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Case Report Open Access

Transfluthrin Poisoning Resulting in Intra Vascular Haemolysis and Methemoglobinemia in G6PD Deficiency-Treatment Challenge

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Case Report

A 14 year old boy presented to Emergency Department, 3 days after, suicidal ingestion of liquid mosquito repellent vaporizer (15 ml, Transfluthrin 0.88% w/w). He developed jaundice, irritability and reddish urine on second day of ingestion. He was admitted to some other hospital on second day of ingestion where he was found have tachypnea and cyanosis which was unresponsive to oxygen therapy. Co-oximetry revealed methemoglobin level of 13.7%. Hence, he was given intra venous methylene blue. Child continued to have tachypnea and cyanosis inspite of methylene blue. Hence, he was referred to our hospital. On admission, examination revealed pulse rate-125 beats per minute, respiratory rate-25 per minute, blood pressure -138/60 mmHg, SpO_2-82% on non- rebreathing face mask @ 15 L/min of O2. Glasgow Coma Score (GCS) was 13/15 and had pallor, jaundice, tender hepatomegaly. Cardiovascular and respiratory system examination were essentially normal.

Arterial blood gas (ABG) analysis at admission revealed Ph-7.39, PaO_2-175 mmHg, PCO_2-34 mmHg, Bicarbonate-19 mEq/L, Lactate-1.9 mmol/L, and methemoglobin-16.3%. Investigations revealed qualitative deficiency of G6PD enzyme, hemoglobinuria, severe anaemia (Hb-3.2 gm/dl) with features of haemolysis in peripheral smear and elevated blood urea nitrogen and creatinine (BUN-34 mg/dL, Cr-1.1 mg/dL) (Table 1) So, double maintenance intravenous fluid, furosemide and soda bicarbonate were given to prevent progression of acute kidney injury secondary to haemolysis.

Time (hours)	Outside hospital	At admission to author's hospital(0 hours)	6hrs	9hrs	12hrs	18hrs	24hrs	32hrs
Methemoglobin On co-oximetry	13.7%	16.3%	20.1 %	19 %	34.3% (plasma exchange)	3%	1.9 %	0.4 %

Table1: Depicting the methemoglobin levels of the patient by co-oximetry during hospital stay.

Methylene blue could not be given in view of G6PD deficiency. Mega dose of enteral vitamin C (500 mg twice daily), Riboflavin (10mg twice daily), N-Acetyl Cysteine infusion (100 mg/kg/hr) were given. Despite the above management, blood methemoglobin level continued to rise (maximum up to 34.3%) along with clinical deterioration in form of increase in irritability. Hence, urgent plasma exchange was done to reduce the methemoglobin level. Two units of packed red blood cell were transfused due to severe anaemia. After plasma exchange, methemoglobin level decreased to 3% along with clinical improvement (decreased irritability). The trend of methemoglobin during the hospital stay is depicted in Figure 1 and Table 2. On second day of admission, haemolysis subsided and he did not require further transfusion of blood products and plasma exchange. He was shifted to ward on third day.

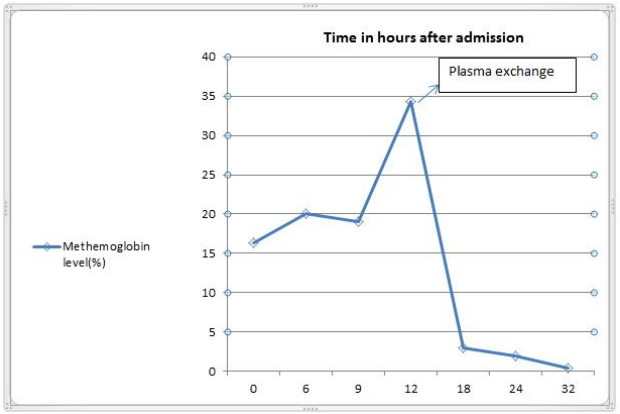

Figure 1: Graphical representation of methemoglobin levels and effect after plasma exchange.

Hematology	
Hemoglobin	3.2 gm/dl
Platelet count	3.6 lac/mm^3
Total Leucocyte count	20,300/mm^3 (P-82%, L-10%, M-1%, E-7%)
Peripheral smear	Suggestive of hemolysis
G6PD level	Qualitative deficiency
Biochemistry	
Na	140 mEq/L
K	4.5 mEq/L
BUN(Blood Urea Nitrogen)	34 mg/dl
Cr(creatinine)	1.1 mg/dl
Arterial Blood Gas	
PH	7.39

PaO^2 (mmHg)	175
$PaCO^2$ (mmHg)	34
HCO^3 (m mol/L)	19
Lactate (m mol/L)	2.1
Coagulation parameters	
PT-INR	0.9
aPTT	32 sec

Table 2: Depicting the haematological and biochemical parameters at admission.

Discussion

Transfluthrin is a synthetic pyrethroid derivative used as an insecticide. Kerosene is the solvent used in the preparation of liquid mosquito repellent vaporizer. Pyrethroids are about 2250 times more toxic to insects than to mammals because of increased sodium channel sensitivity, smaller body size and lower body temperature. Oral ingestion is the most common route of intoxication. Poor absorption through skin and rapid metabolism to inactive metabolites protects the humans from toxicity. Transfluthrin toxicity in human results in central nervous system (CNS) symptoms like headache, dizziness, drowsiness, status epilepticus. Our patient had irritability as the presenting symptom. It acts by prolonging the opening of sodium channels leading to increased influx of sodium ions and thus hyper-excitation of the nervous system [1,2]. Cardiac dysfunction and lung injury are also reported but rare [3]. There is no specific antidote for transfluthrin toxicity, hence management is only symptomatic and supportive. Gastric lavage was not done as the patient presented after 24 hours of ingestion. Our patient had undiagnosed G6PD deficiency that might have resulted in intravascular haemolysis after exposure to transfluthrin. Plasma exchange therapy, hyperbaric oxygen therapy and ascorbic acid therapies should be considered as second-line treatments for patients unresponsive to methylene blue. Even though, evidence for plasma exchange in literature is limited to case reports, this therapy was given to our patient in view of G6PD deficiency which is a contraindication to administer methylene blue [4,5]. As per our knowledge, no case was reported till date to have precipitated haemolysis secondary to G6PD deficiency and methemoglobinemia after transfluthrin ingestion.

Conclusion

Even though liquid mosquito repellent liquid poisoning is common in children, one has to keep in mind regarding this rare complication of intra vascular haemolysis and methemoglobinemia. Timely referral to a higher centre which has a facility of plasma exchange in suspected methemoglobinemia is required.

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