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Sympathetic Crashing Acute Pulmonary Edema in Elderly with Yasser's Fibrillation, Multiple Valvular Disease, and Possible Multivessel Disease in COVID Pneumonia; Prognostication and Management

Yasser Mohammed Hassanain Elsayed[1*]

[1]Critical Care Unit, Kafr El-Bateekh Central Hospital, Egyptian Ministry of Health (MOH), Damietta, Egypt.

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Corresponding Author: Yasser Mohammed Hassanain Elsayed, Critical Care Unit, Kafr El-Bateekh Central Hospital, Egyptian Ministry of Health (MOH), Damietta, Egypt.

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Abstract

Rationale

Sympathetic crashing acute pulmonary edema is acute pulmonary edema often present with marked hypertension, severe dyspnea, and desaturation. Yasser's fibrillation (Sinusoidal atrial fibrillations) or mixed AF is a new cardiovascular discovery that balances AF and normal sinus rhythm. Multiple valve heart disease points to the simultaneous presence of several valvular anomalies. The multivessel disease is defined as significant stenosis (>70%) in 2 or more major coronary arteries of 2.5 mm diameter or more. Coronavirus disease 2019 presents an increased risk for ischemic heart disease after infection.

Patient Concerns

An 88-year-old, housewife widow Egyptian female patient was presented to the intensive care unit with hypertensive pulmonary edema, Yasser's fibrillation (Sinusoidal atrial fibrillations), variable ischemic heart disease, multiple valve heart disease, and suspected COVID-19 pneumonia.

Diagnosis

Sympathetic crashing acute pulmonary edema (SCAPE) in the elderly with Yasser's fibrillation (Sinusoidal atrial fibrillations), multiple valvular disease, and possible multi-vessel disease in a suspected COVID pneumonia.

Interventions

Chest CT, electrocardiography, and oxygenation.

Outcomes

Good outcomes despite the existence of several remarkably serious risk factors were the results.

Lessons

The association of COVID pneumonia with hypertensive crises, pulmonary edema, bilateral pleural effusion, variable-block atrial fibro flutter, elder age, female sex, sympathetic crashing acute pulmonary edema, diverse ischemic heart disease, Yasser's fibrillation, multivalvular disease, multivessel disease, and COVID-19 pneumonia are serious constellation risk factors. The management of a combination of sympathetic crashing acute pulmonary edema, diverse ischemic heart disease, Yasser's fibrillation, multivalvular disease, multivessel disease, and COVID-19 pneumonia in an older female may be complex.

Keywords: Hypertensive emergency, Hypertensive pulmonary edema, Sinusoidal atrial fibrillations, Yasser's fibrillation, SCAPE, COVID-19 pneumonia, Ischemic heart disease.

