Case report

Pericardial and pleural effusion in an elderly woman with Covid-19 pneumonia: CT findings

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A B S T R A C T

Coronavirus-19 disease is an acute respiratory syndrome infection that primarily infects the lungs, and may extend to other organs such as the cardiovascular system. Here we describe the case of a 90-year-old woman, affected by heart failure (NYHA, class III), with bilateral Covid-19 pneumonia, complicated by pleural and pericardial effusion. An unenhanced Computed Tomography, urgently made, allowed to hospitalize and treat the patient, monitoring her clinical situations.

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Background

Since December 2019 the world is facing a rapidly expanding pandemic of lower respiratory tract infection by a novel coronavirus severe respiratory syndrome coronavirus-2 (SARS-CoV-2). In some patients, this viral infection causes a clinical syndrome referred to as coronavirus disease 2019 (Covid-19), but the heterogeneity of the disease course poses a challenge to healthcare providers and optimal management of patients. The use of CT imaging in the diagnosis and follow-up had rapidly grown, and radiological patterns along the disease course are increasingly understood [1]. To date, the most of all the available literature regarding SARS-CoV-2 infection relies on unenhanced CT, which is considered the first-line imaging tool [2]. Current guidelines advocate the use of unenhanced chest CT for the diagnosis, severity assessment and monitoring of Covid-19 disease [3].

Case presentation

In a 90 years old woman, affected by heart failure (NYHA, class III), nasopharyngeal sampling was positive for SARS-CoV-2.

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Fig. 1 – Chest HRCT patterns of bilateral Covid-19 pneumonia of the patient.
(A-C) MPR CT reconstructions, that showed bilateral and multifocal typical ground-glass, with bilateral consolidations areas and interstitial thickenings.
(D-F) Volume Rendering CT reconstructions, that indicated as green the areas representing the normal lung parenchyma, while red areas indicate the inflammatory involvements.
She had persistent chest pain (retrosternal, intensified when coughing and laying down), shortness of breath, and fever (38°C) since about seven days, without clinical improvements from taking paracetamol at home.

At Emergency Department the patient had:
- negative ECG for ischemic alterations;
- auscultation: vesicular murmur was reduced in both lung areas;
- So2 of 89%;
- Laboratory: leukopenia, thrombopenia and increased values of C-reactive protein.

An unenhanced chest Computed Tomography (high resolution computed tomography, HRCT) was urgently performed, that showed (Fig. 1A-F): the presence of typical, multifocal “ground-glass” areas in both lungs, with bilateral consolidations areas in the posterior-basal segments of right and left lower lobes, and also the evidence of bilateral pulmonary interstitial thickenings. All these CT signs were suggestive for bilateral Covid-19 pneumonia.

CT also showed (Fig. 2A-C): the presence of bilateral pleural effusion (mostly on the right); pericardial effusion (which is arranged around the heart, with maximum thickness of about 1 cm), with enlargement of the heart; obliteration and thickening of the mediastinal adipose planes anteriorly.

The patient was immediately hospitalized, and, after about a month and a half of hospitalization, she had returned at home. Now the patient will perform a clinical-radiological and laboratory follow-up.

Discussion

Critical patients with Covid-19 pneumonia showed higher incidences of pericardial effusion, pleural effusion and lymphnodes enlargements than ordinary patients [4]. The pathogenesis of Covid-19 pericardial effusion is yet unresolved; two predominant mechanisms could be relevant [5]. First, the heart affinity of the virus could be explained by SARS-CoV-2 S protein direct binding to human angiotensin-converting enzyme 2 present in the human heart, which allows for cellular infection. Indirectly, pericardial effusion could follow a viral replication and dissemination in the blood, from day 7 up to 1 month after symptoms beginning. This could lead to a cytokine storm syndrome and a direct myopericardial lesion by inflammatory cell infiltration, similarly to Covid-19 direct pulmonary lesions [6,7]. CT has quickly become a cornerstone in both the diagnostic workup and follow-up of SARS-CoV-2 infection and is usually performed unenhanced.

Conclusions

CT is important not only in the early stages of Covid-19 diagnosis, but also in the evaluation of complications (such as pleural-pericardial effusion) and concomitant pathologies during the subsequent course of the disease, orienting toward the best clinical management/outcome for the patient.

Patient consent

The patient confirmed the consent for publication of our case report.

Declaration of Competing Interest

The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

REFERENCES

[1] Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, et al. Correlation of chest CT and RT-PCR testing in coronavirus disease 2019
(COVID-19) in China: a report of 1014 cases. Radiology 2020;200642. doi:10.1148/radiol.2020200642.
[2] ACR recommendations for the use of chest radiography and computed tomography for suspected Covid-19 infection. https://www.acr.org/Advocacy-and-Economics/ACR-Position-Statements/Recommendations-for-Chest-Radiography-and-CT-for-Suspected-Covid-19-Infection.
[3] Li Kunhua, Wu Jiong, Wu Faqi, Guo Dajing, Chen Linli, Fang Zheng. The clinical and chest CT features associated with severe and critical Covid-19 pneumonia. Investigative Radiology 2020;55(6).
[4] Dong N, Cai J, Zhou Y, Liu J, Li F. End-stage heart failure with COVID-19: strong evidence of myocardial injury by 2019-nCoV. JACC Heart Fail 2020;8:515–17.
[5] Purohit R, Kanwal A, Pandit A. Acute myopericarditis with pericardial effusion and cardiac tamponade in a patient with Covid-19. Am J Case Rep 2020;21:e925554.
[6] Asif T, Kassab K, Iskander F, Alyousef T. Acute pericarditis and cardiac tamponade in a patient with Covid-19: a therapeutic challenge. Eur J Case Rep Intern Med 2020;7:001701.
[7] Inciardi RM, Lupi L, Zaccone G, Italia L, Raffo M, Tomasoni D, et al. Cardiac involvement in a patient with coronavirus disease 2019 (COVID-19). JAMA Cardiol 2020;5:1–6.