Case Report

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Pneumonia on the Emerge of COVID Pandemic With Bronchiectasis, Diabetic Ketoacidosis, Ischemic Heart, and Wavy Triple or Yasser's Sign, in HIV Patients; Possible Opportunistic Pneumocystis Pneumonia; a Case Report in Cardiology, Infectious Diseases, Chest, Endocrinology, and Critical Care Medicine

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Abstract

Rationale: *Human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) can make a patient more likely to become seriously ill if they get COVID-19. Bronchiectasis, defined as bronchial dilatations has been described in patients who have suffered COVID-19 pneumonia in the acute phase of the disease. Ischemic heart disease represents a serious association. Diabetic ketoacidosis has been detected in patients with COVID-19. Wavy triple an electrocardiographic sign (Yasser's sign) is a new specific diagnostic sign seen in the cases of hypocalcemia and can be used as a therapeutic guide in cases of hypocalcemia. Pneumocystis pneumonia (PCP) is a serious infection caused by the fungus Pneumocystis jirovecii. Most patients with HIV/AIDS who get PCP have immune insufficiency. About 30-40% of people who get PCP have HIV/AIDS.*

Patient concerns: *A 53-year-old, worker, married male, Egyptian patient was presented to the emergency department with fever, tachycardia, tachypnea, diabetic ketoacidosis, and chest pain. He was previously diagnosed as an HIV/AIDS patient.*

Diagnosis: *Pneumonia with bronchiectasis, diabetic ketoacidosis, and electrocardiographic Wavy triple or Yasser's sign, in HIV patient at initial COVID pandemic with possible PCP.*

Interventions: *Chest CT, electrocardiography, and oxygenation.*

Outcomes: *Good response and outcomes in the presence of numerous remarkable serious risk factors were the results.*

Lessons: *The association of COVID pneumonia with diabetic ketoacidosis in a patient with immunodeficiency disease such as HIV/AIDS is highly interesting in the deterioration of the case. Diabetes, male sex, COVID-19 pneumonia, ischemic heart disease, bronchiectasis, wavy triple an electrocardiographic sign (Yasser's sign), the HIV/AIDS disease, and possible pneumocystis pneumonia are constellation serious risk factors.*

Keywords: Emerge of COVID pandemic, Bronchiectasis, HIV/AIDS, Wavy triple sign (Yasser's sign), Ketoacidosis, Hypocalcemia, Pneumocystis pneumonia (PCP)

Abbreviations

AIDS	: Acquired immunodeficiency syndrome
COVID-19	: Coronavirus disease 2019
DKA	: Diabetic ketoacidosis
ECG	: Electrocardiogram
ED	: Emergency department
HIV	: Human immunodeficiency virus
ICU	: Intensive care unit
IHD	: ischemic heart disease
O_2	: Oxygen
PCR	: Polymerase chain reaction
SGOT	: Serum glutamic-oxaloacetic transaminase
SGPT	: Serum glutamic-pyruvic transaminase
VR	: Ventricular rate

