

## Accidental Dapsone Poisoning in Children

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Dapsone, a sulfonamide derivative has been used commonly in the treatment of leprosy and dermatitis herpetiformis and most recently in the prophylactic treatment of *Pneumocystis carinii* pneumonia in patients infected with human immunodeficiency virus(1,2). Accidental dapsone poisoning during childhood is uncommon.

We report two cases of accidental ingestion of massive dose of Dapsone.

### Case Reports

*Case 1:* A 2<sup>1</sup>/<sub>2</sub>-year-old male child presented with irritability, restlessness and difficulty in breathing which started one day prior to admission. There was history of

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accidental ingestion of 17 dapsone tablets (10 mg each) 24 h back. The drug was being taken by his mother for the treatment of leprosy. Examination revealed central cyanosis, pulse rate of 124/min (regular, good volume), respiratory rate 40/min with intercostal and subcostal recession, normal temp and blood pressure 90/60 mm Hg. The systemic examination was normal. Blood drawn for investigations was chocolate brown in color and it did not change its color when oxygen was bubbled through it. Arterial blood gas analysis was within normal limits (pH 7.47, PCO<sub>2</sub> 23.2, PO<sub>2</sub> 84.6, HCO<sub>3</sub> 20.2, BE-2.2 and O<sub>2</sub> saturation 98.8%). His hemoglobin was 8.5 g/dl. Blood urea 36 mg/dl. Serum electrolytes Na<sup>+</sup> 135 meq/L and K<sup>+</sup> 5.6 meq/L. ECG and X-ray chest were normal. The methemoglobin level at admission was 24%. The child was started on supportive treatment and given sedation with intravenous diazepam. Gastric lavage was done using normal saline.

The specific treatment was initiated by intravenous injection of methylene blue (2 mg/kg of 1.0% solution) at admission. Half of initial dose was repeated after 5 h). The child showed remarkable improvement and his methemoglobin level dropped to 10% and was discharged after 4 days.

*Case 2:* A four-year-old male child presented with inability to support himself, abnormal movements of all the limbs and repeated episodes of vomiting for 1 day. A history of dapsone ingestion was forthcoming which was consumed 18 hours before the onset of symptoms. The exact number of tablets ingested by the child could not be ascertained. The drug was being given to the father for the treatment of leprosy.

The child was fully conscious afebrile with pulse rate of 136/min, respiratory rate

30/min and was having central cyanosis. The CNS examination revealed generalized choreiform movements and presence of cerebellar signs, *i.e.*, truncal ataxia, nystagmus and intention tremors. The cardiovascular and respiratory systems were normal. The blood drawn for various investigations was chocolate brown in color as seen in the previous case. Hemogram showed Hb 10.6 g/dl, PCV 31.5%, TLC 15,000/cu mm, DLC P 71, L 22, M<sub>5</sub>, E<sub>2</sub>, MCV 78 fl, MCH 24 pg, MCHC 31%, reticulocyte count 4% and platelet count of  $357 \times 10^9/L$ . Peripheral smear revealed normocytic normochromic anemia. Arterial blood gas analysis revealed metabolic acidosis (pH 7.26,  $-PCO_2$  34.5,  $PO_2$  80.2,  $HICO_3$  10.8 and oxygen saturation 93.5%). The blood urea, serum electrolytes, electrocardiogram and chest X-ray were normal. The blood methemoglobin level on admission was 20.4%. The treatment was initiated with gastric lavage, intravenous fluids, correction of metabolic acidosis and administration of intravenous ascorbic acid (500 mg). Intravenous ascorbic acid 100 mg twice daily was continued for 1 day. Child showed good recovery and was discharged on oral vitamin C for 1 week.

### Discussion

Accidental dapsone poisoning is a pediatric emergency in young preschool children(3). Dapsone, a sulfone is well absorbed on oral ingestion, with peak levels after two to six hours. The drug can be detected in tissues upto three weeks after ingestion. The half life normally varies from 9-45 hrs (mean 30 hrs) but in toxic doses may be prolonged to two to four days. It causes methemoglobinemia resulting in cyanosis. The clinical symptoms vary and depend on the methemoglobin concentration in the blood(6). Methemoglobin is incapable of binding oxygen and also

increases the affinity of the unaltered hemoglobin for oxygen, shifting the oxygen dissociation curve to the left thus further impairing oxygen delivery resulting in dyspnoea as seen in both the cases. The CNS manifestations occurring in children with dapsone poisoning have been described earlier(4,7,8). The manifestations observed in these children were irritability, hypotonia, truncal ataxia, choreiform movements and dysarthritic speech. Cerebellar signs were noted by us in one of the cases (*Case 2*).

Direct effect of the drug on CNS and cerebral anoxia due to methemoglobinemia have been attributed as the main causes. In acute dapsone toxicity, initial attempts should be directed towards gut decontamination (gastric lavage, activated charcoal orally) and improvement of oxygen delivery. To improve oxygen delivery, main emphasis is on administration of reducing agents such as methylene blue and ascorbic acid. Methylene blue given intravenously is rapidly reduced to leukomethylene blue in the presence of NADPH and methemoglobin, and leukomethylene blue then becomes available to reduce methemoglobin to hemoglobin. It is the mainstay of treatment in severe methemoglobinemia. In less severe cases, ascorbic acid 200-500 mg can be given intravenously(3) as was successfully used in one of our cases. Exchange transfusion has been tried in a case not responding to methylene blue(9).

It is suggested that cases previously perfectly normal and presenting with unexplained central cyanosis with history of ingestion of dapsone be considered as having methemoglobinemia. Dapsone a commonly used drug in the treatment of leprosy should be kept out of reach of children to prevent significant morbidity and mortality.

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