[ID-P#120] Acquired methemoglobinemia due to intentional exposure to uncommon agrochemicals: A retrospective case series

Ramaswamy Nagappan, Pawan Kumar Shukla, Rajan Sand Krishnadutt Chavali
Forensic Medicine and Toxicology, All India Institute of Medical Sciences, Raipur, Chhattisgarh

Objective: This case series i) explores the methemoglobinemia resulting from exposure to agrochemicals, including bio-pesticides, plant growth stimulants, fungicides, and herbicides. ii) highlights the lack of awareness of the toxicity associated with these substances, often perceived as safe natural products, leading to their misuse in deliberate self-harm and the need for early recognition and management in a resource-limited setup.

Materials and Methods: A retrospective review was conducted on institutional medical records of patients who presented with poisoning due to intentional exposure to agrochemicals at a tertiary care centre. Cases with clinically significant methemoglobinemia, indicated by symptoms such as cyanosis, headache, dizziness, and shortness of breath, and/or confirmed by methemoglobin levels exceeding 20%, were included.

Results: Over two years, 101 patients presented with agrochemical poisoning, and 5 developed methemoglobinemia. The cohort included 4 men and 1 woman, aged 15 to 35 years. The xenobiotics ingested included: i) bio-pesticide, ii) plant growth stimulant (extract of Ascophyllum nodosum with other inert ingredients), iii) fungicide (Validamycin), and iv) herbicides (Propanil, 2,4-D Ethyl Ester). All the cases presented between 6 and 24 hours, and clinical features included low oxygen saturation on pulse oximetry, unresponsiveness to oxygen therapy, and central cyanosis. Haematuria, chest pain, and pulmonary oedema were other significant clinical features. Methemoglobin levels ranged from 20% to 40%. All patients were treated with intravenous methylene blue and two also received vitamin C. Methemoglobin levels decreased to below 20% within one-hour post administration and returned to normal within 24 to 48 hours. There were no fatalities, and all patients recovered.

Conclusions: This case series highlights the need for increased awareness among healthcare professionals about the risk of methemoglobinemia from agrochemicals, especially bio-pesticides and plant growth stimulants, which are often perceived as benign. The efficacy of methylene blue and vitamin C reaffirms their utility in treating methemoglobinemia.