Abbreviations

AF: Atrial Fibrillation

AR: Aortic Regurgitation

ARDS: Acute Respiratory Distress Syndrome

AS: Aortic Stenosis

COVID-19: Coronavirus Disease 2019

ECG: Electrocardiogram

ICU: Intensive Care Unit

ED: Emergency Department

IHD: Ischemic Heart Disease

LAD: Left Axis Deviation

LVH: Left Ventricular Hypertrophy

MS: Mitral Stenosis

MR: Mitral Regurgitation

NTG: Nitroglycerin

O2: Oxygen

PE: Pulmonary Edema

SCAPE: Sympathetic Crashing Acute Pulmonary Edema

TS: Tricuspid Stenosis

VR: Ventricular Rate

Introduction

Acute pulmonary edema due to sympathetic surge and increased peripheral vascular resistance often presents to the emergency department (ED) with marked hypertension, severe dyspnea, and hypoxia. It is defined as sympathetic crashing acute pulmonary edema (SCAPE). The SCAPE patients are successfully and rapidly treated with high-dose nitroglycerin (NTG). SCAPE patients usually present with severe acute respiratory distress syndrome (ARDS), sweating, restlessness, and hypertension. High doses of NTG are well tolerated in these patients **[1]**. The nitrate tolerance may be a result of over-physiological and over-pharmacological NTG doses **[2]**. Hypertensive cardiogenic pulmonary edema (PE) presents with acute severe dyspnea, tachycardia, and tachypnea, and can occur when the systolic blood pressure (SBP) exceeds 160 mmHg in association with acute decompensated congestive heart failure (CHF). Hypertensive cardiogenic PE is a challenging clinical status that should be diagnosed and managed as early as possible **[3]**. Hypertensive cardiogenic PE is a hyperacute sequence of CHF due to an accumulation of fluid in the lung secondary to a sudden increase in hydrostatic pressure causing fluid extravasation from the pulmonary circulation into the interstitium **[4]**. Although hypertensive cardiogenic PE is usually managed acutely with high-dose diuretics, this case has highlighted the benefit of high-dose IV nitroglycerin **[3]**. Yasser's fibrillation (Sinusoidal atrial fibrillations) or mixed AF is a new cardiovascular discovery. The partial sino-atrial nodal function has an essential role in the presence of Sinusoidal atrial fibrillations (Yasser's fibrillation) or mixed AF and its interpretation. Sinusoidal atrial fibrillations (Yasser's fibrillation) or mixed AF may be balanced between AF and normal sinus rhythm. The percentages of normal sinus beats to AF beats in the cases of Sinusoidal atrial fibrillations (Yasser's fibrillation) may be a guide for approximate healthy or sick part of the sinoatrial node **[5]**. Multiple valve heart disease (VHD) refers to the simultaneous presence of several valvular anomalies **[6]**. Multiple and mixed VHD are highly prevalent conditions. According to the Euro Heart Survey, multiple VHD, as defined by at least 2 moderate VHDs, was reported in 20% with native VHD and in 17% of those undergoing intervention **[7]**. Combined VHD is highly prevalent, and the most frequent combinations are aortic stenosis (AS) with mitral regurgitation (MR), AS with aortic regurgitation (AR), and AR plus MR. Combined valve disease can be found in rheumatic heart disease, congenital heart disease, and degenerative heart disease **[8]**. Multivalvular disease (MVD) is a common condition with complex pathophysiology, dependent on the specific combination of valve lesions [9]. The pathophysiology of MVD depends on the combination of affected valves and the severity of the valvular defects. Imaging is essential for diagnosis and assessment of disease severity. The treatment of MVD currently represents a challenge for cardiac surgeons **[6]**. Echocardiography is commonly used for the diagnosis of stenosis or regurgitation. The decisions for the timing and type of treatment are based on a multidisciplinary cardiac team **[9]**. The multivessel disease is marked as significant stenosis (>70%) in 2 or more major coronary arteries (CA) of 2.5 mm or more in diameter [10]. Approximately, 40%-50% with ST-elevation myocardial infarction (STEMI) have multivessel IHD **[11,12]**. Coronary artery bypass grafting has been used for the revascularization of multi-vessel disease since 1968 **[13,14]**. Coronavirus disease 2019 presents an increased risk for ischemic heart disease after infection. Despite there is systemic inflammatory response to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection which likely increases the cardiovascular risk, the direct infection of the coronary vasculature, and subsequent atherosclerotic plaques formation, it is still idiopathic **[15]**. Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is hallmarked by extraordinary tissue tropism and an array of clinical presentations, from asymptomatic infection to ARDS, systemic organ failure, and death. Acute myocardial infarction (AMI) and CVA due to disruption of an atherosclerotic plaque are common clinical complications of COVID-19 **[16,17]**.

Case Presentation

An 88-year-old, housewife widow Egyptian female patient was presented to the intensive care unit (ICU) with dyspnea, tachypnea, angina, and palpitations. There was a history of fever, generalized body aches, cough, fatigue, anorexia, and loss of smell since 3 days ago. The patient started this happened after 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 has central cyanosis, irritability, orthopnea, tachypnea, and distress with an irregular rapid pulse rate of VR; 140 bpm, blood pressure (BP) of 220/130 mmHg, respiratory rate of 28 bpm, a temperature of 36.5 °C, and pulse oximeter of oxygen (O2) saturation of 84%. Coarse generalized chest crepitation was heard on chest auscultations. Currently, the patient was admitted to ICU for acute hypertensive pulmonary edema with angina, and atrial fibrillation. Initially, the patient was treated with O2 inhalation by O2 system line (100%, by simple mask, 10L/min) one sublingual isosorbide dinitrate tablet (5 mg), 4 furosemide IV amp (40 mg), sublingual captopril tablet (25 mg), and continue nitroglycerine IVI (10 mg/50 ml solvent, 10 ug/min and titrated according to BP) were given. The patient was treated with cefotaxime; (1000 mg IV, TID), azithromycin tablets (500 mg, OD), hydrocortisone sodium succinate (100 mg IV BID), and paracetamol (500 mg IV TID as needed). After controlling the BP, SC enoxaparin 80 mg, BID), aspirin tablet (75 mg, OD), clopidogrel tablets (75

