Unusual cause of severe toxic methemoglobinemia in an infant: a case report

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Abstract Toxic methemoglobinemia is an uncommon blood disorder induced by exposure to certain oxidizing agents and drugs. In severe cases, this condition may rapidly lead to major cardiopulmonary compromise and constitutes an emergency requiring prompt recognition and early management. We report an unusual case of severe toxic methemoglobinemia following wide cutaneous application of a pomade containing benzocaine, resorcin, and oxyquinoline (Nestosyl®) in an infant.

Keywords Benzocaine · Resorcinol · Oxyquinoline · Cutaneous administration · Methemoglobinemia · Methylene blue

Introduction

Methemoglobinemia is a rare blood disorder, characterized by abnormal levels of oxidized hemoglobin that cannot bind to and transport oxygen [1, 2]. The clinical picture is characterized by acute cyanosis and low oxygen saturations on pulse oximetry but normal oxygen saturation on arterial blood gas analysis [1]. When untreated, methemoglobinemia can lead to major cardiopulmonary compromise, neurologic sequela, and even death [2]. Thus, knowledge of this potentially life-threatening condition is essential for clinicians. This report describes an original case of toxic methemoglobinemia induced by wide cutaneous application of a pomade containing benzocaine, resorcin, and quinoline (Nestosyl®) in a 16-month-old boy. To our knowledge, this cause and route of intoxication has not been previously reported in the literature.

Case report

A previously healthy 16-month-old boy presented to our emergency department for sudden development of cyanosis. On physical examination, the infant was agitated and unconscious (Glasgow Coma Scale=12/15), with a 38°C fever, a low oxygen saturation of 76%, under 3 l/min of oxygen through nasal cannulae. His hemodynamic state was unstable with a heart rate of 200 bpm, a prolonged capillary refill time, and weak pulses. Besides, the patient presented widespread lesions of molluscum contagiosum on the anterior face of the thorax and the limbs. The infant was immediately intubated and mechanically ventilated with vascular filling (20 ml/kg of normal saline 0.9%). The cyanosis was refractory to oxygen (FiO₂=1). The chest radiograph was normal and particularly eliminated a pulmonary barotrauma. The echocardiogram was normal. An arterial blood gas analysis revealed pH: 7.57, P\textsubscript{aO\textsubscript{2}}: 157.4 mmHg, P\textsubscript{CO\textsubscript{2}}: 12.5 mmHg, HCO\textsubscript{3}⁻: 11.6 mmol/l, oxygen saturation (Sat\textsubscript{O\textsubscript{2}}): 99.7%, and a methemoglobin level at 50.6% of total hemoglobin. Treatment of methemoglobinemia was then instituted using a methylene blue 1% solution (10 mg/ml) with a loading dose of 2 mg/kg administered intravenously over 5 min followed by 1 mg/kg twice daily. The parents were questioned about the different drugs and chemicals received recently by the infant. We found then the notion of
Automedication, 24 h previously, by Nestosyl® pomade with wide cutaneous application on the lesions of molluscum contagiosum and consumption of about half of a tube. After ruling out the other acquired causes of methemoglobinemia, and with a high degree of suspicion, methemoglobinemia was considered to be secondary to the wide cutaneous application of this pomade containing three components causing this complication: benzocaine, resorcin, and 8-hydroxyquinoline. Under methylene blue therapy and mechanical ventilation, the clinical course was favorable with rapid improvement of cyanosis, neurologic status, and hemodynamic state. Twenty-four hours later, methemoglobin levels decreased to 9.8%. The patient was weaned from mechanical ventilation on day 2 and discharged on day 3 of his admission to the pediatric intensive care unit.

Comments

Methemoglobin is formed when the iron in hemoglobin is oxidized from ferrous (Fe²⁺) to ferric (Fe³⁺) state. Once Methemoglobin is formed when the iron in hemoglobin is oxidized from ferrous (Fe²⁺) to ferric (Fe³⁺) state. Once

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Conclusion

This report illustrates an original case of toxic methemoglobinemia occurring in a 16-month-old infant after wide cutaneous application of a pomade containing benzocaine, resorcin, and hydroxyquinoline and demonstrates the possibility of the occurrence of severe systemic effects of drugs after wide cutaneous application especially in neonates and infants. It is thus important to educate parents about the potential risks of treatment with over-the-counter medications, especially in young children.

Conflicts of interest The authors declare that they have no conflict of interest or disclosures.

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