Introduction

On 31 December 2019, WHO; there were emerged idiopathic cases of pneumonia in Wuhan City, China. A novel coronavirus was detected as the cause by Chinese medical institutes on 7 January 2020 and was transiently called "2019-nCoV"(WHO, 2022). At this time there were queries about COVID-19 and how it affects people with HIV. HIV/AIDS patients also have higher rates of certain implicated medical conditions. Elderly and underlying medical conditions will be more likely to be serious if they get COVID-19. This is already with severe HIV or people with HIV who are not on treatment. (CDC, 2021). Whether people with HIV are at greater risk of acquiring SARS-CoV-2 infection is still idiopathic. Data are emerging on the clinical outcomes of COVID-19 in people with HIV. (HIV.gov, 2022). Advanced HIV is defined as people with CD4 counts <200 cells/mm3, a history of an AIDS-defining illness without immune reconstitution, or clinical manifestations of symptomatic HIV. (NIH, 2022). Bronchiectasis, defined as bronchial dilatations with or without associated bronchial wall thickening has been also described as possible sequelae of pneumonia. (Martinez-Garcia et al., 2021). Although the appearance of bronchial dilatations has been described in patients who have suffered a COVID-19 pneumonic episode, even in the acute phase of the disease (Ambrosetti et al., 2020; Zhao et al., 2020), in most of the cases have been observed months after the COVID-19 infection. (Martinez-Garcia et al., 2021). The relationship between severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) disease (COVID-19) and diabetes mellitus is bidirectional. On one hand, diabetes mellitus is associated with an increased risk of severe COVID-19. On the other hand, new-onset diabetes and severe metabolic complications of pre-existing diabetes, including diabetic ketoacidosis (DKA) have been observed in patients with COVID-19. (Reddy et al., 2020). Numerous suggested mechanisms have been implicated in cardiac damage in the COVID-19 epidemic. The systemic inflammatory response in severe COVID-19 infection is a result of high cytokines causing cytokine-release syndrome that can be causing multiple tissue injuries, involving both vascular endothelium and cardiac myocytes. (Basu-Ray et al., 2021). Plaque rupture causes acute ischemic events due to the systemic inflammation and catecholamine surge in this disease. (Xiong et al., 2020; Schoenhagen et al., 2002). Coronary artery thrombosis has been reported probable cause of an acute ischemic cardiac event in COVID-19 patients. (Dominguez-Erquicia et al., 2020) Wavy triple an electrocardiographic (ECG) sign (Yasser's sign) is a new specific diagnostic sign seen in 97.3% of the cases of hypocalcemia. Wavy triple an ECG sign can be used as a therapeutic guide in the cases of hypocalcemia. (Elsayed, 2019).

Pneumocystis pneumonia (PCP) is a serious infection caused by the fungus Pneumocystis jirovecii. Most people who get PCP have a medical condition that weakens their immune system, like HIV/AIDS. About 30-40% of people who get PCP have HIV/AIDS. Is also a common opportunistic infection among people living with HIV/AIDS. PCP is quietly rare in healthy people. (CDC, 2021). PCP is diagnosed using a sample from a patient's lungs by Broncho alveolar lavage. Polymerase chain reaction (PCR) can also be used to diagnose of Pneumocystis DNA using different types of samples. Chest high-resolution computed tomography (HRCT) may be valuable. That shows patchy areas of ground-glass opacity. (Huang et al., 2011). The drug of choice is trimethoprim/sulfamethoxazole (TMP/SMX) by oral or injectable for 3 weeks. Death will be the result in absence of treatment of PCP. (CDC, 2021).

Case Presentation

A 53-year-old, worker, married male, Egyptian patient was presented to the emergency department (ED) with fever, tachycardia, tachypnea, and chest pain. Generalized body aches, fatigue, anorexia, and loss of smell were accompanied symptoms. He was previously diagnosed as an HIV/AIDS patient. The chest pain is angina. The patient started to complain of fever 11 days ago. He has direct contact with a case of pneumonia 20 days ago. The patient denied a history of other relevant diseases, drugs, or other special habits. Upon general physical examination; generally, the patient appeared irritable, tachypneic, and distressed with a regular rapid pulse rate of VR; 116 bpm, blood pressure (BP) of 110/70 mmHg, respiratory rate of 28 bpm, the temperature of 37.9°C, and pulse oximeter of oxygen (O_2) saturation of 87%. Currently, the patient was admitted to ICU for pneumonia with diabetic ketoacidosis, and angina. Initially, the patient was treated with O_2 inhalation by O_2 cylinder (100%, by nasal cannula, 5L/min; as needed). Diabetic ketoacidosis was treated as international standard guidelines with normal saline 0.9%, rapid-acting insulin, and electrolytes correction. The patient was initially treated with act-rapid insulin (initial 10 units IVB), normal saline 0.9% (1000 ml IVB in the first hour) Maintenance of act-rapid insulin (0.1 u/kg; 8 u/hours) was continued for about 6 hours. Another 1000 ML normal saline 0.9% was added. The patient was maintained treated with ampicillin with sulbactam (1.5gm IV every 8hours), cefotaxime; (1000 mg IV every 8hours), and paracetamol (500 mg IV every 8 hours as needed). SC enoxaparin 80 mg, BID), aspirin tablet (75 mg, OD), and clopidogrel tablets (75 mg, OD). Diltiazem tablets (60 mg, OD) and atorvastatin tablets (20 mg, OD) were added. The patient was hourly monitored for temperature, pulse, blood pressure, blood glucose measurement, urinary acetone check-up, serial ECG, and O_2 saturation. The initial