mg, OD), captopril tablets (25 mg; BID), and diltiazem tablets (60 mg, OD), warfarin tablet (5 mg, OD), amiodarone tablets (200 mg; BID), furosemide IV amp (40 mg IV TDS), and atorvastatin tablets (20 mg, OD) were added. The patient was daily monitored for temperature, pulse, blood pressure, ECG, and O2 saturation. The initial ECG tracing was done on the initial presentation in the ICU showing AF (of VR: 139) with T-wave inversion in (I, aVL, II, aVF, and V2), widespread variant ST-segment depressions, ST-segment elevation in aVR, and anteroseptal leads (V1-3) tented T-wave (V1-3), evidence of left axis deviation (LAD), and evidence of left ventricular hypertrophy (LVH). There are sporadic P waves in aVR, aVL, aVF, and V1-5 leads (Figure 1A). The second ECG tracing was taken within 8.2 hours of treatment showing normal sinus rhythm (NSR: of VR: 64) with T-wave inversion in (V2), variant ST-segment depressions, ST-segment elevation in aVR, and anteroseptal leads (V1-3), evidence of LAD, biphasic P-wave in V1 and V2, and evidence of LVH. **(Figure 1B)**. The plain chest-XR film was done on the day of ICU admission showing right and left patchy ground-glass pulmonary consolidations, bilateral perihilar COVIDOMA masses, and halo sign **(Figure 2A)**. The chest CT was done on the day of ICU admission showing bilateral multiple patchy ground-glass pulmonary consolidations, fibrotic bands, hazy shadows, and a left reversed halo sign **(Figure 2B)**. Echocardiography was done on the fourth day of ICU admission showing severe aortic stenosis (AS), severe mitral stenosis (MS), mild aortic regurgitation, mild tricuspid stenosis (TS), left ventricular hypertrophy (LVH), and diastolic dysfunction with normal ejection fraction (EF) of 70% **(Figure 2C)**. The initial complete blood count (CBC); Hb was 11.8 g/dl, RBCs; $4.09*10^3/mm^3$, WBCs; $7.7*10^3/mm^3$ (Neutrophils; 73.9 %, Lymphocytes: 21.0%, Monocytes; 5.1%, Eosinophils; 0% and Basophils 0%), and Platelets; $137*10^3/mm^3$. CRP was (6g/dl). SGPT was (38 U/L) and SGOT was (25U/L). Serum albumen was (3.7gm/dl). TSH was (1.78ulU/ml), free T3 was (2.6 pmol/L), and free T4 was (1.71 pmol/L). RBS was (112 mg/dl).Serum creatinine (1.7mg/dl) and blood urea was (83 mg/dl). RBS was (112 mg/dl). Plasma sodium was (151mmol/L). Serum potassium was (4.4mmol/L). Ionized calcium was (0.9mmol/L). The troponin I test was (3.95 U/L). CK-MB was (35 U/L). ABG showed partially compensated respiratory alkalosis. Sympathetic crashing acute pulmonary edema (SCAPE) in the elderly with Yasser's fibrillation, multiple valvular disease, and possible multivessel disease in COVID-19 pneumonia was the most probable diagnosis. Within 8 hours of the above management, the patient finally showed nearly dramatic clinical and mostly electrocardiographic improvement. The patient was discharged within 5 days after clinical stabilizations and continued on aspirin tablets (75 mg, OD), clopidogrel tablets (75 mg, OD), captopril tablets (25 mg; BID), diltiazem tablets (60 mg, OD), warfarin tablets (5 mg, OD), amiodarone tablets (200 mg; OD), frusemide tablets (40 mg OD), oral nitroglycerin retard capsules (2.5 mg, BID), and atorvastatin tablets (20 mg, OD). Further recommended cardiac and chest follow-up was advised.

Figure 1: Serial ECG Tracings; A. Tracing was done on the initial presentation in the ICU showing AF (of VR: 139) with T-wave inversion in (I, aVL, II, aVF, and V2; golden arrows), variant ST-segment depressions (red arrows), ST-segment elevation in aVR, and anteroseptal leads (V1-3; light turquoise arrows), tented T-wave (V1-3; dark blue arrows), evidence of LAD (purple arrows), and. evidence of LVH (yellow arrows). There are sporadic P waves in aVR, aVL, aVF, and V1-5 leads (lime arrows).

