

# CT Imaging Features of 2019 Novel Coronavirus (2019-nCoV) in Hemodialysis Patient

Alaoui Amina<sup>1</sup>, Nasik Hicham<sup>2</sup>, Benlanda Othmane<sup>2</sup>, Wakrim Soukaina<sup>3</sup>

1) Radiology department, Hassan II Hospital of Agadir, Morocco.

2) Anesthesia and intensive care department Hassan II hospital of Agadir, Morocco & Faculty of medicine and pharmacy, university Ibn Zohr, Agadir, Morocco.

3) Radiology department, Hassan II hospital of Agadir, Morocco & Faculty of medicine and pharmacy, university Ibn Zohr, Agadir, Morocco.

## Section: Images in radiology

**Declaration of Conflicting Interests** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Clinical History

A 56-year-old man, patient admitted to the hospital for respiratory distress. He followed up since, for chronic renal failure at hemodialysis stage. At the admission, the physical examination found an asthenic patient, with a marked labored breathing and indrawing of intercostal muscles. Blood pressure was correct, and there was a high fever, the chest auscultation found out crackling groans.

Face to this clinical presentation, we can discuss as the main diagnosis pulmonary oedema which can be both cardio or nephrogenic, bacterial pneumonia and viral pneumonia seen the pandemic of SarsCov 2.

Plain chest radiography showed up, a ground-glass opacification and consolidation in both lungs

The electrocardiogram was normal

Laboratory tests revealed a renal failure and increased leukocyte count. The patient also underwent a nasopharyngeal swab three days after admission; in the aim to perform, an RT PCT test, which is the official test to diagnose SARS Cov 2 in our country. However, this test was negative.

The patient benefited from a hemodialysis session to relieve the pulmonary edema. Unfortunately, it did not improve his respiratory distress. Thus, the patient underwent a CT scan for further etiological exploration.

## Imaging Findings

The Chest CT scan performed in the supine position during end-inspiration without intravenous contrast.

It showed patchy ground glass with fuzzy margins associated to straight edge consolidations. The main findings were associated to a smooth interlobular thickening and crazy paving pattern. Both lungs were involved and predominant in subpleural regions. The amount of involvement estimated to 75%. There was no pleural effusion no mediastinal lymphadenopathy. Since then, Covid 19 pneumonia was highly suspected and the patient underwent a second RT PCR test of a nasopharyngeal swab, which was positive.

The evolution was not satisfying, the patient showed an aggravation on the respiratory distress. The second CT showed a marked progression of lung involvement and a pleural effusion.

Unfortunately, the patient died after 6 days of admission

### **Discussion**

December 2019, the pneumonia with unknown cause has appeared in Wuhan, Hubei Province, China. On January 7, 2020, the 2019 novel coronavirus (2019-nCoV) identified as the causative agent based on virus typing [1, 2]

Transmission of 2019-nCoV the human to human is via droplets or contact. The incubation period of 2019-nCoV is generally 3–7 days but no longer than 14 days, and the virus is infective during the incubation period. The people susceptible to the 2019-nCoV and more seriously affected infection are the elderly patients or those with underlying diseases.

The main symptom is fever. Other symptoms include fatigue, dry cough, and diarrhea, and acute respiratory distress syndrome can occur in severe cases[3, 4].

COVID-19 is spreading rapidly worldwide while present diagnostic methods for identifying the virus have limitations. RT-PCR testing has low sensitivity early on in the disease course. Although chest CT has high sensitivity, it has low specificity [5, 6]. This low specificity may stem from the fact that it is difficult to distinguish COVID-19 findings from findings of other disease on chest CT [7].

The main objective of thoracic computed tomography in this new epidemic is the early recognition of the disease, which can speed up treatment and cause early isolation of patients.

Many hemodialysis patients suffer concurrently from pulmonary edema, which may mimic pneumonia, in terms of both presenting with an abnormal chest radiograph and producing a similar clinical symptom. Nucleic acid test could provide a valuable support, but the sensitivity of the current nucleic acid tests needs to be improved. Given all of the above, the precise diagnosis of COVID-19 infection is more difficult in dialysis patients than in the normal population[8].

