Case Report

HENNA – INDUCED SEVERE HEMOLYSIS: In Glucose 6 – Phosphate Dehydrogenase Deficiency

Abolhassan Seyedzadeh[1], Mitra Hemmati[2], Simin Gheiny[3]

ABSTRACT

Glucose– 6–phosphate dehydrogenase deficiency is one of the most common enzyme deficiencies worldwide. Lawsone is a chemical present in henna, the crushed leaves of which are not only used as a cosmetic agent but also as a therapeutic agent for some types of skin lesion. In vitro observations indicated that lawsone is an agent capable of causing oxidative hemolysis. We report a 42 – days old G6PD – deficient male infant with acute severe hemolysis after application of henna to treat his napkin dermatitis.

KEY WORDS: Acute hemolysis, Henna, Lawsone, Glucose –6– phosphate dehydrogenase deficiency.

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INTRODUCTION

Glucose – 6 – phosphate dehydrogenase (G6PD) deficiency is one of the most common enzyme deficiencies known and is estimated to affect hundreds of millions of people. Severe hemolytic episodes may result after contact with oxidants.[1]

Lawsone (2hydroxy–1,4 napthoquinon) is a chemical present in henna, the crushed leaves of which are used worldwide as a cosmetic agent to stain hair, skin and nails and to treat some types of dermatitis. In vitro observations indicate that lawsone is an agent capable of causing oxidative hemolysis.[2] Although, life threatening consequences of henna application have been previously reported,[3] it is rare in our region. We report a 42 – days old G6PD deficient male infant with acute hemolysis after exposure to henna.

1. Dr. Abolhassan Seyedzadeh
2. Dr. Mitra Hemmati
3. Dr. Simin Gheiny

1-3: Assistant Professor of Pediatrics,
Department of Pediatrics,
Kermanshah University of Medical Sciences,
Kermanshah,
Iran.

Correspondences:

Dr. Abolhassan Seyedzadeh,
Pediatrics Ward,
Imam Reza General Hospital,
Kermanshah,
Iran.
Email: aseyedzadeh2001@yahoo.com

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CASE REPORT

A 42 – days old male infant, presented to Razi Children's Hospital with sudden onset of icter, paleness and reddish colored urine for two days. His mother used henna to treat his napkin rash. There was no history of medication except multivitamin drop. He was born of an uneventful normal vaginal delivery. His past medical and familial history were unremarkable. On physical examination he had an axillary temperature of 37^{0}C, pulse rate of 116/min, respiratory rate of 30/min and blood pressure of 70/50 mmHg. He was icteric on inspection. Heart and lungs were normal. There was no organomegaly on abdominal examination. Genitalia was male and normal except reddish brown coloring because of henna application. Other physical findings were normal.

Laboratory investigations revealed hemoglobin of 6gr/dL, hematocrit of 18.6%, white blood cell count 8100/mm^3, red blood cell count 1,670,000/mm3 and platelet count of 329,000/

mm^3. Peripheral blood smear showed 28% neutrophils and 72% monocytes, anisocytosis (+), poikilocytosis (+), spherocytosis (-) and reticulocyte count 9.8%. Biochemical analysis revealed urea 23mg/dL, creatinine 0.4mg/dL, aspartate aminotransferase 29U/L, alanine aminotransferase 21U/L, indirect bilirubin 8mg/dL and total bilirubin 9.6mg/dL. Other biochemical studies were in normal limits. Coagulation studies were normal. Direct coombs test was negative. Urine analysis showed hemoglubinuria and bilirubinuria. Serology for HBV, HAV, HCV and CMV all were negative. Glucose – 6 – phosphate dehydrogenase (G6PD) enzyme assessment showed complete deficiency with fluorescent spot test methods. Abdominal ultrasonography showed no abnormal finding. After packed cell transfusion and supportive treatment including adequate hydration and diuresis, the patient was stable and was discharged three days later with complete recovery and good condition. Ten days later, patient's clinical re-evaluation was normal.

DISCUSSION

Henna is a dye, obtained from the dried leaves of a shrub, *lawsonia alba*, which is in common use throughout the Middle East and Africa. In some countries, ceremonial and social events, including weddings and circumcisions, are celebrated by the application of henna to the skin to create a variety of designs and patterns.[2] Also, henna is applied to the body on lesions in the treatment of seborrheic dermatitis or fungal infections. In addition to anti – inflammatory effects, analgesic and antipyretic effects of henna have been shown.[4]

An important chemical ingredient of henna is lawsone (2-hydroxy-1, 4 naphthoquinone), constituting about 1% by weight of the crushed leaves. The structure and redox potential of lawsone is similar to that of one of the naphthalene metabolites, 1, 4 naphthoquinone, a potent oxidant of G6PD – deficient red cells.[5, 6] In vitro observations indicate that lawsone, is capable of inducing oxidative injury to G6PD – normal red cells, and even more so to G6PD – deficient red cells.[2] The amount of henna used to stain the skin of newborns is unknown. If l00g is required to stain the palms and soles of adults, and assuming that the surface area of the newborn is approximately 1/10 that of an adult, then it is reasonable that the infant would be exposed to 10g of henna containing 1g of lawsone. Thus, the percutaneous absorption of henna could be a possible source of oxidative injury to neonatal red cells.[7]

Despite potential risk of henna – induced hemolytic anemia, there are few reports of life threatening hemolysis in G6PD – deficient patients due to henna application. Raupp et al reported four cases of G6PD deficiency and life threatening hemolysis after topical application of henna during one year from Arab Emirates. Their cases included one newborn, one infant and two preschool children.[3] Devecioliu et al reported a 27-days old boy who developed hemolytic anemia and acute renal failure following massive topical application of henna from Turkey.[8]

Soker et al reported the oldest case, eleven years old boy, with henna – induced hemolysis from Turkey. This G6PD – deficient patient was hennaed throughout the whole body to treat his psoriatic skin lesions.[5] Both countries, Turkey and Arab Emirates, are neighboring countries of Iran, with common cultural and religious customs. Application of henna is very popular in Iran especially among women from rural areas. Some mothers apply henna to their infant's palms as a blessing and protection. However, application of henna throughout the whole body is unusual in our region i.e. West of Iran. We determined henna as sole causative agent for hemolytic anemia in this G6PD- deficient infant as we ruled out infections and other chemical agents as the cause of hemolysis. Despite high incidence of G6PD deficiency and popularity of henna in our region, this is the first case of henna – induced hemolytic anemia in our center, the main pediatric center in Kermanshah province. Probably, lower amounts of henna used in infants is the cause of rarity of henna – induced hemolytic anemia in our region. However the use of henna should

be discouraged in infants in genral and in known G6PD – deficient individuals of any age.

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