B. Tracing was taken within 8.2 hours of treatment showing NSR (of VR: 64) with T-wave inversion in (V2; golden arrows), variant ST-segment depressions (red arrows), ST-segment elevation in aVR, and anteroseptal leads (V1-3; dark blue arrows), evidence of LAD (purple arrows), biphasic P-wave in V1 and V2 (light turquoise circles), and evidence of LVH (yellow arrows).

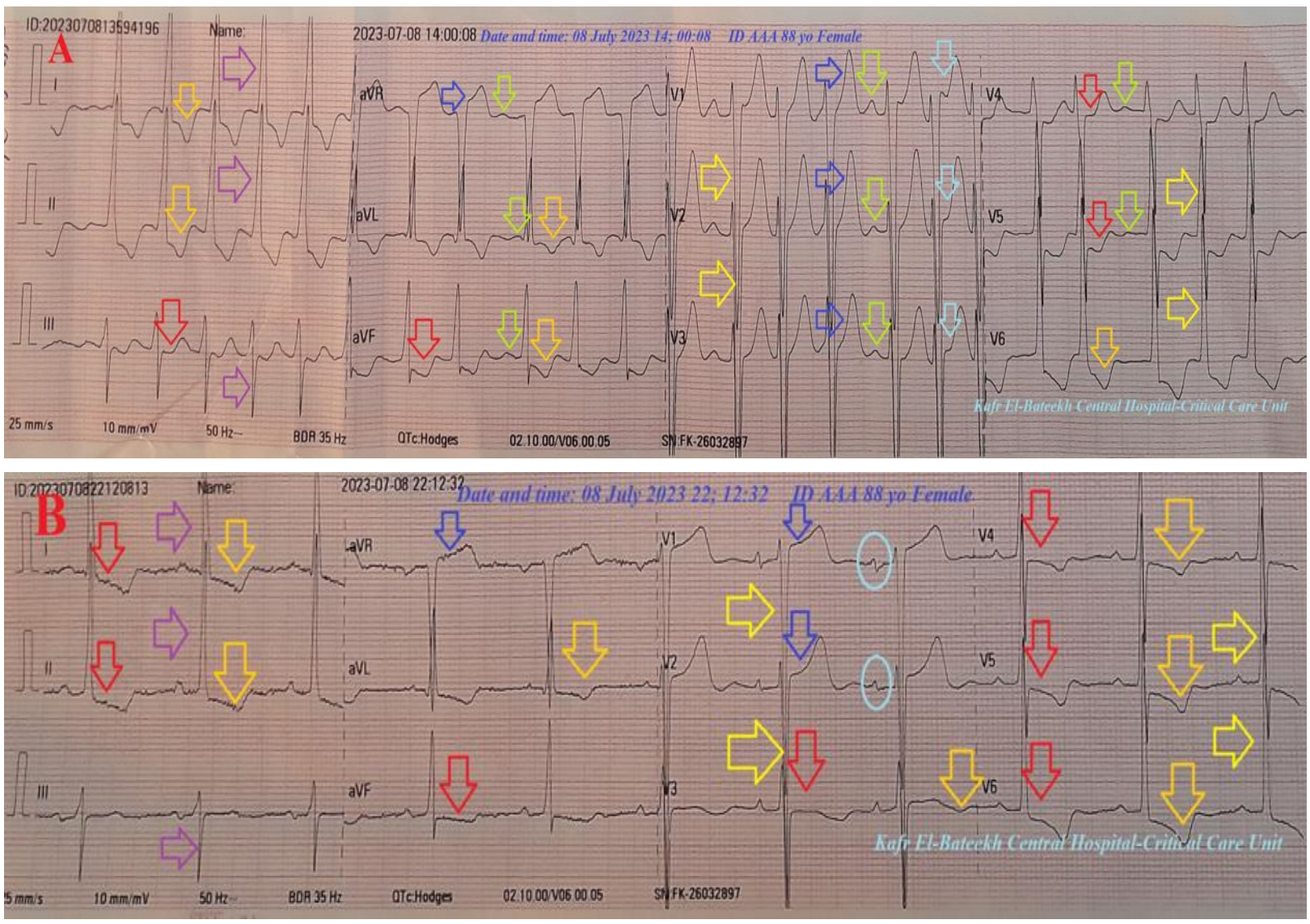

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Figure 2A Chest x-ray was done on the day of ICU admission showing right (golden arrows) and left (lime and red arrows) patchy ground-glass pulmonary consolidations (lime arrows), bilateral perihilar COVIDOMA masses (golden circles), and halo sign (golden arrow in lime circles).

