

## New coronavirus infectious disease (COVID-19)

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**Section:** Chest imaging

**Area of Interest:** Lung

**Procedure:** Computer Applications-General

**Procedure:** Diagnostic procedure

**Procedure:** Education

**Imaging Technique:** CT

**Special Focus:** Education and training Epidemiology

Image verification Infection Case Type: Clinical Cases

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**Patient:** 72 years, female

### Clinical History:

72-year-old female came to the hospital with sore throat, cough, dyspnea, anosmia and fever for 5 days. Physical exam revealed no pathological findings. Biochemistry showed lymphopenia, decreased prothrombin activity, c-reactive protein increase and hypoxemia. RT-PCR was positive for COVID-19. No co-morbidities or risk factors were communicated.

### Imaging Findings:

Chest radiography anteroposterior (AP) was the first imaging modality used.

Interstitial lung occupation consisting on reticular-nodular pattern in both lungs, mostly in the right one, was observed [1]. Thus, mild opacities in the superior, middle and lower right lobes were depicted. There was no pleural effusion.

IVC CT was performed to confirm the findings. Pulmonary embolism (PE) protocol was chosen.

CT showed multiple ground-glass opacities with bilateral, subpleural and peripheral distribution; mostly in the right lung [2]. Bronchovascular and interlobular septal thickening was also appreciated. Thus, patchy ground-glass opacities with subpleural distribution were depicted in the middle and lower left lobes [3].

Pulmonary fibrosis or small air trapping features (tree-in-bud pattern, bronchiectasis) were not observed.

Increased size lymph nodes, pleural or pericardial effusion were not found in the CT.

Support treatment was given to the patient.

### **Discussion:**

Several cases of pneumonia were reported to the World Health Organization (WHO) on December 31, 2019, from Wuhan, China. SARS-Cov-2 (COVID-19) was confirmed to be the cause. Coronaviruses are a family of RNA viruses that cause illness ranging from the common cold to severe diseases. Coronaviruses are zoonotic; which means that they are transmitted between animals and people. Little is known about physiopathology. Decrease in CD4T cells, lymphopenia and cytokine storm may be involved. Mild symptoms include fever, dry cough and dyspnoea. Rhinorrhoea, sneezing and sore throat have also been described. Severe cases show infection pneumonia, severe acute respiratory syndrome, kidney failure and even death. WHO declared COVID-19 a global health emergency in January 2020. RT-PCR screening is now considered the standard laboratory test for diagnosis of COVID-19. Imaging (X-ray and CT) is used to guide clinicians in individual patient management decisions, dealing with complications, follow the course of the disease and look for an alternative diagnosis. CT depicts pathological findings even before RT-PCR test becomes positive.

Features of initial phase include bilateral, multilobar ground-glass opacities (GGO) with a peripheral or posterior distribution (or both), mainly in the lower lobes. Intermediate phase findings include an increase in the number or size of GGO, transformation of GGO into multifocal consolidation areas, septal thickening and development of crazy-paving pattern and organized pneumonia. Final stage is characterised by diffuse alveolar damage pattern corresponding to acute respiratory distress syndrome (ARDS). Alternative diagnosis includes lobar pneumonia, cavitation, tree-in-bud changes, pleural or pericardial effusion, pulmonary fibrosis and lymph node enlargement.

Current treatment strategies are limited to quarantine, isolation and infection control measures. Several treatments are being tested, such as human immunoglobulin, interferons, chloroquine, hydroxychloroquine, remdesivir or methylprednisolone; some of them with a promising outcome. Prognosis depends on COVID-19 stage. ARDS is the most common indication for transferring patients to intensive care unit (ICU). Imaging is essential to deal with complications management.

- COVID 19 has been considered as a global health emergency.

- Signs vary from common viral infection symptoms to pneumonia, severe acute respiratory syndrome, kidney failure and even death.

- CT shows bilateral, multilobar GGO with a peripheral or posterior distribution, mainly in lower lobes, crazy-paving pattern and organized pneumonia.

- ARDS is the most common indication for transferring patients to ICU.
- Imaging is essential to deal with complications and follow the course of the disease

**Differential Diagnosis List:** Lobar pneumonia, Other viral pneumonia, Interstitial lung diseases, Pulmonary fibrosis, Organized pneumonia

**Final Diagnosis:** Lobar pneumonia

**References:**

Sana Salehi, Aidin Abedi, Sudheer Balakrishnan and Ali Gholamrezanezhad. Coronavirus disease 2019 (COVID-19): a systematic review of imaging findings in 919 patients. AJR 2020; 215:1-7 (PMID: [32174129](#))  
Pan Y, Guan H and Zhou S. Initial CT findings and temporal changes in patients with novel coronavirus pneumonia (2019-nCoV): a study of 63 patients in Wuhan, China. Eur Radiol 2020 Feb 13. (PMID: [2055945](#))  
Huang P, Liu T and Huang L. Use of chest CT in combination with negative RT-PCR assay for the 2019 novel coronavirus but high clinical suspicion. Radiology 2020 295:22-23 (PMID: [32049600](#))

