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A CRITICAL REVIEW ON KEROSENE POISONING: HOLISTIC APPROACH

Swati M. Nikam*

Associate Professor, Department of Agadtantra and Vyavahar Ayurved, Shivajirao Pawar Ayurved College and Research Centre, Pachegaon, Newasa, Dist. Ahmednagar.

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***Corresponding Author**
Dr. Swati M. Nikam
Associate Professor, Department of Agadtantra and Vyavahar Ayurved, Shivajirao Pawar Ayurved College and Research Centre, Pachegaon, Newasa, Dist. Ahmednagar.

ABSTRACT

Kerosene poisoning is a common issue in India, often resulting from suicidal or homicidal acts involving ingestion or the pouring of kerosene into the mouth followed by burning clothing. Children are particularly at risk, as they may accidentally consume kerosene, mistaking it for water. Kerosene, also known as paraffin or Kero, is a flammable liquid used in various industries and households worldwide for lighting, heating, and powering devices. It is typically clear and non-viscous. While it can be derived from coal, oil shale, and wood, it is primarily obtained from refined petroleum. With a boiling point between 302ºF and 527ºF, kerosene has low surface tension and remains liquid at room temperature. It is an irritant to the gastrointestinal tract and, if absorbed systemically, can depress the central nervous system. Aspiration of kerosene can be fatal. Due to its low surface tension and high vapor pressure, even small amounts of kerosene entering the respiratory passage can spread throughout the lungs, causing severe pneumonitis. While kerosene is not readily absorbed after ingestion, demulcents should be administered as part of treatment. Gastric lavage is contraindicated due to the risk of aspiration pneumonitis. Treatment for kerosene poisoning is primarily symptomatic. This article will review the major issues associated with kerosene poisoning and discuss treatment strategies.

KEYWORDS: Kerosene poisoning, Toxicology, Agadtantra, Management of Poisoning.

INTRODUCTION

Kerosene is an aliphatic hydrocarbon obtained from the fractional distillation of petroleum. It has low surface tension, low viscosity, and is liquid at room temperature. Typically, pale yellow or colourless, it is odourless with a density of 0.78-0.81g/cm^3.[1]

Soluble in organic solvents, kerosene is the most common cause of accidental poisoning in children who mistake it for water. It irritates the gastrointestinal tract and, if absorbed, depresses the central nervous system. Aspiration into the lungs poses a particular danger.[2]

Due to its low surface tension and high vapor pressure, even small amounts of kerosene entering the respiratory passages can spread throughout the lungs, leading to severe pneumonitis. It is not readily absorbed after ingestion, so demulcents can be used to reduce absorption. Symptoms of poisoning include nausea, vomiting, diarrhoea, pulmonary pneumonitis, and central nervous system depression.[2]

To prevent aspiration into the lungs, gastric lavage should not be attempted in conscious or semi-conscious patients. In unconscious patients, endotracheal intubation should be performed before gastric aspiration and lavage. There is no specific antibiotic for kerosene poisoning, so treatment is primarily symptomatic.[4]

Kerosene poisoning occurs when someone ingests or inhales kerosene, a flammable liquid commonly used as a fuel for lamps, heaters, and stoves. It is also known as paraffin or lamp oil. Kerosene poisoning can result in a range of symptoms and complications, depending on the amount ingested or inhaled and the route of exposure.

Causes of kerosene poisoning

1. **Accidental ingestion:** One of the most common causes of kerosene poisoning, especially in children, is accidental ingestion. Children are particularly at risk due to their curious nature and tendency to explore their surroundings. They may mistake kerosene for water or another beverage due to its colourless or pale-yellow appearance. Accidental ingestion can also occur if kerosene is improperly stored in containers that resemble drinkable liquids, such as water bottles.[5]

2. **Intentional ingestion:** In some cases, individuals may intentionally ingest kerosene as a means of self-harm or harm to others. This can occur in cases of attempted suicide or homicide. Intentional ingestion of kerosene is more common in adults but can also occur

in adolescents and children, especially in cases of intentional poisoning by caregivers or others.