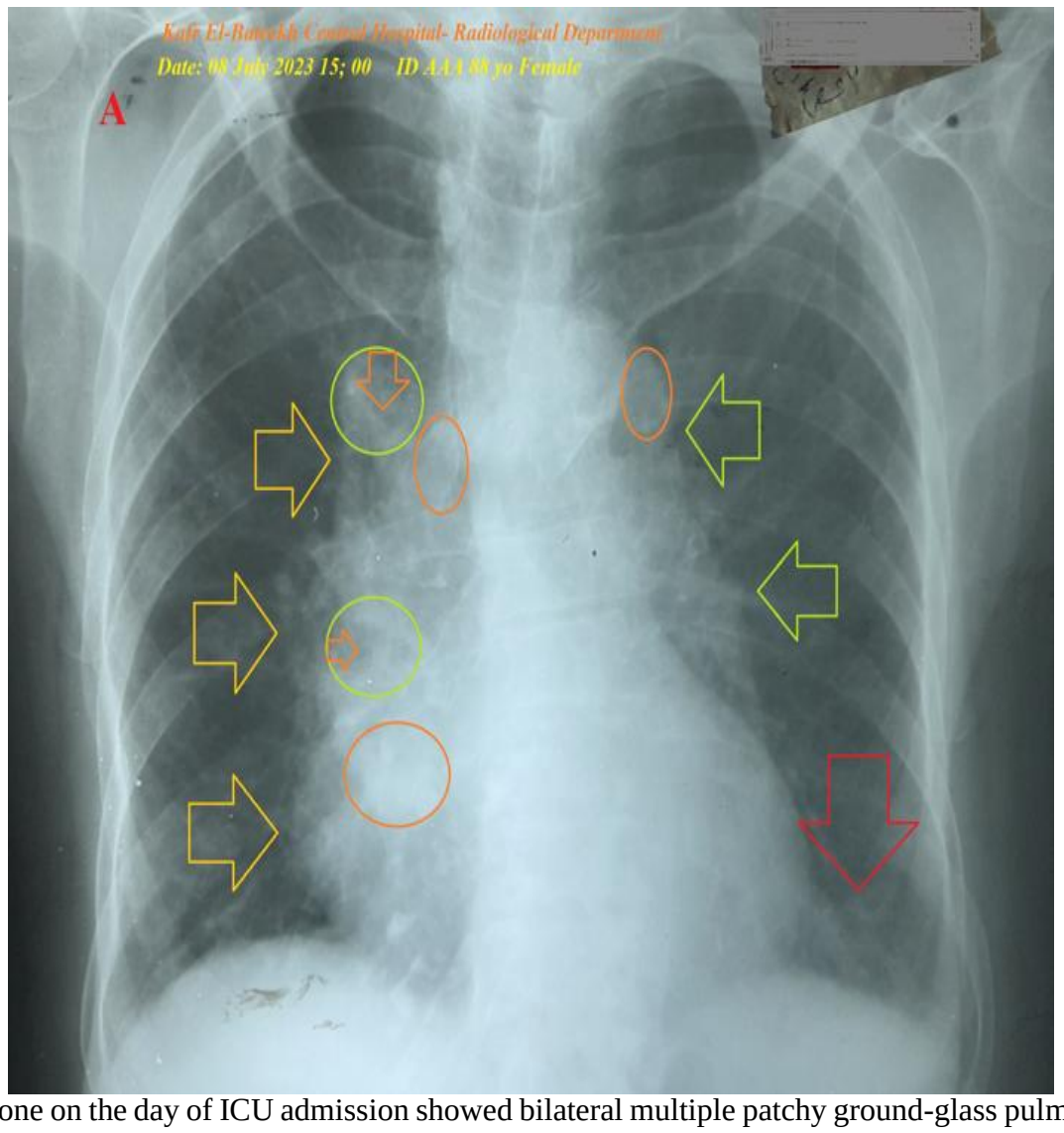


Figure 2B; **Sections of Chest CT Scan** done on the day of ICU admission showed bilateral multiple patchy ground-glass pulmonary consolidations (lime arrows), fibrotic bands (small red arrows), hazy shadows (yellow rectangle and yellow arrows), and left reversed halo sign (light turquoise arrow).

