel to China or known exposure, and chest imaging plays a vital role in both assessment of disease extent and follow-up.

As per her review of the present clinical literature concerning COVID-19, Melina Hosseiny of the University of California at Los Angeles concluded: "Early evidence suggests that initial chest imaging will show abnormality in at least 85% of patients, with 75% of patients having bilateral lung involvement initially that most often manifests as subpleural and peripheral areas of ground-glass opacity and consolidation."

Furthermore, "older age and progressive consolidation" may imply an overall poorer prognosis.

Unlike SARS and MERS—where initial chest imaging abnormalities are more frequently unilateral—COVID-19 is more likely to involve both lungs on initial imaging.

"To our knowledge," Hosseiny et al. continued, "pleural effusion, cavitation, pulmonary nodules, and lymphadenopathy have not been reported in patients with COVID-19."

Ultimately, the authors of this AJR article recommended CT for follow-up in patients recovering from COVID-19 to evaluate long-term or even permanent pulmonary damage, including fibrosis—as seen in SARS and MERS infections.

TABLE 1: Comparison of Clinical and Radiologic Features of SARS, MERS, and COVID-19

Feature	SARS	MERS	COVID-19
Clinical sign or symptom			
Fever or chills	Yes	Yes	Yes
Dyspnea	Yes	Yes	Yes
Malaise	Yes	Yes	Yes
Myalgia	Yes	Yes	Yes
Headache	Yes	Yes	Yes
Cough	Dry	Dry or productive	Dry
Diarrhea	Yes	Yes	Uncommon
Nausea or vomiting	Yes	Yes	Uncommon
Sore throat	Yes	Uncommon	Uncommon
Arthralgia	Yes	Uncommon	
Imaging finding			
Acute phase			
Initial imaging			
Normal	15–20% of patients	17% of patients	15–20% of patients
Abnormalities			
Common	Peripheral multifocal airspace opacities (GGO, consolidation, or both) on chest radiography and CT	Peripheral multifocal airspace opacities (GGO, consolidation, or both) on chest radiography and CT	Peripheral multifocal airspace opacities (GGO, consolidation, or both) on chest radiography and CT
Rare	Pneumothorax	Pneumothorax	Pneumothorax
Not seen	Cavitation or lymphadenopathy	Cavitation or lymphadenopathy	Cavitation or lymphadenopathy
Appearance	Unilateral, focal (50%); multifocal (40%); diffuse (10%)	Bilateral, multifocal basal airspace on chest radiography or CT (80%); isolated unilateral (20%)	Bilateral, multifocal, basal airspace; normal chest radiography findings (15%)
Follow-up imaging appearance	Unilateral, focal (25%); progressive (most common, can be unilateral and multifocal or bilateral with multifocal consolidation)	Extension into upper lobes or perihilar areas, pleural effusion (33%), interlobular septal thickening (26%)	Persistent or progressive airspace opacities
Indications of poor prognosis	Bilateral (like ARDS), four or more lung zones, progressive involvement after 12 d	Greater involvement of the lungs, pleural effusion, pneumothorax	Consolidation (vs GGO)
Chronic phase			Unknown, but pleural effusion and interlobar septal thickening have not yet been reported
Transient reticular opacities[a]	Yes	Yes	
Airtrapping	Common (usually persistent)		
Fibrosis	Rare	One-third of patients	Not yet reported

Note—SARS = severe acute respiratory syndrome, MERS = Middle East respiratory syndrome, COVID-19 = coronavirus disease 2019, GGO = ground-glass opacity, ARDS = acute respiratory distress syndrome.
[a]Over a period of weeks or months.

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More information: Melina Hosseiny et al, Radiology Perspective of Coronavirus Disease 2019 (COVID-19): Lessons From Severe Acute Respiratory Syndrome and Middle East Respiratory Syndrome, *American Journal of Roentgenology* (2020). DOI: 10.2214/AJR.20.22969

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