**Figure 1**

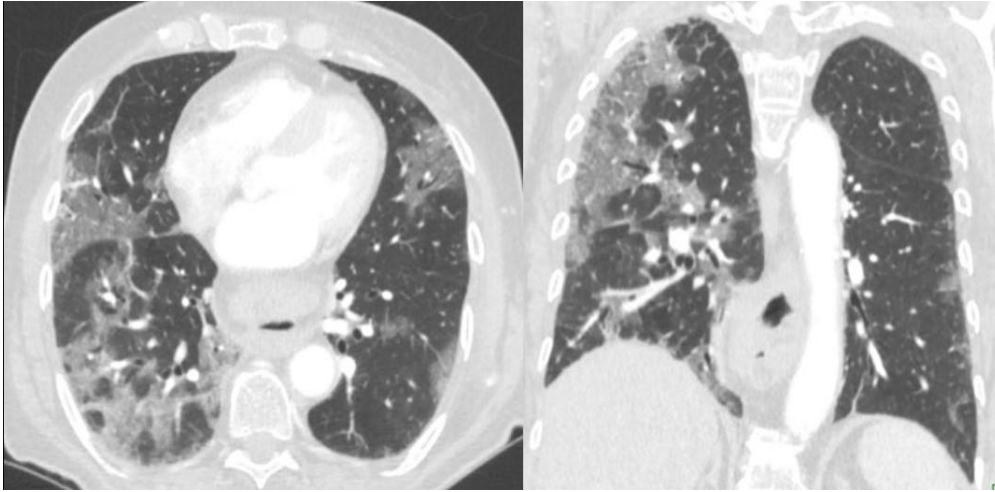
**a**



**Description:** AP chest X-Ray: a reticular-nodular pattern in both lungs, mostly in the right one, was observed. In addition, mild opacities in the superior, middle and lower right lobes were depicted. **Origin:** © Department of Radiology. Complejo Hospitalario de Navarra, Pamplona, Spain, 2020.

**Figure 2**

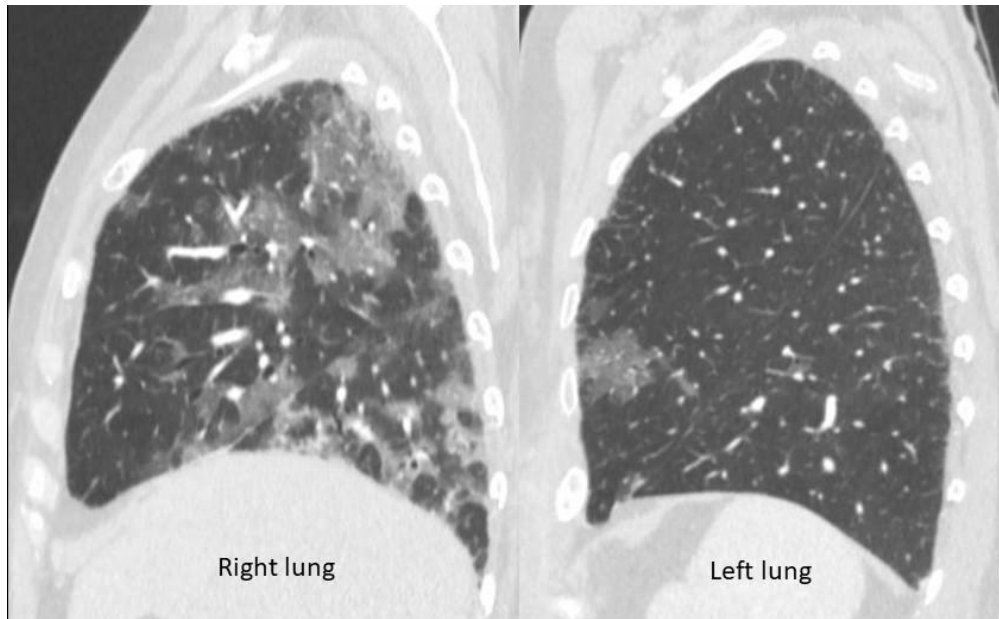
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**Description:** IVC CT: axial and coronal sections. Multiple ground-glass opacities with bilateral, subpleural and peripheral distribution; mostly in the right lung were appreciated. Hiatal hernia in the posterior mediastinum was also observed in axial section. **Origin:** © Department of Radiology. Complejo Hospitalario de Navarra, Pamplona, Spain, 2020.

**Figure 3**

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**Description:** IVC CT: sagittal section. Multiple ground-glass opacities with bilateral, subpleural and peripheral distribution; mostly in the right lung were observed. **Origin:** © Department of Radiology. Complejo Hospitalario de Navarra, Pamplona, Spain, 2020.