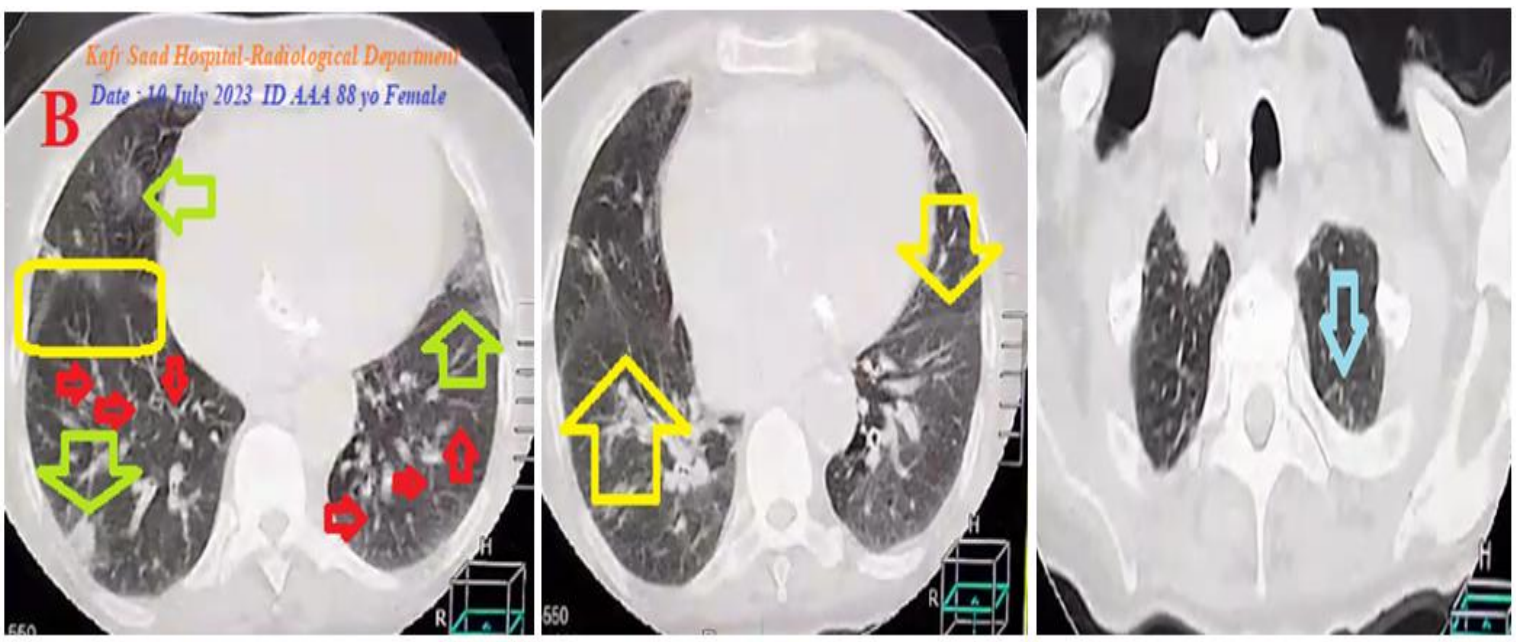
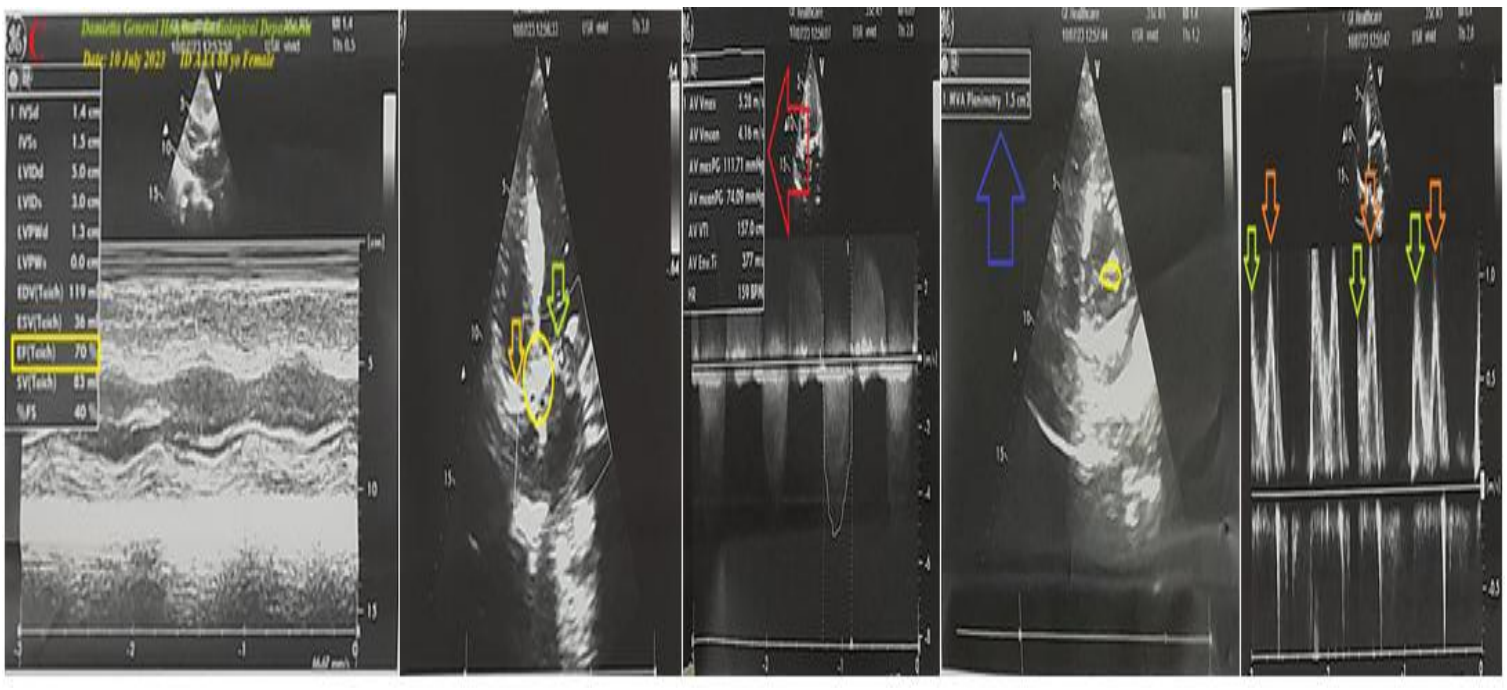


