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Case Report

COVID-19 Pneumonia with Flask-shape Cardiomegaly and Bilateral Pleural Effusion; Good Outcome and Possible Differentiation

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Abstract

Rationale: Cardiovascular complications represent a serious outcome of acute coronavirus disease 2019. Cardiomegaly has multiple directories in COVID-19 patients. However, the acute cardiovascular findings post-COVID-19 can make a patient more likely to become severely ill. New-onset cardiac deterioration is frequent in worsen respiratory COVID-19 cases especially, with preexisting cardiac ailments. Pleural effusion is a common pathological accumulation of fluid in the pleural space. Pleural effusion happened in10.3% of COVID-19 patients.

Patient concerns: An elder, housewife, widow female, Egyptian patient was presented to the intensive care unit with fever, tachycardia, tachypnea, chest pain, and acute confusion state. She was previously diagnosed as a hypertensive patient.

Diagnosis: COVID Pneumonia with bilateral pleural effusion, and huge flask-shape cardiomegaly. Interventions: Chest CT, brain CT, electrocardiography, and oxygenation.

Outcomes: Gradual response and good outcomes in the presence of several significant serious risk factors were the results.

Lessons: COVID-19 infection may be a predisposing risk factor for cardiac status deteriorations in underlying cardiovascular disease. The association of COVID-19 pneumonia, hypertension, multiple valvular diseases, and bilateral pleural effusion with huge cardiomegaly in an elderly female patient is a constellation of serious risk factors.

Keywords:COVID-19 pneumonia, cardiomegaly, pleural effusion, pericardial effusion, hypertension, valvular heart disease

Abbreviations

ACS: Acute coronary syndrome; CHF: Congestive heart failure ; COVID-19: Coronavirus disease 2019; CV: Cardiovascular ; ECG: Electrocardiogram; ICU: Intensive care unit; IHD: ischemic heart disease; O2: Oxygen; SGOT: Serum glutamic-oxaloacetic transaminase; SGPT: Serum glutamic-pyruvic transaminase; VHD; Valvular heart diseases ; VR: Ventricular rate

Introduction

Cardiovascular (CV) complications may be serious sequels of acute coronavirus disease 2019 (**COVID-19**). However, the post-acute CV findings of COVID-19 have not yet been exhaustively applied[1]. Thorough evaluation studies of post-acute COVID-19 manifestations of the CV system at 12 months and post-acute COVID-19 squeals via the spectrum of care settings of the acute infection are also defective[1]. New-onset cardiac deterioration is frequent in worsen respiratory COVID-19 cases especially, with preexisting cardiac ailments[2]. The link of SARS-CoV-2 with

ACE2 can cause ACE2 pathways changes that predispose to acute injury of the lung, heart, and endothelial cells[3]. It might directly infect the myocardium, causing viral myocarditis[3]. Plaque rupture will be causing acute coronary syndrome (ACS) can result from the systemic inflammation and catecholamine rush inherent in this disease[4,5]. Coronary artery thrombosis was reported as a possible cause of ACS in COVID-19 patients[6]. Pleural effusion can be used as an indicator of severe inflammation and poor clinical outcomes. It might be an integral risk factor for critical COVID-19 patient[7]. Chest CT has a pivotal role in the provisional diagnosis of COVID-19. Typical chest CT signs in COVID-19 patients mainly as multiple bilateral patchy ground-glass opacities in lobules with peripheral distribution[7]. **Pleural effusion** is a common pathological accumulation of fluid in the pleural space. Viral pleuritis, congestive heart failure (CHF), and cancer are suggested causes of pleural effusion [8]. One-year mortality of non-malignant pleural effusion has a range of 25 to 57%[9]. Pleural effusion happened in10.3% of COVID-19 patients. The refractory cases have a higher incidence of pleural effusion than general COVID-19 patients. This is more clearly with pulmonary inflammatory response [10]. Transthoracic echocardiography (TTE) is recommended for COVID-19 cases with CHF. Newly diagnosed **cardiomegaly** is better seen on chest X-ray or chest CT[2].

