

## Henna - induced hemolytic anemia and acute renal failure

Celal Devocioğlu, Selahattin Katar, Ömer Doğru, M. Ali Taş

Department of Pediatrics, Dicle University Faculty of Medicine, Diyarbakır, Turkey

**SUMMARY:** Devocioğlu C, Katar S, Doğru Ö, Taş MA. Henna-induced hemolytic anemia and acute renal failure. *Turk J Pediatr* 2001; 43: 65-66.

Henna is a traditional cosmetic agent and is used worldwide, especially in the Middle East. Its active agent is lawsone (2-hydroxy-1,4-naphthoquinone). Henna is not only applied to hands or hair as a cosmetic agent in traditional ceremonies, but is also applied to the body on lesions in the treatment of seborrheic dermatitis or fungal infections. However, its application over the body or in newborns is rare. Here we report a 27-day-old boy who developed hemolytic anemia and acute renal failure following topical application of henna to his abdomen, intertriginous region and legs to treat diaper rash.

**Key words:** henna, G6PD enzyme deficiency, hemolysis, acute renal failure.

The crushed leaves of henna are used worldwide, and especially in the Middle East, as a cosmetic agent. Lawsone (2-hydroxy-1,4-naphthoquinone) is a chemical present in henna, and has been shown to cause severe hemolytic anemia and renal tubular necrosis in animals. Henna may cause hemolysis in G6PD (glucose-6-phosphate dehydrogenase) enzyme deficiency in regions where it is commonly used. Although henna has low allergenic potential, it may also cause contact dermatitis. This case is presented because a thorough review of the literature showed no report of acute hemolysis and acute renal failure after henna application.

### Case Report

A 27-day-old boy was admitted to our hospital with a four-day history of dyspnea, paleness, low amount of urine and icterus. The patient had no complaints four days previously, when henna was applied to his abdomen, intertriginous region and legs to treat diaper rash.

Dyspnea and paleness developed after henna application and the amount of urine decreased two days later. Past history revealed the patient was born at term, in hospital, cried immediately after birth, had no cyanosis, was breastfed, and had no vaccination, medication or aspiration. The parents were unrelated; the first child was a two-year old boy, who was alive and healthy. On physical examination length, weight and head circumference were between 25<sup>th</sup>-50<sup>th</sup> percentile.

Axillary temperature was 37 °C, blood pressure was 102/62 mmHg and heart rate was 184/min. General appearance was poor, with the child hypoactive, very pale and icteric. Skin from the patient's knees to the umbilical level had apparently been dyed a reddish color. When the parents were questioned, we learned that they had applied henna four days previously. The patient was dyspneic and intercostal and subcostal retractions were present. The liver was 4 cm palpable subcostally in the midclavicular line. Reflexes were diminished.

Laboratory examination revealed: Hb 5.6 g/L, Hct 17.6%, WBC 22,300/mm<sup>3</sup>, erythrocytes 1,800,000/mm<sup>3</sup>, and platelets 291,000/mm<sup>3</sup>. On peripheral smear there were 48% PMNL, 44% lymphocytes, 8% bands, and 12% normoblasts; thrombocytes were adequate and clustered. Erythrocyte morphology: anisocytosis and fragmented erythrocytes were present. There was no spherocytosis or elliptocytosis. Sickling test was negative, and reticulocytes were 8%. Osmotic fragility test was negative. G6PD enzyme was found to be qualitatively deficient. Urea was 149 mg/dl, creatinine 4 mg/dl, Na 148 mEq/L, K 5.7 mEq/L, ALT 126 IU/L, AST 106 IU/L, blood glucose 47 mg/dl, total bilirubin 14.6 mg/dl, and direct bilirubin 2 mg/dl. Urine analysis revealed pH 5, density 1010, protein (+), bilirubin (+), and hemoglobin (+), and 1-2 epithelial cells were seen at each field on microscopic examination. Both the patient and

his mother were blood group 0 Rh (+); direct Coombs test was negative. On blood gas analysis pH was 6.8, pCO<sub>2</sub> 33 mmHg, pO<sub>2</sub> 29 mmHg, HCO<sub>3</sub> 5.9 mmol/L, and BE -25 mmol/L. Blood culture was negative. Abdominal ultrasonography performed 40 hours after blood transfusion was normal. Previously determined hepatomegaly was thought to be due to anemia and heart failure, and it disappeared after blood transfusion. After NaHCO<sub>3</sub> deficit therapy and blood transfusion, hematocrit increased to 28 and pH was 7.02, Na 129 mEq/L, K 5.2 mEq/L, HCO<sub>3</sub> 13.4 mmol/L, BE -14 mmol/L, urea 216 mg/dl, and creatinine 5.6 mg/dl. Oliguria was also present and peritoneal dialysis was planned, but the patient's condition deteriorated, and he died at 56<sup>th</sup> hour of admission to hospital.

### Discussion

Henna is a traditional cosmetic agent and is used worldwide, especially in the Middle East. The active agent in henna is lawsone<sup>2-4</sup>. Although henna low allergenic potential, it has been shown to cause contact dermatitis<sup>2-5</sup>. Henna is not only applied to hands or hair as a cosmetic agent in traditional ceremonies, but is also applied to the body on lesions in the treatment of seborrheic dermatitis or fungal infections. Analgesic, antipyretic and anti-inflammatory effects of henna have been shown in rats<sup>6</sup>, which may account for its use as a medication; however, its application over the body or in newborns is rare.

In a study from Sudan, Sir Hashim et al.<sup>8</sup>, presented 31 cases who were hospitalized due to henna intoxication. All cases developed severe angioneurotic edema, and emergency tracheostomy was required for 15 cases due to airway obstruction. Acute renal failure occurred in five cases, and all cases recovered after peritoneal dialysis. However, 13 deaths occurred within 24 hours of presentation.

Munday et al.<sup>1</sup>, in a study from New Zealand, showed that lawsone, the active agent of henna, may cause hemolysis in a dose-dependent manner, has a nephrotoxic effect, and may cause tubular necrosis and an increase in urea and creatinine levels<sup>1</sup>. It is known that percutaneous henna application may cause hemolysis in G6PD-deficient red blood cells, but few cases

have been reported in literature<sup>3-4</sup>. G6PD is an important X-linked enzyme deficiency at the pentose phosphate pathway. Drugs, infections, nutrients or oxidizing agents may cause nonspherocytic hemolytic anemia in G6PD enzyme-deficient patients. In our case, no medication, nutrient or infection that could cause hemolytic anemia in G6PD deficiency was determined, and hemolysis was thought to be due to henna application to a G6PD enzyme-deficient infant. Acute renal failure seemed to be a result of the nephrotoxic effect of the henna. Although anti-inflammatory, antipyretic and analgesic effects of henna have been documented, in most regions, as in our country, henna is widely used as a traditional cosmetic agent. However, it has been shown to be nephrotoxic and cytotoxic, and may cause contact dermatitis, hemolytic anemia, and hyperbilirubinemia in the newborn, effects which may cause severe problem. Regional health education programs should be planned in common G6PD enzyme-deficient regions in order to prevent henna application and resultant hemolysis in G6PD enzyme-deficient cases.

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