Figure 2C; **Echocardiography** was done on the fourth day of ICU admission showing severe aortic stenosis (red arrow and central yellow circle), severe mitral stenosis (blue arrow, lime arrow, and ovoid yellow circle), mild tricuspid stenosis, (golden arrow), and diastolic dysfunction (orange and lime arrows) with normal EF (yellow rectangle).



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Discussion

Overview

- An elder housewife widow Egyptian female patient was presented to the ICU with hypertensive pulmonary edema, Yasser's fibrillation, variable IHD, multiple VHD, and suspected COVID-19 pneumonia.

The Primary Objective for my case study was the presence of an elder housewife widow Egyptian female patient who presented with hypertensive pulmonary edema, Yasser's fibrillation, variable IHD, multiple VHD, and suspected COVID-19 pneumonia in the ICU.

The Secondary Objective for my case study was how you would manage this case in the ICU.

- Interestingly, the presence of a positive history of contact with a confirmed COVID-19 case, bilateral ground-glass consolidation, COVIDOMA, halo sign, reversed halo sign, and some 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 of COVID-19 diagnosis.
- The existence of both severe aortic stenosis (AS), severe mitral stenosis (MS), mild aortic regurgitation (AR), and mild tricuspid stenosis (TS) suggest the diagnosis of multivalvular disease.
- ST-segment depression in inferior and anterior leads ST-segment in aVR and 1-3 may indicate the diagnosis of multivessel disease.
- There are sporadic P waves in aVR, aVL, aVF, and V1-5 leads in the presence of underlying AF supporting the diagnosis of Yasser's fibrillation (Sinusoidal atrial fibrillations) or mixed AF **[5]**.
- The presence of angina with down-sloping, horizontal or straight, and up-slopping ST-segment depression in inferior and anterior leads suggests the diagnosis of variant IHD.
- Junctional tachycardia was the most probable differential diagnosis for the current ECG case study. The irregularity of the ECG with a combination of the absent P waves and its sporadic presence reliably excludes it.
- 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 coronary angiography.

Conclusion and Recommendations

The association of COVID pneumonia with hypertensive crises, pulmonary edema, bilateral pleural effusion, variable-block atrial fibro flutter, elder age, female sex, sympathetic crashing acute pulmonary edema, diverse ischemic heart disease, Yasser's fibrillation, multivalvular disease, multivessel disease, and COVID-19 pneumonia are serious constellation risk factors.

