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Post COVID-19 Pediatric Acute Myocardial Infarction In a Known Case of Acute Lymphoblastic Leukemia (A case Report)

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Abstract

A known case of acute lymphoblastic leukemia presented with short history of COVID-19 infection complicated by mucormycosis, admitted to emergency department complaining from irritability, sweating and central cyanosis. After providing a detailed history, clinical examination and laboratory work up; he was diagnosed as acute myocardial infarction that needs fibrinolytic treatment in PICU and then discharged well.

Keyword: Acute Lymphoblastic Leukemia, COVID-19, MI, Mucormycosis.

INTRODUCTION

Globally, as of 5:50 pm Central European Summer Time (CEST), 20 April 2022, there have been 504,079,039 confirmed cases of COVID-19, including 6,204,155 deaths, reported to WHO. [(1)] There are many different complications occurred especially post viral infection; one of these complications is thromboembolic event that was the main leading cause of death. This complication may be encountered for adult but rarely mentioned for pediatrics age group. [(2)]

COVID-19 is s disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Most cases in pediatrics are mild, and need only supportive treatment.[(3)] The most common symptoms of COVID-19 in children are cough and fever. It is important to note, however, that these symptoms may not always be present and may not be the classic symptoms seen in adult patients; thus, a high index of suspicion for SARS-CoV-2 infection is required in children. [(4)]

Mucormycosis is a common name given to infection of body organs by Mucor, Rhizopus, or Absidia which are the Mucorales species of fungi with similar properties. The fungi of the Mucorales group have angiophilic

characteristics and lead to an early invasion of blood vessels, vascular occlusion, infarction, and ischemia or hemorrhage.[5] The most common clinical form is rhinocerebral involvement. The infection starts at the nose, spreads by creating arterial thrombosis and necrosis, and is followed by a fulminant course. Mucormycosis is more common in patients with diabetic ketoacidosis (DKA), hematological malignancies, neutropenia due to immunosuppression, and in patients using broad-spectrum antibacterial agents.[6,7] The association between coronavirus and mucormycosis of the paranasal sinuses must be given a serious consideration.[8]

The aim of this paper is to review the association of COVID 19 infection and it is complication (mucormycosis) as a possible cause of acute myocardial infarction in pediatrics patient who is a known case of acute lymphoblastic leukemia.

Case presentation

A four-year-old boy is a known case of relapsed acute lymphoblastic leukemia in the past 18 months. In the last 14 days; he was diagnosed as COVID-19 infection, now presented with irritability associated with agitation, crying, sweating and vomiting twice. The patient has bluish discoloration of the lips and distal fingers. He was admitted to the emergency room of Al-Zahraa Teaching Hospital, Najaf.

On examination, the patient has a disturbed level of consciousness, cyanotic, dyspneic, distress, pale, SPO_2 49%, HR 51 beat per minute and blood pressure (BP) was undetected. At the left side of nasal bridge there was a 1 cm deep ulcer with infected skins and black discoloration. Investigations are shown in Figure 1, 2:

- ECG also showed ST elevation with hyperacute T-wave at leads (V1-V2-V3) bundle branch block.
- chest x-rays showed cardiomegaly.
- D-Dimer 2715 ng/mL
- S. Ferritin >1200 ng/mL
- LDH 489 U/L

The patient was diagnosed as anterolateral myocardial infarction and rhino mucormucosis, as in Figure 3; he was transferred to the intensive care unit where he was managed with midazolam infusion for intubation and general anesthesia. At this time, the Alteplase was administered with a loading dose (80 minutes since symptoms started), the patient shows a dramatic response that occurred within 1 hour; the serial ECG showed normalization of the ST segment and Hyper acute T- Wave.

Differential diagnosis

1. Myocarditis.
2. Cardiomyopathy.
3. Acute myocardial infarction.
4. Viral Pneumonia.

Outcome and follow-up

The patient stayed for 3 days at the intensive care unit then discharged to the ward with symptoms free. After 7 days the patient discharged home with a continuous chemotherapy after two weeks.

