



RARE PRESENTATION OF CARBON MONOXIDE POISONING: AFTER PETROLEUM INTOXICATION

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ABSTRACT

Accidental inhalational poisoning from hydrocarbons is quite common but ingestional poisoning is rare. In this case, the poisoning was due to occupational hazard and accidental ingestion of petrol by a young boy while doing car engine tuning. Patient was treated supportively while he was supplied with oxygen inhalation at high flow. Prognosis is weak in poisoning usually due to poor patient compliance.

INTRODUCTION

Occupational exposures and acute poisonings resulting from unsound management are estimated to account globally for 1 303 100 million deaths (2.3% of total) and 43 109 000 DALYs (1.6% of total).^[1]

Carbon monoxide (CO) is a colorless, odorless gas produced as a by-product of incomplete combustion of organic compounds. The clinical presentation of CO poisoning may be mild, moderate, or severe. The most frequently documented complications are persistent or delayed neuropsychiatric sequelae, including dementia, amnesic syndromes, psychosis, and Parkinsonism. These symptoms may be preceded by a lucid period of 2–40 days after the initial exposure.^[2-3] CO – sometimes termed a “silent killer”^[4,5] As the specific gravity of CO is 0.97, it is slightly lighter than air.^[6-7] The recently published Global Burden of Disease Study (GBD) showed that worldwide, unintentional poisoning was responsible for an estimated 180,000 deaths in 2010. This translates into a mortality rate of 2.6 per 100,000 inhabitants, making poisoning a top 50 cause of death. However, compared to 1990 figures, it appears that unintentional poisoning has decreased significantly; an 11% reduction in total deaths and a 34% decrease in the mortality rate^[8-9]

Case presentation

A 19-year-old male, automobile mechanic by profession presented in a drowsy state on a wheel chair in the

medical emergency of Holy Family Hospital, affiliated with Rawalpindi Medical University, Punjab Pakistan with history of accidentally petroleum ingestion while doing car engine tuning.

He was experiencing cyanosis since 1 day, vomiting which was 3-4 episodes per day, abdominal pain mainly epigastric and had altered sense of consciousness with 74% oxygen saturation on 15L oxygen. He was newly diagnosed with HCV infection. His blood pressure was 100/60 mm Hg, pulse 76/min & BSR 98 mg/dl.

Suspicion of Aspiration/ Chemical Pneumonitis was made but his chest x-ray appeared to be unremarkable so it was ruled out. Lab reports revealed Hb 15.1, TLC 10.4, PLT 270, Urea 24, Creatinine 1.2, Na 140, K+ 3.7, Cl- 106 and Total Bilirubin 2. No pulmonary edema was found. His ECG and cardiac markers turned out to be normal. Gastric lavage was not attempted.

Diagnosis Co Poisoning was made leading to methemoglobinemia secondary to hydrocarbon inhalation. Carboxy Hemoglobin was measured in arterial blood gases which was 15% (reference value 0-3%) (table 1).

Table 1. ABG's

Time	PH	PCO2	PO2	HCO3	COHb
At Admission	7.14	31.0	226	20.1	15%
After 6 hours	7.387	37.8	94	22.7	9%
Discharge	7.35	36	90	22.1	2%

Therefore he was put on carbon monoxide treatment protocol according to the American College of Emergency Physicians, starting with MgSO₄ injections stat followed by iv third generation cephalosporins,

proton pump inhibitors, steroids & paracetamol infusion. He was supplied with oxygen inhalation at high flow. According to the plan, vitals charting was done, chest physiotherapy and pulmonology consultation was done.

Table 3. American College of Emergency Physicians Clinical Policy on Adult Patients with Carbon Monoxide Poisoning

Critical Questions	Decision	Level of Evidence
Can noninvasive COHb measurements be used to accurately diagnose CO toxicity?	No	Level B
Does HBO therapy as compared with NBO therapy improve long-term neurocognitive outcomes?	Remains unclear	Level B
Can cardiac testing be used to predict morbidity or mortality?	Obtain electrocardiogram and cardiac biomarkers to identify acute myocardial injury, which can predict poor outcomes	Level B

Abbreviations: CO, carbon monoxide; COHb, carboxyhemoglobin HBO, hyperbaric oxygen; NBO, normobaric oxygen.

[2]

He was retained for two days in the hospital, during which he was on the room air for second day. He was found vitally stable on the third day and was discharged.

He was called for followup on day 20 and day 40 for post sequelae but he was found asymptomatic.

