are higher in thalassemics and that these are reduced after blood transfusion. The possibility of utilizing these levels to predict transfusion requirements should be explored.

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Poisoning with Writing Ink

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Commercially available writing or marking ink contains aniline dyes as a major contituent. Aniline is a product of nitrobenzene. Fatal poisoning by ingestion of this compound, though uncommon, is occasionally reported(l). We report a patient who died of methemoglobinemia following accidental ingestion of writing ink.

Case Report

An 11-year-old girl swallowed about 30 ml of 'Sulekha' writing ink. One and half hours later, she was found unconscious and complete pale with bluish tint. Her lips were dark purple in colour. Despite gastric lavage, oxygen administration and slow intravenous infusion of 1% methylene-blue solution in the dosage of 1 mg/kg body weight, she died 12 hours later.

Autopsy Examination

The dead body showed marked blueing of the lips, hard palate and finger nail beds. The face was livid and fine froth was present around the nostrils and mouth. Chocolate colored postmortem stains were elicited on the back. Petechial hemorrhages were observed in the cerebral hemispheres while other organs were congested.

Histopathological examination showed evidence of renal tubular necrosis and hepatic centrilobular necrosis. Blood examination by spectrophotometry showed four characteristic absorption bands in the wavelength scale, first at λ 640-628 in the red, second at λ 587-570, third at λ 550-530, and the fourth which was merged in the absorption of the blue rays, at λ 510-490. In other words, the first two absorption bands were seen between D and E, the third was between C and D, while the fourth, rather

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indistinct, was situated between E and F Fraunhofer lines. Chemical analysis of the blood sample and the viscera by 'butanone method of Schrenk', detected and measured the amount of nitrobenzene compound, suggesting that the cause of death was as a result of aniline dye poisoning.

Discussion

Besides writing and marking inks, aniline is also used in the manufacture of wax crayons, shoe dyes, paints and paint removers. Majority of the cases of aniline poisoning in house are due to contact with articles recently marked with indelible ink used prior to laundering. The first documented report was in 1886 but fresh cases also have been reported subsequently(2). Shoe dyes and wax crayons are other unusual sources of accidental poisoning with aniline dyes(3).

Both aniline and nitrobenzene convert hemoglobin to methemoglobin, which is responsible for the symptoms(4) and the brown or brownish chocolate color of the blood and the internal viscera. The derebral hypoxia is associated with peteehial hemorrhages in the cerebral cortex. Renal tubular necrosis, hepatic necrosis and ulceration of the urinary bladder wall may also occur. Hemolysis may follow large overdosage(l).

The clinical features include cyanosis when the methemoglobin level exceeds 15% and in severe cases, jaundice, due to hepatic necrosis. Headache and confusion are experienced at methemoglobin level of 30-40%. At still higher levels, respiratory depression, hypotension, coma and death ensue(l).

The lethal dose is estimated to be approximately 1 g though recovery has followed the intake of even higher doses(l).

Treatment includes symptomatic management along with infusion of methylene-blue 1 mg/kg of a 1% solution or ascorbic acid 1 g if the former is not available.

Besides looking for the characteristic absorption bands in the wavelength scale by spectrophotometry of blood sample to detect methemoglobinemia(5,6) following intake of nitrobenzene compounds, the latter are identified primarily from the characteristic smell of almonds apart from positive 'butanone test of Schrenk', based on the formation of a color with butanone which also helps estimate the amount of nitrobenzene compound(7).

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