The management of a combination of sympathetic crashing acute pulmonary edema, diverse ischemic heart disease, Yasser's fibrillation, multivalvular disease, multivessel disease, and COVID-19 pneumonia in an older female may be complex.

Conflicts of Interest: There are no conflicts of interest.

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References

1. Hsieh YT, Lee TY, Kao JS, Hsu HL, Chong CF. (2018). Treating acute hypertensive cardiogenic pulmonary edema with high-dose nitroglycerin. Turk J Emerg Med. 18(1):34-36.
2. Münzel T, Daiber A, Gori T. (2013). More answers to the still unresolved question of nitrate tolerance. Eur Heart J. 34(34): 2666-2673.
3. 3. López-Rivera F, Cintrón Martínez HR, Castillo LaTorre C, Rivera González A, Rodríguez Vélez JG, Fonseca Ferrer V. (2019). Treatment of Hypertensive Cardiogenic Edema with Intravenous High-Dose Nitroglycerin in a Patient Presenting with Signs of Respiratory Failure: A Case Report and Review of the Literature. Am J Case Rep. 20: 83-90.
4. 4. Bajwa SS, Kulshrestha A. (2012). Diagnosis, prevention and management of postoperative pulmonary edema. Ann Med Health Sci Res. 2(2): 180-185.
5. Hassanain Elsayed YM. (2024). Sinusoidal Atrial Fibrillation (Yasser's Fibrillation) and Partial SAN Function in COVID-19 Pneumonia; a New Cardiovascular Discovery Change in Atrial Fibrillation Directory, International Journal of Cardiovascular Medicine. 3(5): 1-8.
6. Berti S, Bonanni M, D'agostino A, Celi S, Mariani M. (2023). Treatment of multiple valve disease: surgery, structural intervention, or both? Eur Heart J Suppl. 25: 21-24.
7. Iung B, Baron G, Butchart EG, Delahaye F, Gohlke-Bärwolf C, Levang OW, Tet. (2003). A prospective survey of patients with valvular heart disease in Europe: The Euro Heart Survey on Valvular Heart Disease. Eur Heart J. 24(13): 1231-1243.
8. Yang LT, Enriquez-Sarano M, Scott CG, Padang R, Maalouf JF, Pellikka PA. (2020). Concomitant Mitral Regurgitation in Patients With Chronic Aortic Regurgitation. J Am Coll Cardiol. 76(3): 233-246.
9. Unger P, Clavel MA, Lindman BR, Mathieu P, Pibarot P. (2016). Pathophysiology and management of multivalvular disease. Nat Rev Cardiol. 13(7): 429-440.
10. Cui K, Lyu S, Song X, Liu H, Yuan F, Xu F. (2019). Long-Term Safety and Efficacy of Staged Percutaneous Coronary Intervention for Patients with ST-Segment Elevation Myocardial Infarction and Multivessel Coronary Disease. Am J Cardiol. 124(3): 334-342.
11. Pimor A, Auffret V, Didier R, Delaunay R, Filippi E, Hacot JP. (2018). Immediate complete revascularization in patients with ST-segment elevation myocardial infarction and multivessel disease treated by primary percutaneous coronary intervention: Insights from the ORBI registry. Arch Cardiovasc Dis. 111(11): 656-665.
12. Widimsky P, Holmes DR Jr. (2011). How to treat patients with ST-elevation acute myocardial infarction and multi-vessel disease? Eur Heart J. 32(4): 396-403.
13. Mohr FW, Morice MC, Kappetein AP, Feldman TE, Ståhle E, Colombo A. (2013). Coronary artery bypass graft surgery versus

percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial. Lancet. 381(9867): 629-638.

14. Gul F, Parekh A. (2024). Multivessel Disease.

15. Eberhardt N, Noval MG, Kaur R, Sajja S, Amadori L, Das D. (2023). SARS-CoV-2 infection triggers pro-atherogenic inflammatory responses in human coronary vessels. Nat Cardiovasc Res. 2(10): 899-916.

16. Lamers MM, Haagmans BL. (2022). SARS-CoV-2 pathogenesis. Nat Rev Microbiol. 20(5): 270-284.

17. Katsoularis I, Fonseca-Rodríguez O, Farrington P, Lindmark K, Fors Connolly AM. (2021). Risk of acute myocardial infarction and ischaemic stroke following COVID-19 in Sweden: a self-controlled case series and matched cohort study. Lancet. 398(10300): 599-607.

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