The diagnosis of COVID-19 in our dialysis patient was made from the start with a CT scan even if the PCR was negative, since the patient underwent a dialysis session just before the examination and because pulmonary parenchymal characteristics: multiple peripheral ground-glass lesions, and consolidations in both lungs, that are asymmetrical and predominant in the sub pleural regions. Clinical and CT worsening of the patient even if he benefited from an adequate management pushed us to repeat the PCR, which returned positive

For treatment, hemodialysis could take away some drugs and reduce their concentration in the blood. Taken together, an adjusted or even supplemental dose of those antiviral drugs should be

administer. In addition, a previous study has indicated that renal dysfunction in patients with pneumonia is associated with a risk of severe infection [9].

Our patient received adequate treatment and the evolution was marked by clinical and CT improvement

In conclusion, Compared to RT-PCR, chest CT imaging may be a more reliable and rapid method to diagnosis and assess COVID-19, especially in the epidemic area.

SARS-CoV-2 infection should be monitor intensively for dialysis patients due to immunodepression, difficulty in diagnosis, and additional concern regarding the use of antiviral drugs.

### Final Diagnosis

The diagnosis of COVID 19 with signs of secondary infection was made.

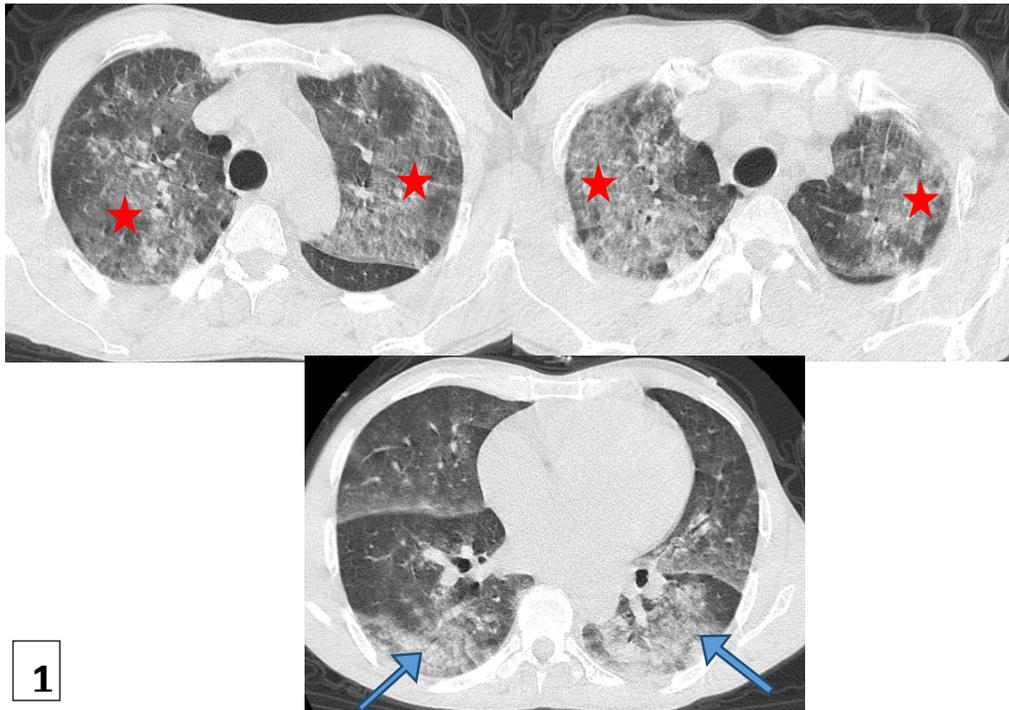
### Differential Diagnosis List

Pulmonary edema and chronic renal failure  
Other Viral Pneumonia  
Common Pneumonia

