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Case Report

Acalypha indica Induced Hemolytic crisis and Methemoglobinemia in G6PD Deficiency

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Abstract

Acalypha indica (Indian Nettle in English, Kuppaimeni in Tamil, Kuppameniya in Sinhala) leaves are locally used as herbal remedy. It can induce hemolysis and methemoglobinemia in a Glucose-6-Phosphate Dehydrogenase (G6PD) deficient person. Here we report a 46-year-old-male was presented with hemolysis and methemoglobinemia following *Acalypha indica* ingestion. Later, he was found to have G6PD deficiency. He completely recovered with supportive treatment.

Keywords

Acalypha indica, G6PD deficiency, Hemolytic anemia, Methemoglobinemia

Figure 1- *Acalypha indica*

Introduction

G6PD deficiency is a congenital shunt defect, affecting more than 200 million people all over the world. It is an X linked disease. These patients are easily vulnerable to oxidative stress. Hemolytic episodes are often triggered by infections, certain food, drugs or toxins. (1). Here we report the hemolytic anemia in G6PD deficiency triggered by *Acalypha indica* ingestion. Methemoglobinemia can occur simultaneously with severe hemolytic crisis. Treatment is avoidance of triggers and supportive care (2).

Case Report

A 46-years-old previously healthy Sri Lankan army soldier presented to the emergency unit with acute onset of hematuria, jaundice and mild grade intermittent fever with generalized tiredness over three days duration. There was no history suggestive of infective focus. He didn't have long standing constitutional symptoms and symptoms of auto immune diseases. He occasionally took alcohol and smoked cigarettes. He was not a drug abuser and had no history of high risk sexual promiscuity. There was no significant past or family history. There was no history of any drug ingestion like Primaquine, Sulphonamide or Nalidixic acid.

On examination, he was ill, severely pale and icteric. He was dyspnoeic and tachycardic with stable blood pressure. His oxygen saturation (SPO_2) at room air was 87%. Urinary catheterization revealed gross hematuria. There was no peripheral lymphadenopathy and no signs suggestive of auto immune diseases. He had mild generalized abdominal tenderness but no organomegaly. Rest of the examination was unremarkable.

Immediate oxygen support, IV Ceftriaxone, vigorous hydration and packed cell transfusion were started following drawing blood for the investigations. But his SPO_2 did not pick-up with supplementary oxygen. Urgent arterial blood gas (ABG) analysis showed 99% of arterial oxygen saturation despite of low SPO_2 in the pulse oximetry. Methemoglobinaemia was suspected as he was having saturation gap in the pulse oximetry and ABG. Blood was sent to measure methemoglobin level.

On further questioning, he gave a history of consumption of herbal rice with *Acalypha indica* leaves in companion

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with their colleagues for the Covid-19 prevention at their army camp prior to the symptoms.

Laboratory workup revealed anemia (Haemoglobin-4.9g/dL), reticulocytosis (15.7%), hyperbilirubinemia (indirect bilirubin-383micromol/L), high aspartate transaminase (216U/L), normal alanine transaminase (28U/L), high lactate dehydrogenase (3471U/L) and hemoglobinuria, suggestive of acute intravascular hemolysis. He had mild neutrophilic leukocytosis (12,020/microL) with CRP of 74mg/L and ESR of 12mm/1sthour. His renal function and chest-X-Ray were normal. Blood picture showed micro spherocytes, blister and bite cells with polychromasia. Direct Coombs test was negative. Methemoglobin level was 12.9% (less than 2%). Finally, a diagnosis of *Acalypha indica* induced hemolysis with methemoglobinemia due to G6PD deficiency was made. Apart from above supportive management, oral ascorbic acid 1gram three times per day was prescribed for management of methemoglobinemia.

His dyspnoea improved and hematuria settled following one week stay at the hospital. Advice regarding the disease and triggers was given to the patient.

Later, when reticulocytes count was less than 2%, Brewer's test and quantitative assay was done to quantify the G6PD levels which was 2.8 U/gHb (7.9 -16.3) confirmed the diagnosis of severe G6PD deficiency.

Discussion

G6PD is a key enzyme of the pentose phosphate pathway in erythrocytes is responsible for production of Nicotinamide Adenine Dinucleotide Phosphate (NADPH). NADPH plays a major role in maintaining glutathione which is a free radical scavenger. Therefore, G6PD deficiency leads to hemolysis following oxidative stress. (3)

Inadequate NADPH levels lead to heme iron oxidation to ferric rather than ferrous state. Resultant methaemoglobin causes increased oxygen affinity with impaired oxygen delivery and tissue hypoxia. Methemoglobinemia should be suspected in patients with saturation gap in pulse oximetry and ABG (4).

Patients are mostly asymptomatic and develop acute hemolysis following certain triggers. Degree of hemolysis varies according to the magnitude of enzyme deficiency (1).

Though avoidance of triggers is the corner stone of management in the hemolysis, treatment which includes aggressive hydration and red cell transfusion are determined by the clinical presentation (1,2). Methemoglobinemia is managed with supplemental oxygen and supportive care. Methemoglobin level more than 30% is treated with Methylene blue. But Methylene blue is contraindicated in G6PD deficiency as it depends on NADPH pathway. On the contrary, it further worsens the hemolysis. In this circumstance, intravenous ascorbic acid can be given. (5,6).

Conclusion

Acalypha indica ingestion can induce hemolytic crisis and concomitant methemoglobinemia in G6PD deficiency. Methylene blue should be avoided in G6PD deficiency.

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