

CASE REPORT

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Methemoglobinemia with Indoxacarb Poisoning– Case Report

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ABSTRACT

Methemoglobin is a useless form of hemoglobin constantly formed in red cells of peripheral blood. It is converted to functional hemoglobin by enzyme reducing systems and remains low in healthy. Apart from genetic defects methemoglobinemia occurs after exposure to oxidants in environment and chemicals. We report a case of 40 year old male with Indoxacarb poisoning presented with cyanosis due to methemoglobinemia, improved after giving methylene blue and supportive management.

Key words: Methemoglobinemia, Indoxacarb Poisoning, CO-Oximeter, Methylene Blue.

Introduction

Indoxacarb is a broad spectrum foliar insecticide used on a broad range of crops. It impairs nerve function, causes feeding cessation, paralysis and death of many insects like corn earworm, moth, and fruit worm.¹ Poisoning with insecticides such as Indoxacarb, aluminum phosphide, and paraquat are commonly implicated for methemoglobinemia. Methemoglobin² (MetHb) is generated by the oxidation of haem iron moieties to the ferric state causing characteristic bluish brown colour resembling cyanosis. Considering the possibility of methemoglobinemia in a patient following ingestion of indoxacarb in a suicidal attempt and we highlighted its early recognition and management in the following discussion.

Case Report:

A 40year old diabetic patient was admitted in the emergency room with complaints of chest discomfort and giddiness since the past 4 hours. On arrival, he was conscious, coherent, pupils were normal in size and reacting to light, vitals were stable, ECG showed T inversion in V3-V6, 1 avL,{Fig 1} and arterial blood gas analysis (ABG) revealed pH:7.41, pCO₂:25, pO₂:79, HCO₃:19.6 and SO₂c:96% at room air. Within an hour of admission, the patient developed cyanosis over face and hands, poly graphic monitor displayed

tachycardia, tachypnea, Spo₂ was 85% with 15L of O₂, and ECG showed diffuse T wave inversion, which resolved spontaneously.{Fig 2}

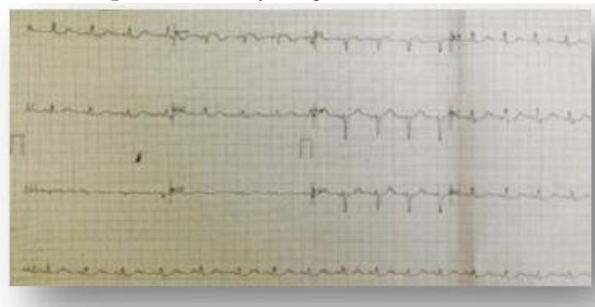


Fig 1



Fig 2

In view of ongoing oxygen desaturation and hemodynamic instability patient was intubated and connected to ventilator. Oxygen saturation gap was noticed. Patient was admitted and shifted to Intensive care unit for further evaluation and management. As the cardiac markers were negative for any infarction,

a working diagnosis of unknown poisoning was accepted. A clue was obtained from the patient attendants, they revealed that the patient was depressed and attempted suicidal earlier. However, the pseudocholinesterase levels were within normal limits excludes organophosphorus poisoning. Our previous experience with dapsone poisoning and the dark color of the blood samples {Fig 3} gave a suspicion on meth-hemoglobinemia. Blood was drawn and sent for oximetry.

