

# Radiologic chest CT findings from COVID-19 in Orleans Parish, Louisiana

Raman Danrad MD<sup>1</sup> | David L. Smith MD<sup>1</sup> | Edmund K. Kerut MD<sup>2,3</sup> 

<sup>1</sup>Department of Radiology, School of Medicine, LSU Health Science Center & University Medical Center, New Orleans, Louisiana

<sup>2</sup>Division of Cardiovascular Diseases, School of Medicine, LSU Health Sciences Center, New Orleans, Louisiana

<sup>3</sup>Heart Clinic of Louisiana, Marrero, Louisiana

## Correspondence

Edmund K. Kerut, MD, Heart Clinic of Louisiana, 1111 Medical Center Blvd, Suite N613, Marrero, LA 70071.  
Email: kenkerut@gmail.com

## Abstract

Orleans Parish in Louisiana is in the midst of an exponentially increasing number of patient admissions with COVID-19 and respiratory symptoms. Patients have been described having CT findings most consistent with an early-stage (<7 days from symptoms onset) or an advanced stage (8-14 days from symptoms onset). We describe and illustrate those early and advanced stage CT findings from patients with documented COVID-19 who have been admitted to University Medical Center in New Orleans, Louisiana.

## KEYWORDS

COVID-19, CT

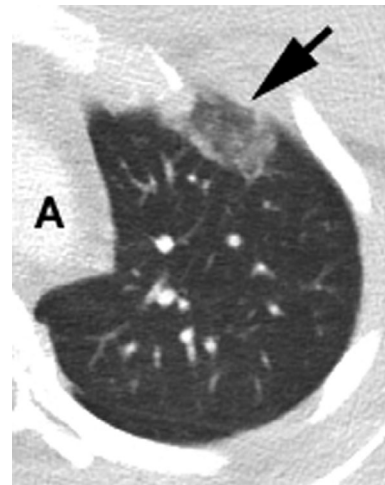
## 1 | INTRODUCTION

An acute coronavirus disease affecting mostly the respiratory tract, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or COVID-19, has quickly become a pandemic.<sup>1,2</sup> Within the state of Louisiana, Orleans Parish is presently experiencing an exponential acceleration of cases, with a large number of patients having severe lung involvement.

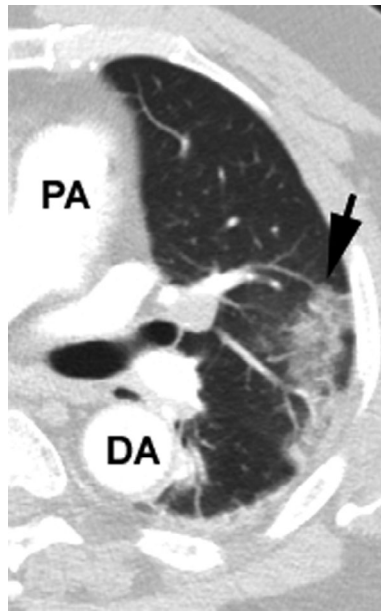
Chest X-ray has been of little benefit during early stages of COVID-19, but chest computed tomography (CT) has been noted to have abnormal findings, even prior to the onset of respiratory symptoms.<sup>3-5</sup> These findings are not specific by themselves and should not be used as criteria to diagnose COVID-19 infection. However, they are helpful in the appropriate clinical setting. Findings by CT may be categorized into two main categories by time from onset of symptoms: Early (<7 days from symptoms onset) or advanced (8-14 days from symptoms onset). The advanced stage may then progress to either "healing" or that of deterioration with cytokine storm and adult respiratory distress syndrome (ARDS).<sup>1</sup>

## 2 | CT FINDINGS of COVID-19

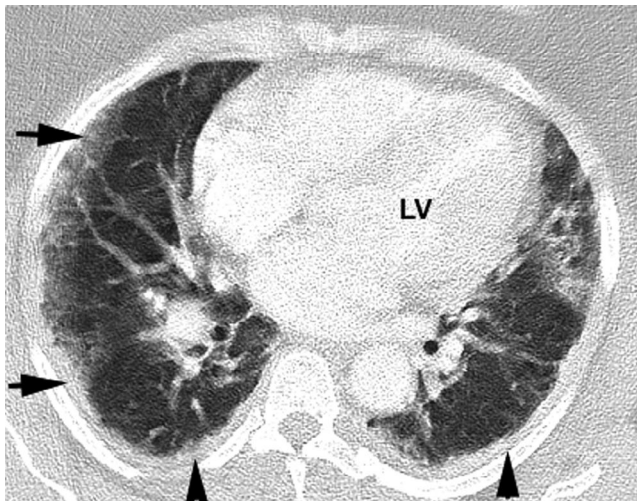
CT abnormalities with COVID-19 have been reported to vary. Lymphadenopathy, lung cavitation, and pleural effusions are usually not associated with COVID-19.<sup>6-8</sup>