3. **Inhalation:** Inhalation of kerosene vapours can occur in poorly ventilated areas or during activities such as refuelling lamps, heaters, or stoves. Breathing in kerosene vapours can irritate the respiratory tract and lead to symptoms such as coughing, difficulty breathing, and chest pain. Prolonged exposure to high concentrations of kerosene vapours can result in chemical pneumonitis, a serious condition characterized by inflammation of the lungs.[6]

4. **Dermal exposure:** Direct skin contact with kerosene can also lead to poisoning, although this is less common than ingestion or inhalation. Dermal exposure to kerosene can cause skin irritation, redness, and dermatitis. Prolonged or repeated exposure to kerosene on the skin can result in chemical burns.

5. **Environmental exposure:** Environmental factors, such as living in close proximity to areas where kerosene is used or stored, can also contribute to kerosene poisoning. For example, individuals living in households that use kerosene for heating or lighting may be at a higher risk of exposure to kerosene vapours.

6. **Occupational exposure:** Workers in industries where kerosene is used as a fuel or solvent may be at risk of occupational exposure to kerosene. This can occur through inhalation of vapours or dermal contact with kerosene during handling, storage, or use.

7. **Improper Handling and Storage:** Improper handling and storage of kerosene can increase the risk of accidental poisoning. For example, storing kerosene in unlabelled or improperly sealed containers can lead to accidental ingestion or inhalation. Failure to follow safety precautions when refuelling lamps, heaters, or stoves can also result in exposure to kerosene vapours.

Symptoms of kerosene poisoning

1. **Gastrointestinal symptoms**

- **Nausea:** A feeling of discomfort or queasiness in the stomach, often accompanied by an urge to vomit.
- **Vomiting:** The forceful expulsion of stomach contents through the mouth, which can be a reflexive response to ingested kerosene irritating the stomach lining.

- **Abdominal pain:** A dull, sharp, or cramping pain in the abdomen, which may be caused by irritation or inflammation of the gastrointestinal tract.[7]

2. **Respiratory symptoms**

- **Coughing:** A reflex action that helps clear the airways of mucus, irritants, or foreign particles, which may occur in response to inhaling kerosene vapors.
- **Difficulty breathing:** A sensation of tightness in the chest or shortness of breath, which may be caused by irritation or inflammation of the respiratory tract.
- **Chest pain:** A discomfort or pain in the chest area, which may be sharp or dull and can be exacerbated by coughing or breathing deeply.

3. **Neurological symptoms**

- **Dizziness:** A sensation of light-headedness, unsteadiness, or vertigo, which may occur due to the central nervous system depressant effects of kerosene.
- **Confusion:** A state of disorientation or mental fog, which may be accompanied by difficulty concentrating or remembering.
- **Drowsiness:** A feeling of sleepiness or fatigue, which may progress to lethargy or coma in severe cases of poisoning.
- **Coma:** A state of unconsciousness from which the individual cannot be awakened, which is a sign of severe central nervous system depression.[8]

4. **Skin symptoms**

- **Skin Irritation:** Redness, itching, or inflammation of the skin, which may occur with direct contact with kerosene.
- **Dermatitis:** Inflammation of the skin, which may be characterized by redness, swelling, and blistering, and can result from prolonged or repeated exposure to kerosene.

5. **Other symptoms**

- **Irritability:** A state of being easily annoyed or provoked, which may be a behavioural response to the physical discomfort caused by kerosene poisoning.
- **Pneumonitis:** Inflammation of the lung tissue, which can occur if kerosene is aspirated into the lungs and can lead to symptoms such as cough, chest pain, and difficulty breathing.

Complications of kerosene poisoning

1. **Aspiration pneumonitis:** Aspiration of kerosene into the lungs can lead to aspiration pneumonitis, which is inflammation of the lung tissue due to the inhalation of foreign material. This can result in symptoms such as coughing, chest pain, difficulty breathing, and fever. Severe cases of aspiration pneumonitis can cause respiratory failure and require mechanical ventilation.[9]

2. **Chemical pneumonitis:** Inhalation of kerosene vapours can also lead to chemical pneumonitis, which is inflammation of the lung tissue caused by exposure to chemicals. This can result in symptoms similar to aspiration pneumonitis and can lead to respiratory failure if not treated promptly.

3. **Central nervous system depression:** Kerosene is a central nervous system depressant, meaning it can slow down brain activity and lead to symptoms such as dizziness, confusion, drowsiness, and coma. Severe central nervous system depression can be life-threatening and may require intensive care management.