DISCUSSION

Myocardial infarction in children is a very rare entity, being mostly associated with Kawasaki disease or an anomalous origin of the coronary artery from the pulmonary artery (ALCAPA).[7] During the time of the COVID-19 pandemic, numerous cases of Kawasaki like disease have appeared, many of them were associating aneurysmatic dilations of the coronary
artery after being evolved as a multisystem inflammatory syndrome in children (MIS-C). However, the patient in the present case has no Kawasaki diseases, no typical echocardiograph finding, no tonsilitis, no lymphadenopathy, no peeling of skin but he complains from mucormucosis that has become disseminated because of COVID-19 infection and underlying immune deficiency because of acute lymphoblastic leukemia. Many reported cases that described acute myocardial infarction as complication of mucormycosis have been published.[9,10]

Risk factors for mucormycosis include hematologic and solid malignancies, diabetes, organ transplant, corticosteroids, and HIV. The hallmark of the disease is angioinvasion, leading to thrombosis, infarction, fatal bleeding, hematogenous spread, and septic embolism. Disease patterns include: rhinocerebral, pulmonary, cutaneous, gastrointestinal and disseminated. A cardiac involvement is rare but can occur in disseminated infections. Clinical presentation, radiological findings, microbial cultures, and bronchial lavage are nonspecific. Definitive diagnosis is often made with biopsy or surgery. Primary treatment is with amphotericin B. Although disseminated infection has a high mortality rate, prompt antifungal therapy and surgical debridement might lead to better rates of survival. [11]

Limitation: the diagnosis of mucormycosis was done according to clinical sins without biopsy as there was no histopathology center in our hospital.

Learning points and take home messages

1. Acute coronary syndrome should be suspected as a complication of COVID-19 patient
2. Deal with irritability and ECG change urgently
3. Keep in mind the golden period of time is from the starting of the symptoms to the starting of alteplase infusion to get the best response and to preserve the cardiac function.

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FIBMS histopathology

FIBMS Hematopatho

Patient ID		Name	احمد انور زهير
Visit Date	22-05-2021	Age	Male - 5 Years
Print Date	22-05-2021	Prof.Dr	Himself

CHEMISTRY

TEST		RESULT		UNIT	REFERENCE
Cardiac Profile					
LDH	:	489	H	U/L	(0 - 248)
D-Dimer	:	2715	H	ng/mL	(0 - 500)
Iron Tests					
Ferritin	:	> 1200	H	ng/mL	men: (70 - 435) cyclic women: (10 - 160) Menopausal women: (25 - 280)

مختبر الصادق للفحوصات التخصصية

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Figure No.1: Laboratory investigations.

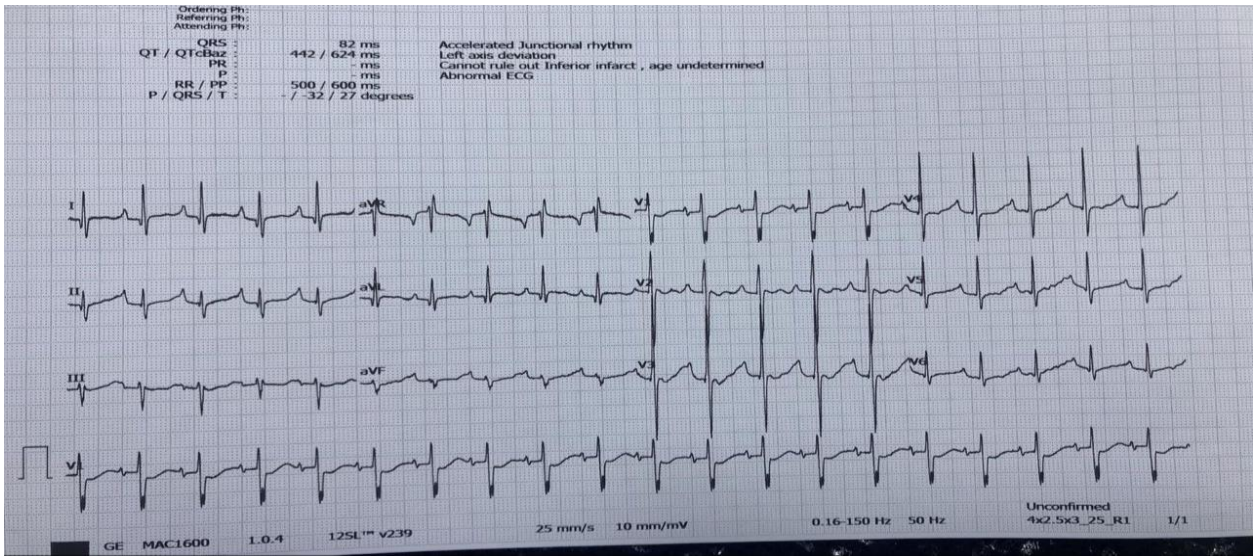

Figure No.2: ECG Findings.

Figure No.3: Rhino Mucormucosis.

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