**FIGURE 1** All images are contrast CT images of the chest in the standard axial plane. For optimal imaging of the lungs, lung windowing was used. All images are from patients admitted during the mid-weeks of March 2020 to University Medical Center, New Orleans, Louisiana. All patients had documented COVID-19 by PCR, and respiratory symptoms. Left lung image. A typical GGO is noted (arrow) as a round opacity at the level of the aortic arch, peripherally involving the anterior segment of the left upper lobe. Typically, GGOs are more often found in the basilar location. A = aortic arch



**FIGURE 2** Left lung image. A peripheral GGO (arrow) with reticulation. Reticulation is noted with development of thickening of interlobular septa, appearing as linear opacities. DA = descending aorta; PA = main pulmonary artery



**FIGURE 3** Level of the heart. Right lung demonstrates an atypical presentation of a peripheral GGO with reticulation, which is not rounded but more band-like (horizontal arrows). Also, bilateral diffuse band-like subpleural consolidations are noted (vertical arrows). These band-like consolidations have been observed in several patients. LV = left ventricle

Early category CT findings are generally associated with ground glass opacities (GGOs). They are typically multifocal, peripheral, bilateral at different levels, and mostly bibasilar (Figures 1 and 2). As this early category progresses to the advanced category, GGOs will demonstrate a reticular pattern with a decreased GGO prominence (Figures 3–6). The GGOs will continue to progress to consolidation bilaterally (Figures 7–9). As mentioned previously, although a pleural



**FIGURE 4** Left lung image. A zone of GGO (oblique arrow) surrounding an area of consolidation (horizontal arrow). This is termed a halo sign, in which a circular area of GGO is noted around an opacity. An area of normal lung (\*) is also noted. As in the prior CT image, a band-like consolidation is noted (vertical arrow). This is a GGO coalesced into a consolidation with a thick band-like appearance. LV = left ventricle

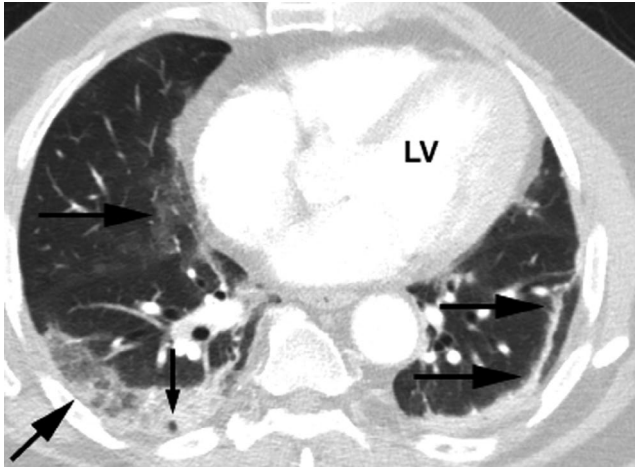


**FIGURE 5** The reversed halo sign or atoll sign (horizontal arrow) is defined as a focal area of GGO surrounded by a crescent or ring of consolidation. A typical GGO (vertical arrow) and area of consolidation (oblique arrow) is also noted in the left lung. Ao = ascending aorta; PA = main pulmonary artery

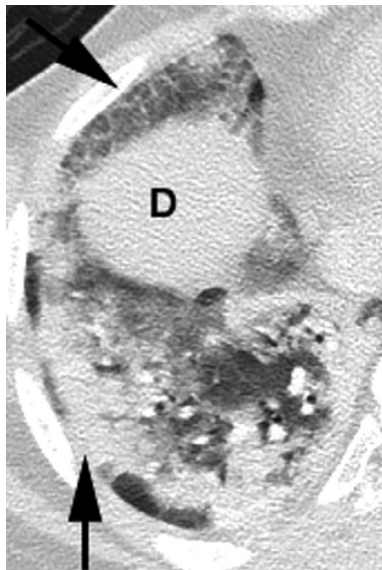
effusion is not usually described as associated with COVID-19, one may be noted on occasion (Figure 10).

