VOLUME - 11, ISSUE - 11, NOVEMBER - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

General Medicine

MANAGEMENT OF NITROBENZENE POISIONING WITH METHYLENE BLUE

Dr. G. Ilayaperumal	Post Graduate, Department of General Medicine, Rajah Muthiah Medical College and Hospital, Annamalai University.
Dr. Saritha. K. Narayanan	M.D., Associate Professor, Department of General Medicine, Rajah Muthiah Medical College and Hospital, Annamalai University.
Prof. Dr. M. Ramakrishna Rao	M.D., Professor, Department of General Medicine, Rajah Muthiah Medical College and Hospital, Annamalai University.

ABSTRACT Nitrobenzene can cause life threatening Methemoglobinemia. Its management includes the use of intravenous methylene blue to reduce the iron moiety from its ferric to ferrous state. A case of poisoning with nitrobenzene is presented with intravenous administration of methylene blue. Sudden onset of cyanosis with symptoms of hypoxia after administration or ingestion of an agent that can cause Methemoglobinemia.(1) We report a 38yr old male patient who had complaints of unknown poisoning.

KEYWORDS : Methemoglobinemia, Methylene blue, Nitrobenzene.

INTRODUCTION

Nitrobenzene is mostly used in synthesis of aniline and in production of benzidine, quinolone and azobenzene. Nitrobenzene is a pale yellow liquid which has an almond like odour at room temperature. The reduction of nitrobenzene to aniline occurs once nitrobenzene is metabolized within the body and this process oxidizes the hemoglobin in the blood into MetHb, causes methemoglobinaemia. Lethal dose range from 1g to 10g. In metheglobinemia, the ferrous state of iron (Fe^{2+}) in Hb may be oxidized to the ferric state (Fe^{3+}) under the action of oxidizers, e.g. nitrite and nitrobenzene, leading to formation of MethhbMethemoglobin (MetHb), loses the ability to carry oxygen. Human body can tolerate a very small amount <1% of MetHb, but a higher level is likely to cause methemoglobinemia. Methemoglobinemoa should be suspected when there is sudden onset of cyanosis with symptoms of hypoxia after administration of ingestion of an agent that can cause methaemoglobinaemia with hypoxia (Low Spo_2 on pulse oximeter) that does not improve with an increased fraction of inspired oxygen Abnormal dark red, chocolate or brownish coloration of the blood.

CASE REPORT

Mr.x / 38 yrs presented to casualty with c/o unknown poisoning at around 6.00 pm at his residence .Vitals during presentation – BP – 120/70 mmHg, pulse – 94, SpO_2 – 89% with 15 lit of O_2. ABG showed metabolic acidosis, in view of poor respiration and metabolic acidosis he was intubated and put on mechanical ventilator. On initial 10 second assessment patient is alert and is able to speak. ECG – showed HR-100/min, NSR, NAD, No ST/T changes. Nasogastric tube insertion-aspirate was yellow coloured.

Patient conscious oriented and afebrile,
Cyanosis present (both peripheral and central),
No piccle,
CVS –s1s2+ no murmur,
RS – bilateral air entry + right basal creps+,
CNS-b\l pupil 2.5mm ERTL,
P/A –Soft, not distended nor scaphoid,
BS+,
AIRWAY – Patent
BREATHING - RR-29 cycles per min,
SPO2 -78% with 15 litre O_2 via NRB

SpO_2 doesn't improve on oxygenation with 15 Litre 02 via NRB, Blood sample taken for ABG analysis showed dark brown colour, Nasogastric aspirate showed pale yellow colour.

Methylene blue 1 to 2 mg/kg body weight infused intravenously over 5 to 10 minutes (0.1 to 0.2 mL/Kg pf 1% solution).

Repeat dose – in 1 hr intervals till a maximum cumulative dose of 7mg/kg.

Ascorbic acid – 1 gm IV stat followed by 500mg IV bd.

Dextrose infusion – 50 ml / hourly, on ICU admission.

DISCUSSION

Nitrobenzene is easily absorbed from the respiratory tract, the gastrointestinal tract or the skin following intentional or accidental exposure. It is highly lipophilic because of which the highest concentrations get accumulated in the liver, brain, blood and stomach. In the blood, it leads to the excessive oxidation of the iron moiety of the haemoglobin molecule forming methaemoglobin. This molecule has an oxidized iron moiety (Fe^{3+}) instead of the usual reduced form (Fe^{2+}).[1] This methaemoglobin molecule is incapable of oxygen transport. As a result, the SpO_2 falls despite a high PaO_2 leading to the classical description of chocolate brown blood failing to redden even on exposure to ambient air. The clinical symptoms are graded according to the methaemoglobin levels.[2] Mild symptoms of headache, fatigue and nausea occur at 20–30 %; dyspnea, lethargy and tachycardia occur at 30–45 %; arrhythmias, coma, seizures, respiratory distress and lactate acidosis occur at 50–70 %; cardiovascular collapse and death occur at levels greater than 70 %. The lethal dose reported ranges from 1 to 10gm. The management has two aspects: first, to restore normal physiological conditions with supportive management and second, to attempt to decrease the methaemoglobin level. The first includes administration of sodium bicarbonate and intermittent haemodialysis, The second entails the usage of methylene blue and rarely exchange transfusion.[2]

CONCLUSION

Nitrobenzene causes many harmful health effects. Repeated exposure leads to cause methemoglobinemia.so the oral as well as intravenous administration of methylene blue can be effective in the management as evident in this case.

REFERENCES

1. Goldfrank's Toxicologic Emergencies.
2. Tintinalli's Emergency Medcine 9th Edition.