Case presentation

A 75-year-old, housewife, widow, Egyptian female patient was presented to the intensive care unit (ICU) with fever, tachycardia, tachypnea, chest pain, and acute confusion state. Generalized body aches, sweating, fatigue, anorexia, and loss of smell were associated symptoms. The chest pain is pleuretic. The patient started to complain of fever 4 days ago. The relatives gave a recent history of hypertension and continued on captopril 25mg, a once-daily tablet. She has direct contact with a confirmed case of COVID-19 pneumonia 10 days ago. The patient denied a history of other relevant diseases, drugs, or other special habits. Informed consent was taken. Upon general physical examination; generally, the patient appeared irritable, tachypneic, and distressed with an irregular rapid pulse rate of VR; 102 bpm, blood pressure (BP) of 130/80 mmHg, respiratory rate of 24 bpm, the temperature of 38.5 °C, and pulse oximeter of oxygen (O2) saturation of 88%. The pleuretic rub bilaterally listened. Currently, the patient was admitted to ICU for COVID-19 pneumonia with chest pain, and huge cardiomegaly. Initially, the patient was treated with O2 inhalation by O2 cylinder (100%, by nasal cannula, 5L/min; as needed). The patient was maintained treated with cefotaxime; (1000 mg IV TID), azithromycin tablets (500 mg, OD), oseltamivir capsules (75 mg, BID only for 5 days), and paracetamol (500 mg IV TID as needed). SC enoxaparin 80 mg, BID), aspirin tablets (75 mg, OD), clopidogrel tablets (75 mg, OD), hydrocortisone sodium succinate (100 mg IV BID), and furosemide (500 mg IV BID) The patient was daily monitored for temperature, pulse, blood pressure, ECG, and O2 saturation. The initial ECG tracing was done on the day of the presentation to the ICU showing sinus arrhythmia with rapid VR (102). There are 3 unifocal PVCs in V1-3 leads, T-wave inversion in I and aVL leads, and P-mitral in lead II (**Figure 1**). The plain chest-XR was done 3 days before the ICU admission showing flask-shape cardiomegaly, right lung ground-glass opacity (GGO), reversed Halo sign (pink arrows), and bilateral obstruction of costophernic angle (**Figure 2A**). The chest CT without contrast was done 3 days before the ICU admission showing bilateral pleural effusion with few bilateral small-sized GGO (**Figure 2B**). The brain CT without contrast was done 3 days before the ICU admission showing brain involution changes (**Figure 2C**). The echocardiography was done on the day of the presentation showing dilated both left atrium and ventricle, mitral and aortic regurgitations, and a slightly low EF ratio (56%) (**Figure 2D**). The initial complete blood count (CBC); Hb was 12 g/dl, RBCs; $3.91*10^3/mm^3$, WBCs; $16.4*10^3/mm^3$ (Neutrophils; 89.5 %, Lymphocytes: 7.4%, Monocytes; 2.1%, Eosinophils; 1% and Basophils 0%), and Platelets; $136*10^3/mm^3$. D-dimer was high (0.753 ng/ml). CRP was high (94g/dl). SGPT was slightly high (51U/L) and SGOT was normal (43U/L). Serum albumen was

normal (3.5gm/dl). Serum creatinine was normal (0.8mg/dl) and blood urea was normal (19mg/dl). RBS was normal (155 mg/dl). Arterial blood gases showed initial respiratory alkalosis. Plasma sodium was normal (138mmol/L). Serum potassium was normal (5.4mmol/L). Ionized calcium was slightly low (0.91mmol/L). The troponin test was negative (0.02U/L). COVID-19 pneumonia with bilateral pleural effusion and huge flask-shape cardiomegaly **was the most probable diagnosis**. The patient was discharged on the fifth day after clinical and electrocardiographic improvement. The patient was continued on aspirin tablets (75 mg, once daily) and furosemide tablets (40 mg once daily). The patient was planned for future cardiac catheterization with recommended cardiovascular follow-up.

