

# Two Case Reports of Occupational Exposure of Aniline Dye and Causing Methemoglobinemia

Manas Parikh<sup>1</sup>, Nima Thakkar<sup>2</sup>, Dr. Jayesh J Dutt<sup>3</sup>, Dr. Ibrahim Malek<sup>4</sup>

<sup>1</sup>3<sup>rd</sup> Year Medicine resident, Department of General Medicine, AMC MET Medical College & Sheth LG Hospital, Ahmedabad, India

<sup>2</sup>2<sup>nd</sup> Year Medicine resident, Department of General Medicine, AMC MET Medical College & Sheth LG Hospital, Ahmedabad, India

<sup>3</sup>Professor of Medicine, Department of General Medicine AMC MET Medical College & Sheth LG Hospital, Ahmedabad, India

<sup>4</sup>Assistant Professor, Department of General Medicine, AMC MET Medical College & Sheth LG Hospital, Ahmedabad, India

**Abstract:** Aniline is a chemical use mainly in the manufacturing of perfumes, dyes, paint removers, pesticides and photographic materials. At room temperature it is simplest aromatic amine, is clear to slightly yellow oily liquid that darkens to a brown color on exposure to air. When aniline exposure occur it rapidly absorbs from the lungs and leads to systemic toxicity. Aniline compounds cause oxidative stress which leads to methemoglobinemia and hemolytic anemia may land the patient in critical conditions.

**Keywords:** Meth Hb Aniline dye Methylene blue Methyhemoglobin

## 1. Introduction

- Aniline is a chemical use mainly in the manufacturing of perfumes, dyes, paint removers, pesticides and photographic materials.
- At room temperature it is simplest aromatic amine, is clear to slightly yellow oily liquid that darkens to a brown color on exposure to air.
- When aniline exposure occur it rapidly absorbs from the lungs and leads to systemic toxicity. Aniline compounds cause oxidative stress which leads to methemoglobinemia and hemolytic anemia.

- Creat - 1.1 mg/dl
- Sodium - 129 meq/lit
- Pottasium - 3.8 meq/lit
- Chloride - 95
- Bilirubin - 0.9 mg/dl
- SGPT - 37 unit

### Methhb level - 46.2%

- ABGA
- PH - 7.42
- PO2 - 55
- PCO2 - 42
- SO2 - 93.6%
- HCO3 - 26.0
- G6PD deficiency –not detected

## 2. Case Report 1

### History

- A 52 year male patient a factory worker brought to LG hospital on 14th July 2020 with alleged history of exposure to unknown substance (Aniline dye) With complain of
- Discoloration of skin since 4 days
- Breathlessness sudden onset
- Swelling of face, lips and neck region

### Vitals and examination

- PULSE - 112/min
- BP - 134/80 mmhg
- RR - 28 - 30/min
- RS - bilateral expiratory rhonchi present
- Cvs - s1s2 +
- Cns - conscious and oriented
- Spo2 - not recordable

### Investigations

- Hemoglobin - 14.6gm/dl
- Total count - 16640
- Differential - 90/5/3/2
- Platelets - 1.67 lakh
- Mcv - 106 FL
- Urea - 24 mg/dl

## 3. Case Report 2

### History

- A 20 year male patient a factory worker brought to LG hospital on 17th July 2020 with alleged history of exposure to unknown substance (?Aniline dye) due to drowning in tank of dye at his work place
- With complain of
- Discoloration of skin
- Sudden onset breathlessness

### Vitals and examination

- P - 120/MIN
- BP - 110/70 MMHG
- RR - 30/MIN WITH RESPIRATORY DISTRESS
- RS - rhonchi present
- Cvs - s1s2 +
- Cns - conscious and oriented
- SPO2 - 98% WITH BIPAP support

### Investigations

- Hemoglobin - 17.9 gm/dl
- Total count - 28230
- Differential - 85/10/04/01

Volume 10 Issue 9, September 2021

[www.ijsr.net](http://www.ijsr.net)

Licensed Under Creative Commons Attribution CC BY

- Platelets - 1.45 lakh
- Mcv - 70 FL
- Urea - 20 mg/dl
- Creat - 1.2 mg/dl
- Sodium - 120 meq/lit
- Pottasium - 3.1 meq/lit
- Chloride - 89 meq/lit
- Bilirubin - 0.8 mg/dl
- SGPT - 30 unit

**Methhb level - 4.8%**

- ABGA
- PH - 7.22
- PO2 - 48.9

- PCO2 - 49.2
- SO2 - 77
- HCO3 - 20
- G6PD deficiency –not detected
- Both pt treated with inj. methylene blue 1mg/kg iv over 10mins
- may repeat dose 1 hour later if metHb level remains >30% or symptoms persists
- Repeat methhb level

Case 1 - <1%

Case 2 - 2.8%



**4. Discussion**

- Methemoglobin (MetHb) is a modified form of normal hemoglobin where fe<sup>2+</sup> (ferrous ion) is oxidized into fe<sup>3+</sup> (ferric ion).
- MetHb cannot bind with oxygen and hence cannot carry oxygen. The human body can tolerate a very small

amount (<1%) of MetHb and higher level causes methemoglobinemia.

- Exposure to aniline dye leads to oxidative stress causing RBC destruction leads to hemolytic anemia and it is aggravated if G6PD deficiency present.
- The diagnosis of methemoglobinemia is based on the results of an arterial blood gas examination and measurements of methHb concentration in blood.

Level of MethHb(%)	Signs and symptoms
20-30	Anxiety Headacche Tachypnea , tachycardia
50-60	Impaired o2 deleivery to vital tissues leads to Dysrrhythmias Depressed mental status,coma,seizures
>70	Incompatible to life

## 5. Conclusion

Both paients had life threatening methemoglobinemia due to aniline dye exposure but timely intervention by resuscitation and inj. methylene blue as antidote could revive the pt.