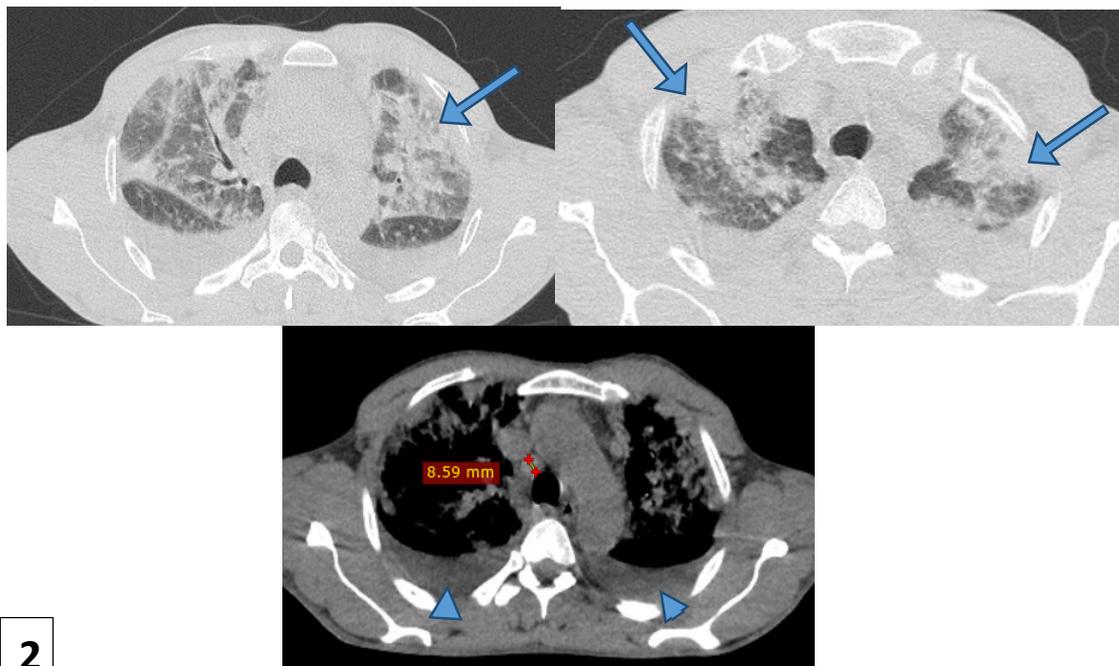
### References

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med* 2020 Jan 24 [Epub]. <https://doi.org/10.1056/NEJMoa2001017>
2. Chen Y, Liu Q, Guo D. Coronaviruses: genome structure, replication, and pathogenesis. *J Med Virol* 2020 Jan 22 [Epub]. <https://doi.org/10.1002/jmv.25681>
3. Rubin EJ, Baden LR, Morrissey S, Campion EW. Medical journals and the 2019-nCoV outbreak. *N Engl J Med* 2020 Jan 27 [Epub]. <https://doi.org/10.1056/NEJMe2001329>
4. Hui DS, I Azhar E, Madani TA, Ntoumi F, Kock R, Dar O, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health - The latest 2019 novel coronavirus outbreak in Wuhan, China. *Int J Infect Dis* 2020;91:264-266
5. Fang Y, Zhang H, Xie J, Lin M, Ying L, Pang P, Ji W. Sensitivity of Chest CT for COVID-19: Comparison to RT-PCR. *Radiology* 2020. Doi: 10.1148/radiol.202000432. Published February 19, 2020. Accessed February 29, 2020
6. Pan F, Ye T, Sun P, Gui S, Liang B, Li L, Zheng D, Wang J, Hesketh RL, Yang L, Zheng C. Time Course of Lung Changes of Chest CT During Recovery From 2019 Novel Coronavirus (COVID-19) Pneumonia. *Radiology* 2020. Doi: 10.1148/radiol.202000370. Published February 13, 2020. Accessed February 29, 2020.
7. Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, Tao Q, Sun Z, Xia L. Correlation of Chest CT and RTPCR Testing in Coronavirus Disease 2019 (COVID-19) in China: A Report of 1014 Cases. *Radiology* 2020. Doi: 10.1148/radiol.202000642. Published February 26, 2020. Accessed March 1, 2020
8. Xiao Y, et al. Severe Acute Respiratory Syndrome Coronavirus 2 Infection in Renal Failure Patients: A Potential Covert Source of Infection. *Eur Urol* (2020), <https://doi.org/10.1016/j.eururo.2020.03.025>
9. Al-Tawfiq JA, Hinedi K, Ghandour J, et al. Middle East respiratory syndrome coronavirus: a case-control study of hospitalized patients. *Clin Infect Dis* 2014;59:160–5.

Figures and Captions



**Figure1:**Unenhanced Chest CT scan of a 56-year-old man. A lung window shows :Patchy ground-glass (red star) and consolidations (blue arrow) beach with indistinct border in both lungs, that are predominant in the subpleural regions.



**Figure2:**Unenhanced Chest CT scan of a 56-year-old man. 4 days after hospitalization marked progression showing increasing number of opacities and density of consolidation and showing the news consolidations and the pleural effusion