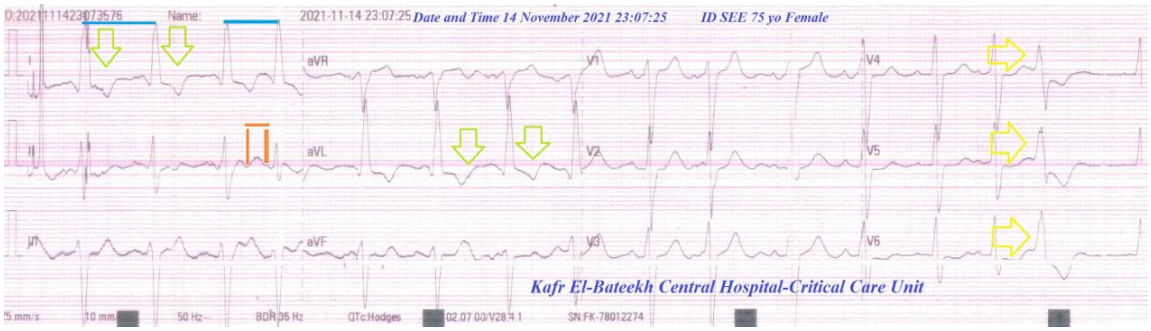
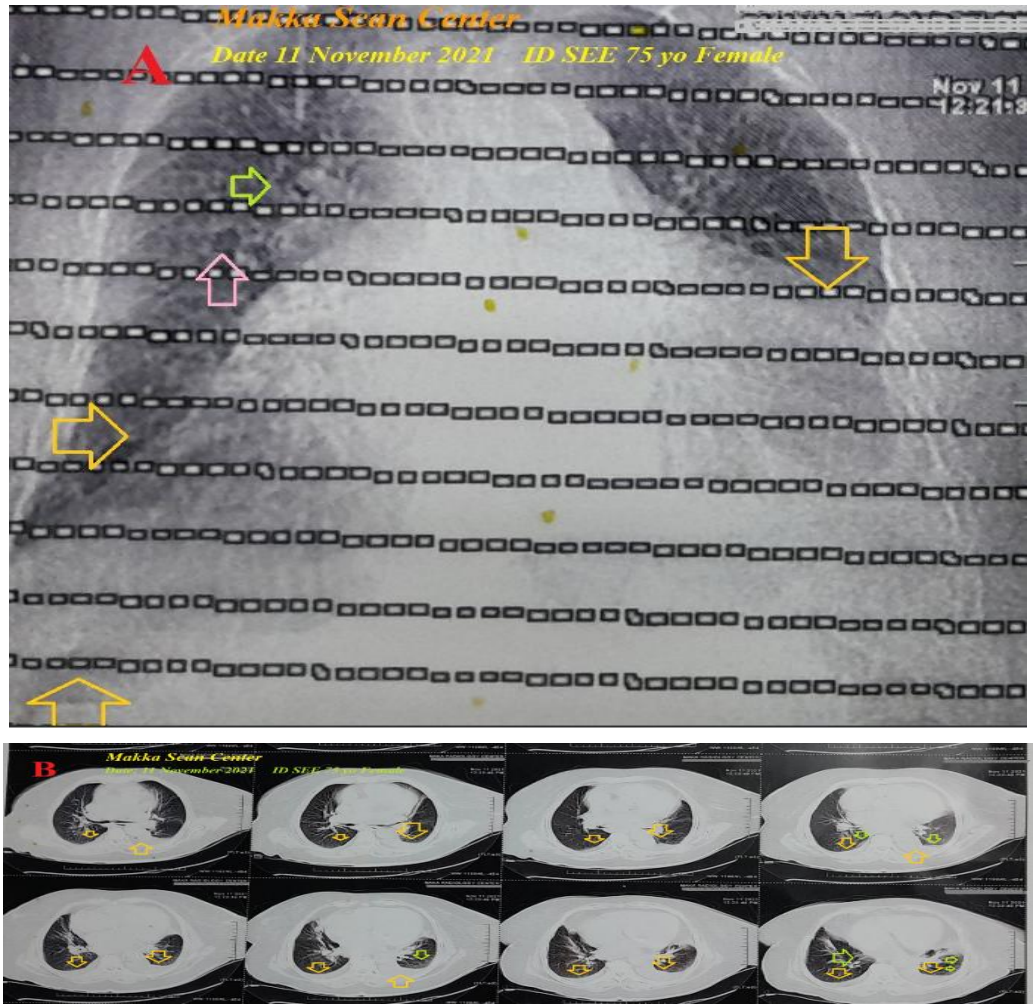


Figure1: ECG tracing was done on the day of the presentation to the ICU showing sinus arrhythmia with rapid VR (102; blue lines). There are 3 unifocal PVCs in V1-3 leads (yellow arrows), T-wave inversion in I and aVL leads (lime arrows), and P-mitral in lead II (orange lines).



