

CASE REPORT

METHEMOGLOBINEMIA-AN ALTERNATIVE TREATMENT MODALITY

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Methaemoglobinemia is a rare condition characterized by elevated levels of methemoglobin levels. We report a case of a young lady who took thinner (a solvent used in paint). Methemoglobinemia was diagnosed on the basis of saturation gap and elevated methemoglobin levels. She recovered after exchange transfusion, which was done due to non-availability of parenteral methylene blue.

Keywords: Methemoglobinemia, treatment, exchange transfusion

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INTRODUCTION

Normally haemoglobin contains iron in reduced ferrous form (Fe^{2+}) while methemoglobin contains iron in the ferric state (Fe^{3+}). This causes an alteration in the blood's ability to bind oxygen.¹ Methemoglobin does not bind oxygen, thus leading to a functional anaemia.

Methemoglobin causes a leftward shift of the oxygen-haemoglobin dissociation curve, resulting in decreased release of oxygen to the tissues. The presence of cyanosis despite oxygen treatment results from these effects.²

CASE REPORT

A 15 years old girl was admitted with the complaint of shortness of breath for 30 minutes. This shortness of breath was preceded by intake of thinner (solvent containing benzene) with suicidal intent. On presentation, her vitals were: pulse rate, 80/min; respiratory rate, 24/ min; blood pressure, 120/80 mmHg; temperature, 98 °F; and oxygen saturation of 92% on pulse oximeter. She was not cyanosed and lungs were clear on auscultation. Initially she was managed with high flow oxygen. Initial blood investigations, ECG and chest x ray were unremarkable. Arterial blood gases revealed pH as 7.63, pCO₂, 18.1 mmHg; pO₂:192.4 mmHg; and SpO₂:99.9%. During the next 2 hours, her shortness of breath worsened with appearance of cyanosis and tachycardia (pulse rate increasing to 140/min). Her pulse oximeter SpO₂ declined to 66% however, her ABGs remained normal (pH: 7.49, pCO₂:24.3 mmHg, pO₂:159 mmHg and SpO₂:98.9 %). On the basis of saturation gap, methemoglobinemia was suspected and her methemoglobin levels were sent which turned out to be 30.4% (Normal: up to 1.2 %). Intravenous methylene blue was not available so exchange transfusion was planned. Eight (08) units of packed cells were infused over 24 hours. She showed complete resolution of symptoms and normalization

of pulse oximeter SpO₂. She was kept under observation for next five days and had a psychiatric consultation to mitigate future suicidal risk. She was discharged and was advised for follow up.

DISCUSSION

Methemoglobinemia occur when methemoglobin levels rises above 1%.³ Methemoglobinemia may be hereditary (rare) or acquired. Acquired methemoglobinemia results due to ingestion of drugs or toxic substances like benzene⁴, chlorates, dapsone, etc. Clinical features are shown in table-1.

Table-1: Clinical features of methemoglobinemia

Methemoglobin levels	Clinical features
3-15%	Slight discolouration of skin
15-20%	Mild cyanosis
25-50%	Dyspnoea, chest pain, palpitations, syncope
50-70%	Arrhythmias, altered mental status, seizures
>70%	Death

Diagnosis of methemoglobinemia is based on clinical symptoms and an elevated serum methemoglobin level. On ABGs, possible clue to the diagnosis is the presence of a "saturation gap" which is the difference between the oxygen saturation measured on pulse oximetry and the oxygen saturation on ABGs results.⁵ Co-oximeter remains the most accurate device for diagnosing methemoglobinemia. It is advisable to treat patients with methemoglobin levels of 20% or higher.

Methylene blue is the first line emergency treatment for symptomatic methemoglobinemia. Methylene blue may cause methemoglobinemia in susceptible patients; hence requires careful administration.

Exchange transfusion and hyperbaric oxygen are alternate treatment options considered where methylene blue therapy is ineffective or unavailable. Mild chronic methemoglobinemia may be treated with oral methylene blue, ascorbic acid and riboflavin. No pharmacologic treatment exists for hereditary forms.

CONCLUSION

Patient was rescued from complications due to early diagnosis and treatment. The option of exchange transfusion can be used in case of non-availability of parenteral methylene blue.

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