An Unusual Case of Neonatal Methemoglobinemia

A 26-day-old neonate weighing 3.4 kg, presented with an acute history of loose motions, vomiting and drowsiness. At admission, patient was dehydrated, acidotic and cyanosed. Blood gas was suggestive of severe metabolic acidosis, which was corrected by intravenous hydration and soda-bicarbonate therapy. There was purulent discharge from umbilicus along with erythema; C-reactive protein (CRP) was 80 mg/L. Stool microscopy showed 25-30 pus cells/high power field. A diagnosis of sepsis was made, and he was started on intravenous antibiotics (Meropenem and Vancomycin).

Despite oxygen therapy, pulse oximetry showed saturation of 85% whereas arterial blood gas showed PaO_2 of 122 mmHg and saturation of 98%. In view of this discrepancy and arterial blood being dark brown in color, diagnosis of methemoglobinemia was strongly suspected. Blood level of methemoglobin was 31%, which confirmed methemoglobinemia as a cause of cyanosis.

NADH b5 cytochrome reductase level was normal (11.5 IU/g Hb), ruling out hereditary causes of methemoglobinemia. On enquiring about any drug intake, parents revealed history of topical application of Silver sulfadiazine cream on umbilicus since 7th day of age. Silver sulfadiazine application was immediately stopped. Patient also had anemia with Hb of 9.4 g/dL; therefore, packed red blood cells were transfused to improve oxygen carrying capacity.

He was treated with methylene blue (2 mg/kg intravenously) after ruling out G-6 PD deficiency. Baby improved rapidly after one dose of methylene blue. Cyanosis disappeared and sensorium became normal. Repeat blood methemoglobin level was 3.9%. Umbilical pus culture had growth of *Staph. aureus*, and baby received antibiotics for 14 days. On follow up, child is now aged 6 years and is doing well with normal growth and developmental parameters. He did not suffer from any further episodes of methemoglobinemia.

Methemoglobinemia in a neonate can be congenital - (due to hereditary deficiency of NADH cytochrome b5-reductase enzyme) or acquired. Acquired methemoglobinemia in newborns and young infants could be due to endogenous conditions, like diarrhea, sepsis and acidosis or it can be due to exogenous drug or toxin [1-3]. Silver sulfadiazine application, as a cause of neonatal methemoglobinemia is rare. Systemic absorption of locally applied drugs is increased in newborn babies as compared to older infants and children [4]. As such, local application of silver sulfadiazine is generally contraindicated in neonates and infants below 2 months of age [5]. Our patient developed methemoglobinemia secondary to combination of exogenous (application of silver sulfadiazine cream over umbilicus) and endogenous (sepsis, diarrhea and acidosis) factors.

To conclude, a high index of suspicion is required for early diagnosis of methemoglobinemia in neonates, and care should be taken in choosing appropriate drug for local application in newborn infants.

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