Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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COVID-19 pneumonia versus EVALI, distinguishing the overlapping CT features in the COVID-19 era

Emergency radiologists and general radiologists are increasingly exposed to a myriad of chest pathologies caused by an ever-growing list of environmental and infectious agents. Most recently, this includes Coronavirus disease 2019 (COVID-2019)-related pneumonia caused by the SARS-CoV-2 and electronic-cigarette, or vaping, product use-associated lung injury (EVALI). Each entity is associated with typical CT manifestations that can usually be differentiated in their classic form; however, when presented with overlapping imaging features, the distinction in the emergency department (ED) setting remains crucial. This may be especially challenging in the light of overlapping clinical findings such as fever, cough, shortness of breath, and gastrointestinal symptoms in an otherwise healthy young adult.[1,2]

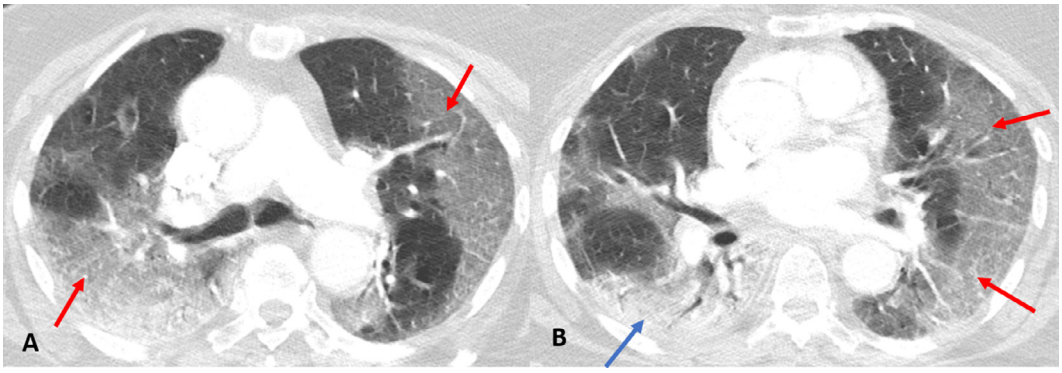

Fig. 1. Contrast enhanced CT of the chest shows typical findings of COVID-19 pneumonia in a 55-year-old woman who presented to the emergency department with fever, cough and shortness of breath and O2 saturation of 88% on room air requiring supplemental oxygen. COVID-19 pneumonia was confirmed with real-time polymerase chain reaction (RT-PCR). Peripheral GGO is seen in the both lungs (red arrows in A and B) with more focal consolidation in the right lower lobe (blue arrow in B). The opacities are pleural based with involvement of the immediate subpleural space. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.).

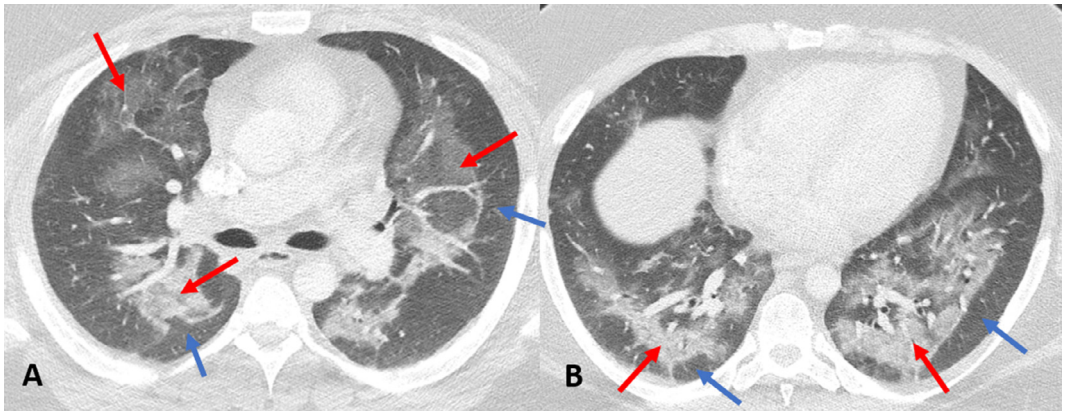

Fig. 2. 37 year-old-man presenting with low grade fever, cough, shortness of breath and O2 saturation of 92% on room air. Patients confirmed marijuana vape use in the past month before admission. RT-PCR for COVID-19 pneumonia as well as all cultures and infectious assessments were negative. Electronic-cigarette, or vaping, product use-associated lung injury (EVALI) was the final diagnosis by excluding other causes. Non-contrast CT images show extensive GGO in both lungs with slight lower lung predominance (red arrows in A and B). As compared to the case in Fig. 1, there is a distinct area of subpleural sparing (blue arrows). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.).

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Typical COVID-19 chest CT manifestations include ground glass opacities (GGO) in a peripheral and subpleural distribution, multilobar involvement, and with a slight lower lung predominance.[3] Relatively smaller components of consolidation may be present and typically increase throughout the disease course.[3] Crazy paving, which is a combination of interlobular septal thickening and GGO, is also a frequent finding.[4]

Electronic-cigarette use continues to be popular especially among the young adult population and therefore EVALI and its imaging findings remain a relevant diagnosis in the COVID-19 era. Although the imaging patterns of EVALI can be quite diverse and categorized under hypersensitivity pneumonitis, acute eosinophilic pneumonia, diffuse alveolar damage, lipoid pneumonia and organizing pneumonia,[2] the imaging pattern that most overlaps with COVID-19 is organizing pneumonia (OP). Both COVID-19 and EVALI can involve the lung periphery and usually lack pleural effusions; however, the presence of significant subpleural sparing should prompt consideration for organizing pneumonia subtype of EVALI over COVID-19 pneumonia.

Ultimately, the greatest likelihood of successfully distinguishing COVID-19 pneumonia from EVALI (like the provided examples in Figs. 1 and 2 which were seen in a single ED shift), lies with open communication between radiologist and ED clinician; that is, suggestive imaging findings are combined with direct patient questioning regarding recent use of e-cigarettes, COVID exposures etc. A diligent radiologist familiar with these unique imaging and clinical characteristics is well-positioned to initially suggest the diagnosis, thereby facilitating earlier treatment and the best patient outcome.

Declaration of Competing Interest

No conflict of interest

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