COVID-19 EXPOSING GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY WITH METHEMOGLOBINEMIA: A CASE REPORT

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INTRODUCTION: Glucose-6-phosphate dehydrogenase deficiency (G6PD-D) is one of the most common enzyme deficiencies in humans. Oxidative injuries often precipitate acute hemolytic anemia (AHA) in G6PD-D patients [1]. Furthermore, severe AHA in G6PD-D patients has been rarely associated with methemoglobinemia [2]. In this case report, we present a COVID-19 patient treated with hydroxychloroquine (HCQ) who subsequently developed AHA and methemoglobinemia.

CASE PRESENTATION: A 60-year-old African American (AA) male with hypertension and type 2 diabetes mellitus presented to the hospital with fever and shortness of breath. COVID-19 testing was positive. The patient developed refractory hypoxia and tachypnea, requiring intubation and admission to the intensive care unit. On day 2, 800mg of hydroxychloroquine (HCQ) was administered and on day 3, HCQ 400mg was given. On day 5, pulse oximetry readings (SpO2) decreased despite increase in fraction of inspired oxygen. Arterial blood gas analysis revealed an appropriate partial pressure of oxygen (PaO2) suggesting discordance between SpO2 and PaO2. As a result, a methemoglobin level was ordered and was elevated to 12% (normal range 0-3%). Concurrently, hemoglobin (Hb) levels had decreased from 12.0 g/dL to 6.8 g/dL. Additional lab work suggested hemolysis, with elevated lactate dehydrogenase (2060 IU/L, normal 98-192IU/L), decreased haptoglobin (<3 mg/dL, normal 41-203mg/dL), elevated bilirubin (6.3mg/dL, normal 0.3-1.2mg/dL), and schistocytes and spherocytes on peripheral smear. The development of methemoglobinemia along with AHA raised suspicion for underlying G6PD-D. A G6PD level was obtained and was within normal range (19.8units/g, normal 7-20.5units/g). Family history revealed that the patient’s three children and one grandchild carried the disease, raising the patient’s likelihood of having the trait due to its x-linked inheritance pattern. The patient was given IV ascorbic acid, as methylene blue is contraindicated in G6PD-D. Despite this, Hb levels continued to decrease, requiring multiple blood transfusions. Unfortunately, the patient developed refractory shock with progression of multiorgan system failure and expired on day 10 of hospitalization.

DISCUSSION: This patient presented with severe and rapid progression of COVID-19 infection. The use of HCQ was chosen in an attempt to treat the patient, possibly triggering AHA and methemoglobinemia in the setting of a likely underlying G6PD-D. Although the patient’s G6PD level was normal, this can often be falsely elevated in the midst of a severe hemolytic episode and thus needs to be checked 3 months after event to confirm diagnosis [3]. Given that about 10% of AA’s carry mutations in G6PD-D, this reaction may be more common than reported.

CONCLUSIONS: Physicians should proceed with caution when prescribing HCQ as a treatment option for COVID-19 in populations at high risk for the mutation.


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