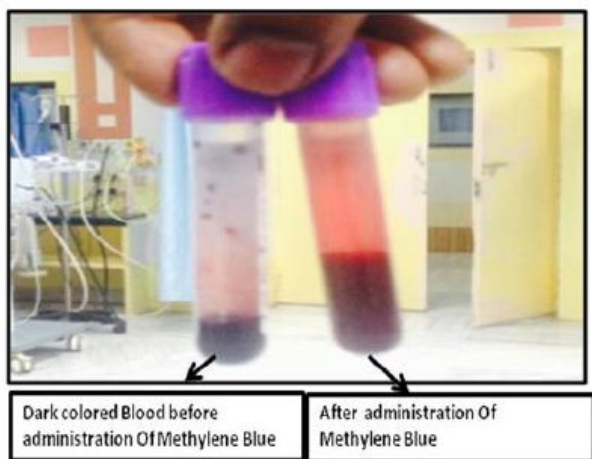


Fig 3

We observed a reading of 47% meth.hb. The antidote methylene blue could not be given because of the non conformation of the compound and cyanide poisoning being a contraindication. Four hours later, patient regained full consciousness. After a detailed inquiry, patient finally revealed that he has taken an insecticide with a suicidal intent. Indoxcarb poisoning {Fig 4} was confirmed once his attendants brought the container. Immediately Methylene-Blue the antidote was administered as a bolus dose of 2mg/kg body weight. After an hour the oximetry values were reduced to 1.8% and he was put on maintenance dose of 1mg/kg was infused for the next 12 hours in view of rebound phenomenon. After 24 hours his oximetry value came to normal 1%. The patient was successfully weaned off from the ventilator on the same day as his saturation levels improved. High dose injection Vitamin C and Riboflavin was also administered. He was discharged from the hospital on the 4th day after psychiatric counseling with normal oximetry value.

Discussion:

Poisoning with the substances with biological extracts which are rich in nitrogenous products can potentially cause methemoglobinemia. Indoxcarb is an insecticide which contains biological extracts,

stabilizers, and fillers. Patients who appear cyanotic and having hypoxic symptoms even with high PaO₂ levels on ABG should be suspected of methemoglobinemia [3]. The chocolate brown appearance of freshly drawn blood is a decisive clue. [4] Indoxcarb is marketed under the name as shown in {fig-4}.



Fig 4

In our patient too we noticed chocolate colored blood was observed and oximetry revealed 47%. MetHb levels as compared to normal MetHb levels of less than 1% and mild methemoglobinemia of 2-10% [3,6,7]. The cyanosis usually manifests at a level of 15% and treatment is warranted at levels above 30% while levels >60% are considered to be lethal.[3,6,7] though survival has been reported with a MetHb level of 81% and 91% [2]

The antidote methylene blue could not be given immediately because of the non conformation of the compound and cyanide poisoning being a contraindication. Once it was confirmed as Indoxcarb poisoning (Index) 100ml, Immediately Methylene-Blue the antidote was administered as a bolus dose of 2mg/kg body weight. After an hour the oximetry values were reduced to 1.8% and he was put on maintenance dose of 1mg/kg was infused for the next 12 hours in view of rebound phenomenon. [5] Other supportive measures include the administration of vitamin C and correction of the metabolic abnormalities, since, the extent and severity of symptoms are directly related to the percentage of hemoglobin that has been oxidized to meth-hemoglobin. The blood gas analysis reveals lactic acidosis consequent to anaerobic cellular metabolism.

Modern blood gas analyzers are having CO-oximeter which identifies and quantifies all hemoglobin species including methemoglobin. Additionally, CO-oximetry provides robust assessments of oxygen saturation even in methemoglobin patients than pulse oxymeter and blood gas analysis. We treated our patient on the basis of clinical suspicion and blood gas analysis, chocolate colored blood, our experience with dapsone poisoning, methemoglobin estimation by CO-oximetry and conformation of Indoxcarb poisoning. In the absence of clear history and conformation of Indoxcarb poisoning, methylene blue should not be administered since cyanide poisoning is a contraindication.

Methemoglobinemia occurs after exposure to oxidants in environment and chemicals. Therefore, it can be substantiated that indoxcarb, an oxidiazine insecticide manifested its toxicity in humans in the form of methemoglobinemia in our patient. However, this was successfully managed with intravenous methylene blue and other supportive and symptomatic treatment. As indoxcarb is a commonly used insecticide, the clinicians working in Emergency, ICUs should be able to recognize and manage it.

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