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

In December 2019, a lower respiratory tract febrile illness of unknown origin was reported in a cluster of patients in Wuhan City, Hubei Province, China. A novel strain of coronavirus isolated from the bronchoalveolar lavage of the patients was determined to be responsible for the outbreak. The pulmonary syndrome was later named coronavirus disease 2019 (COVID-19) by the World Health Organization.

COVID-19's imaging features are variable and nonspecific, but the imaging findings reported thus far do show "significant overlap" with those of severe acute respiratory syndrome and Middle East respiratory syndrome

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 [1] 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.

Besides the acute phase, CT is recommended for follow-up in individuals who are recovering from COVID-19 to evaluate long-term or permanent lung damage including fibrosis, as is seen with SARS and MERS infections

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			
Imaging Finding			
Acute Phase Initial finding			
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 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			
Transient reticular opacities	Yes	Yes	
Air trapping	Common (usually persistent)		
Fibrosis	Rare	One-third of Patients	Not yet reported

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

REFERENCE

1. Melina Hosseiny, Soheil Kooraki, Ali Gholamrezanezhad, Sravanthi Reddy. Radiology Perspective of Coronavirus Disease 2019 (COVID-19): Lessons From Severe Acute Respiratory Syndrome and Middle East Respiratory Syndrome American Journal of Roentgenology2020; Feb 28: 1-5. doi10.2214/AJR.20.22969.
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