DISCUSSION

Hazardous chemicals, whether naturally occurring or man-made, can reach the human body through different routes (such as food, air and water) and cause a variety of health effects.^[1]

Chemical exposure is a major health problem globally. Poison control centers (PCCs) play a leading role both in developed and developing countries in the prevention and control of poisonous chemical exposures. There is a limited capacity for qualitative and analytical toxicology leading to limited surveillance activities to capture toxic risk existing in the community and a deficiency was observed in chemical disaster planning. PCCs in Pakistan need capacity building for specialized training in toxicology, toxicology vigilance, chemical disaster planning, analytical laboratory tests and telephone service for consultation in poisoning cases.^[10] Although Hydrocarbon poisoning may result from Ingestion, most common among children < 5 years which can result in aspiration pneumonia & Inhalation which is most common among adolescents, resulting in ventricular fibrillation, usually without warning symptoms. In this case, the poisoning was due to occupational hazard and accidental ingestion of petrol by a young boy while doing car engine tuning. Diagnosis of pneumonia is by clinical evaluation, chest x-ray, and oximetry. Gastric emptying is contraindicated because aspiration is a risk.

Treatment is Supportive care. charcoal is not recommended. Patients who do not have aspiration pneumonia or other symptoms after 4 to 6 hours are discharged. Patients who have symptoms are admitted and treated supportively.^[11]

In this case patient was treated with MgSO₄ injections stat followed by iv third generation cephalosporins, proton pump inhibitors, steroids & paracetamol infusion. He was supplied with oxygen inhalation at high flow. According to the plan, vitals charting was done, chest physiotherapy and pulmonology consultation was done.

Accidental inhalational poisoning from hydrocarbons is quite common but ingestional poisoning is rare. So it should be kept in mind when patient presents with cyanosis and altered sense of sensorium, followed by repeated ABG's.

CONCLUSION

This type of ingestional poisoning is rare in adults and usually neglected due to poor patient compliance, not attending follow ups during lucid period which can prevent neuropsychiatric sequelae.

REFERENCES

1. <https://www.euro.who.int/en/health-topics/environment-and-health/chemical-safety/data-and-statistics>
2. Adir Y, Bentur Y, Melamed Y: Hyperbaric oxygen for neuropsychiatric sequelae of carbon monoxide poisoning. Harefuah, 1992; 122: 562-3. <https://pubmed.ncbi.nlm.nih.gov/1526579/>
3. Wu, C., Huang, J. & Hsia, S. Acute carbon monoxide poisoning with severe cardiopulmonary

- compromise: a case report. *Cases Journal*, 2009; **2**: 52. <https://doi.org/10.1186/1757-1626-2-52>
4. Can G., Sayili U., Sayman Ö.A, Et all. Mapping of carbon monoxide related death risk in Turkey: a ten-year analysis based on news agency records. *BMC Public Health*, 2019; **19**: 9. <https://pubmed.ncbi.nlm.nih.gov/30606153/>
 5. Byard R.W. Carbon monoxide-the silent killer. *Forensic Sci. Med. Pathol*, 2019; **15**: [1–2]. <https://link.springer.com/article/10.1007/s12024-018-0040-5>
 6. Baselt R.C. 11th ed. Biochemical Publications; Seal Beach. Disposition of Toxic Drugs and Chemicals in Man, 2017.
 7. <http://biomedicalpublications.com/DT11%2DCT.pdf>
 8. Elenhorn M.J. 2nd ed. Williams & Wilkins, Baltimore. Medical Toxicology Diagnosis and Treatment of Human Poisoning, 1997. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6992844/>
 9. Lozano R, Naghavi M, Foreman K, Et all. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study, 2010: 2095–2128. <https://pubmed.ncbi.nlm.nih.gov/23245604/>
 10. Nadeem Ullah Khan, Ricardo Pérez-Núñez, Nudrat Shamim, Et all. Intentional and unintentional poisoning in Pakistan: a pilot study using the Emergency Departments surveillance project. *BMC Emerg Med*, 2015; **15**(Suppl 2): 2. Published online 2015 Dec 11. doi: 10.1186/1471-227X-15-S2-S2
 11. Ullah, Nadeem & Mir, Mohammed & Khan, Et all. The Current State of Poison Control Centers in Pakistan and the Need for Capacity Building. *Asia Pacific journal of medical toxicology*, 2014; **3**: 31-35. <https://pubmed.ncbi.nlm.nih.gov/26985441/>
 12. Gerald F. O'Malley, Rika O'Malley. Hydrocarbon Poisoning, 2020. <https://www.msmanuals.com/professional/injuries-poisoning/poisoning/hydrocarbon-poisoning>