ECG tracing was done on the day of the presentation to the ICU showing sinus tachycardia of VR; 116.There is horizontal ST-segment depression V4 lead, T-wave inversion in II, III, aVF, V5, and V6 leads, wide-spread AC artifacts in I, II, III, aVR, aVL, V5, and V6 leads, and Wavy triple sign (Yasser's sign) of hypocalcemia in V1 and V3 leads (Figure 1). The plain chest-XR film was done within the day of the ICU admission showing bilateral lobar pneumonia with ground-glass opacities and bilateral honeycomb appearance (Figure 2A). The chest CT without contrast was done within the day of the ICU admission showing bilateral lobar pneumonia with multiple bilateral variable-sized ground-glass opacities and bilateral honeycomb appearance. There is evidence of an air bronchogram (Figure 2B). The initial complete blood count (CBC); Hb was 12 g/dl, RBCs; 4.05*103/mm3, WBCs; 20.2*103/mm3 (Neutrophils; 86.2 %, Lymphocytes: 9.3%, Monocytes; 2.5%, Eosinophils; 2% and Basophils 0%), and Platelets; 107*103/mm3. D-dimer was high (2.9 ng/ml). CRP was high (113g/dl). SGPT was slightly high (66 U/L), SGOT was normal (40U/L). Serum albumen was normal (3.3gm/dl). Serum creatinine was normal (1.3mg/dl) and blood urea was normal (29mg/dl). RBS was high (567 mg/dl). Urine acetone was positive (+++). Arterial blood gases showed initial metabolic acidosis. Plasma sodium was low (129mmol/L). Serum potassium was normal (5.4mmol/L). Ionized calcium was slightly low (0.82mmol/L). The troponin test was positive (17U/L). Pneumonia with bronchiectasis, diabetic ketoacidosis, and electrocardiographic Wavy triple or Yasser's sign, in HIV/AIDS patient at initial COVID pandemic with possible PCP, was the most probable diagnosis. The patient was discharged within 3 days of management post-clinical and laboratory improvement.

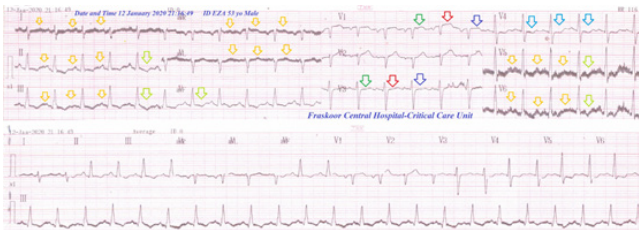

Figure 1: ECG tracing was done on the day of the presentation to the ICU showing sinus tachycardia of VR; 116.There is horizontal ST-segment depression V4 lead (light blue arrows), T-wave inversion in II, III, aVF, V5, and V6 leads (lime arrows), wide-spread AC artifacts in I, II, III, aVR, aVL, V5, and V6 leads (orange arrows), and Wavy triple sign (Yasser's sign) of hypocalcemia in V1 and V3 leads (dark blue, green, and red arrows).