### 3 | CONCLUSION

Orleans Parish in Louisiana is in the midst of an exponentially increasing number of patient admissions with COVID-19 and respiratory symptoms. Patients have been described having CT findings most consistent with an early stage (<7 days from symptoms onset) or an advanced stage (8–14 days from symptoms onset).



**FIGURE 6** Right lung - Area of GGO noted more centrally than usually found (horizontal arrow). A peripheral GGO with reticulation (oblique arrow) and the vacuole sign (small vertical arrow). The vacuole sign is a translucent, low-density shadow within an opacity. Left lung - A parenchymal band (horizontal arrows) is noted. This is defined as a linear opacity, usually up to 3 mm in width and up to 5 cm in length. It may extend to the visceral pleura, which may be retracted where the band attaches. LV = left ventricle

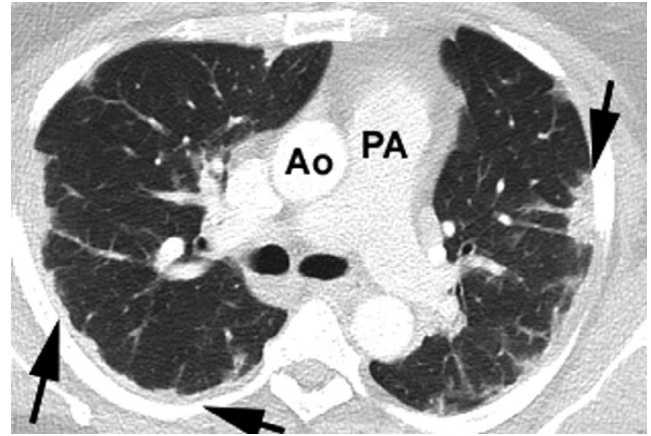


**FIGURE 7** Right lung image. Basilar level image demonstrates a GGO with reticulation (oblique arrow). Also, a peripheral area of consolidation (vertical arrow) is noted. D = diaphragm

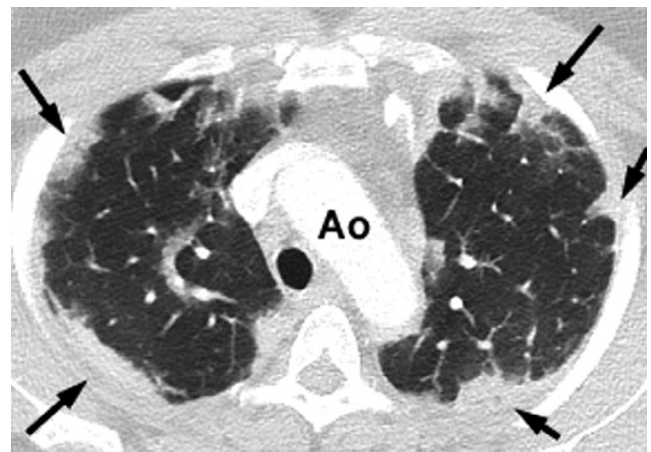
We describe and illustrate early and advanced stage CT findings from patients with documented COVID-19 who have been admitted to University Medical Center in New Orleans, Louisiana.

#### ORCID

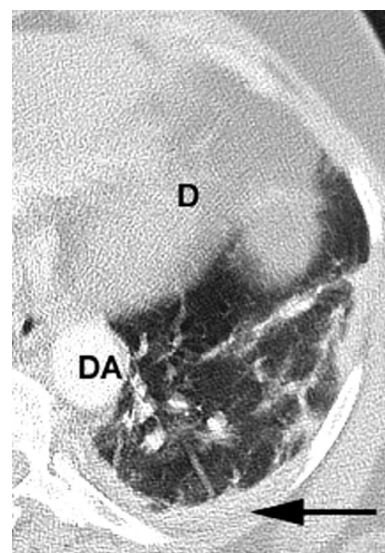
Edmund K. Kerut  <https://orcid.org/0000-0003-3880-3987>



**FIGURE 8** Right lung - Linear subpleural consolidations (arrows). Left lung - Rounded consolidation (arrow). Ao = ascending aorta; PA = main pulmonary artery



**FIGURE 9** Multiple peripheral consolidations are noted in both lung fields (arrows) in this advanced category patient. Ao = transverse aorta



**FIGURE 10** Left lung image. Although not usually associated with COVID-19, this patient has a tiny left pleural effusion at the posterior base of the left lung (horizontal arrow). D = diaphragm, DA = descending aorta

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