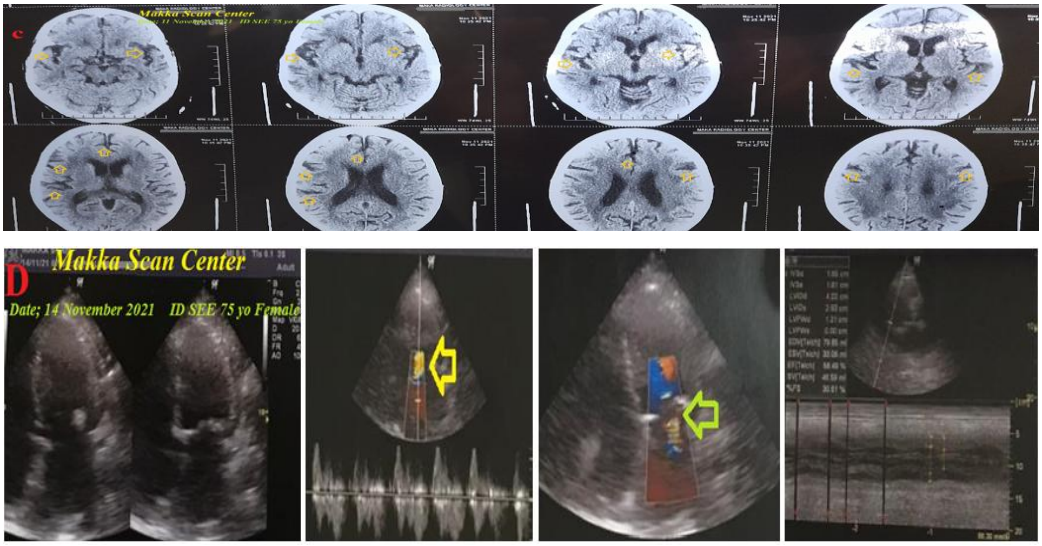


Figure 2: **2A**-Chest x-ray plain film was done within 3 days before the ICU admission showing flask-shape cardiomegaly, right lung ground-glass opacity (GGO; lime arrows), reversed Halo sign (pink arrows), and bilateral obstruction of costophernic angle (golden arrows) **2B**; Chest CT without contrast was done within 3 days before the ICU admission showing bilateral pleural effusion (golden arrows) with few bilateral small-sized GGO (lime arrows). **2C**; Brain CT without contrast was done within 3 days before the ICU admission showing brain involution changes (golden arrows). **2D**; Echocardiography with multiple views was done on the day of the presentation showing dilated both left atrium and ventricle, mitral (yellow arrow) and aortic regurgitations (lime arrow), and slight low an EF ratio (56%)

Discussion

• Overview:

• An elder, housewife, widow female, Egyptian patient was presented to the intensive care unit with fever, tachycardia, tachypnea, chest pain, and acute confusion state.

• **The primary objective** for my case study was the presence of COVID-19 pneumonia with bilateral pleural effusion and huge flask-shape cardiomegaly in the ICU.

• **The secondary objective** for my case study was the **question**; how would you manage this case in the ICU?

• Interestingly, the presence of a positive history of contact with a confirmed pneumonic case, bilateral lobar pneumonia with bilateral small-sized ground-glass opacities, reversed Halo sign, and laboratory COVID-19 suspicion on top of clinical COVID-19 presentation with fever, dry cough, generalized body aches, anorexia, and loss of smell will strengthen the higher suspicion diagnosis of COVID-19 pneumonia.

• Negative troponin test with non-ischemic chest pain exclude the presence of the acute ischemic event.

• Hypoxia and fever may be possible causes of acute confusion state.

• Radiological evidence of cardiomegaly with echocardiographic multiple valvular heart diseases (VHD) supports that cardiomegaly is not due to COVID-19 infection.

• Large pericardial effusion, giant right atrial angiosarcoma, and pulmonary capillary hemangiomatosis (PCH) [11,12] **were the most probable differential diagnosis** for the current case study. But chest CT scan, MRI, and echocardiography can exclude them.

• COVID-19 infection may be a reasonable risk factor for cardiac status deteriorations.

• Multiple factors were implicated in the presence of bilateral pleural effusion. COVID Pneumonia and VHD have suggested causes.

• I can't **compare** the current case with similar conditions. There are no similar or known cases with the same management for near comparison.

• The only limitation of the current study was the unavailability of cardiac catheterization.

Conclusion and Recommendations

• COVID-19 infection may be a predisposing risk factor for cardiac status deteriorations in underlying cardiovascular disease.

• The association of COVID-19 pneumonia, hypertension, multiple valvular diseases, and bilateral pleural effusion with huge cardiomegaly in an elderly female patient is a constellation of serious risk factors.

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