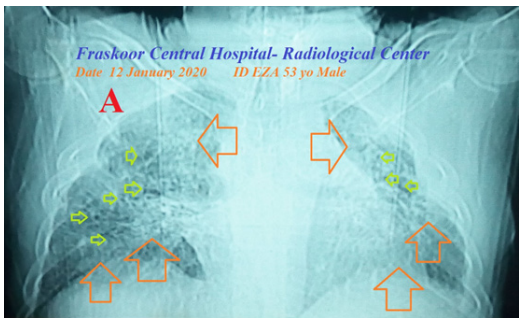

Figure 2 A: Chest x-ray was done within the day of the ICU admission showing bilateral lobar pneumonia with ground-glass opacities (brown arrows) and bilateral honeycomb appearance (lime arrows).

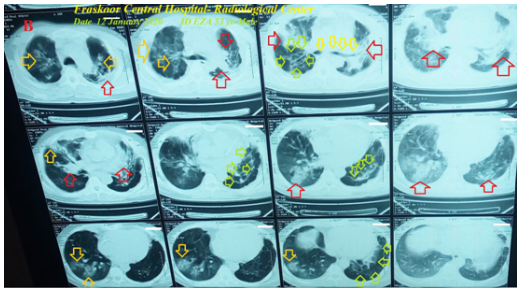

Figure 2 B: Chest CT without contrast was done within the day of the ICU admission showing bilateral lobar pneumonia (red arrows) with multiple bilateral variable-sized ground-glass opacities (golden arrows) and bilateral honeycomb appearance (lime arrows). There is evidence of an air bronchogram (yellow arrows).

Discussion

Overview

- A 53-year-old, worker, married male, Egyptian patient was presented to the ED with pneumonia with bronchiectasis, diabetic ketoacidosis, angina, and ECG wavy triple or Yasser's sign, in HIV/AIDS patient at initial COVID pandemic with possible PCP opportunistic.
- The primary objective for my case study was the presence of pneumonia with bronchiectasis, diabetic ketoacidosis, angina, and ECG wavy triple or Yasser's sign, in HIV/AIDS patient at initial COVID pandemic with possible PCP opportunistic in ICU.
- The secondary objective for my case study was the question of; how would you manage this case in the ICU?
- Interestingly, the presence of the positive history of contact with a confirmed pneumonic case, bilateral lobar pneumonia with multiple bilateral variable-sized ground-glass opacities, an air bronchogram, 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 of COVID-19 diagnosis.
- At the time of the current case presentation, the COVID-19 pandemic was at its initial emergence in the world.
- History of past HIV/AIDS diagnosis and radiological evidence of bilateral pneumonia supporting the presence of PCP.

- Radiological bilateral honeycomb appearance is suggesting the diagnosis of bronchiectasis. The acute COVID-19 pneumonia is a reasonable interpretation for the current bronchiectasis.
- The presence of angina with horizontal ST-segment depression V4 lead and T-wave inversion in II, III, aVF, V5, and V6 leads, and elevated troponin are suggesting the diagnosis of unstable angina.
- The presence of DKA added another risk for the case.
- The existence of respiratory alkalosis is the indicator for the current Wavy triple sign or (Yasser's sign) of hypocalcemia.
- Acute pulmonary embolism was the most probable differential diagnosis for the current case study. But normal CTPA 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 serological PCR for both HIV/AIDS, PCP, and COVID-19 infection.

Conclusion and Recommendations

The association of COVID pneumonia with diabetic ketoacidosis in a patient with immunodeficiency disease such as HIV/AIDS is highly interesting in the deterioration of the case.

Diabetes, male sex, COVID-19 pneumonia, ischemic heart disease, bronchiectasis, wavy triple an electrocardiographic sign (Yasser's sign), the HIV/AIDS disease, and possible pneumocystis pneumonia are constellation serious risk factors.

Conflicts of Interest

There are no conflicts of interest.

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