4. **Skin Burns and Irritation:** Direct contact with kerosene can cause chemical burns and irritation to the skin. Prolonged or repeated exposure to kerosene can lead to dermatitis, which is inflammation of the skin characterized by redness, itching, and blistering.[10]

5. **Gastrointestinal complications:** Ingestion of kerosene can irritate the gastrointestinal tract and lead to symptoms such as nausea, vomiting, abdominal pain, and diarrhoea. In severe cases, kerosene ingestion can cause gastrointestinal bleeding and perforation, which require immediate medical attention.[11]

6. **Systemic toxicity:** Ingestion or inhalation of large amounts of kerosene can lead to systemic toxicity, where the chemical affects multiple organ systems in the body. This can result in organ damage and failure, especially in the liver and kidneys.[12]

7. **Long-Term health effects:** Chronic exposure to kerosene, especially through inhalation, can lead to long-term health effects such as chronic respiratory problems, neurological disorders, and increased risk of cancer.[13]

Treatment of kerosene poisoning[14]

1. **Symptomatic treatment:** Treatment is primarily supportive and aimed at managing symptoms. This may include intravenous fluids to maintain hydration, antiemetics to control nausea and vomiting, and oxygen therapy for respiratory symptoms.

2. **Prevention of aspiration:** In cases of suspected aspiration, supportive care to maintain a clear airway and adequate oxygenation is crucial. Endotracheal intubation may be necessary in severe cases.

3. **Monitoring:** Close monitoring of vital signs, fluid balance, and neurological status is essential in managing kerosene poisoning.

Prevention of kerosene poisoning[15]

1. Store kerosene and similar products out of reach of children in a secure location.
2. Use child-resistant packaging for kerosene containers.
3. Educate caregivers and children about the dangers of kerosene ingestion and inhalation.
4. Ensure proper ventilation when using kerosene indoors.

CONCLUSION

Kerosene poisoning can result in serious complications and requires prompt medical attention. Prevention through proper storage and handling of kerosene is key to avoiding accidental poisoning, especially in children.

REFERENCES

1. Gummin DD. Hydrocarbons. In: Adams JG, ed. *Emergency Medicine*. Philadelphia, PA: Elsevier, 2013; 2: 152.
2. Nelson LS. Acute poisoning. In: Goldman L, Schafer AI, eds. *Goldman-Cecil Medicine.* Philadelphia, PA: Elsevier, 2020; 102.
3. Theobald JL, Kostic MA. Poisoning. In: Kliegman RM, St. Geme JW, Blum NJ, Shah SS, Tasker RC, Wilson KM, eds. *Nelson Textbook of Pediatrics*. Philadelphia, PA: Elsevier; 2020; 21: 77.
4. Wang GS, Buchanan JA. Hydrocarbons. In: Walls RM, Hockberger RS, Gausche-Hill M, eds. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. Philadelphia, PA: Elsevier; 2018; 9.

5. Gautam Biswas, Review of Forensic Medicine and Toxicology, Fourth Edition, Jaypee Brothers Medical Publishers, 2019; P- 637.
6. Gautam Biswas, Review of Forensic Medicine and Toxicology, Fourth Edition, Jaypee Brothers Medical Publishers, 2019; P- 637,638.
7. Henry Mathew/Alexander A.H. Lawson, Treatment of Common Acute Poisoning, Fourth Edition, Churchill Livingstone Edinburgh London and New York, 1979; p-75.
8. Gautam Biswas, Review of Forensic Medicine and Toxicology, Fourth Edition, Jaypee Brothers Medical Publishers, 2019; P- 637.
9. Krishan Vij, Textbook of Forensic Medicine and Toxicology Principles and Practice, Sixth Edition, Elsevier, A division of Reed Elsevier India Private Limited, 2014; P- 516.
10. Gautam Biswas, Review of Forensic Medicine and Toxicology, Fourth Edition, Jaypee Brothers Medical Publishers, 2019; P-637.
11. Krishan Vij, Textbook of Forensic Medicine and Toxicology Principles and Practice, Sixth Edition, Elsevier, A division of Reed Elsevier India Private Limited, 2014; P-516.
12. Prof CK Parikh, Parikh'S Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology, Seventh Edition, CBS Publishers & Distributors Pvt Ltd New Delhi, 2016; P-623.
13. Gautam Biswas, Review of Forensic Medicine and Toxicology, Fourth Edition, Jaypee Brothers Medical Publishers, 2019; P- 637.
14. Gautam Biswas, Review of Forensic Medicine and Toxicology, Fourth Edition, Jaypee Brothers Medical Publishers, 2019; P-637.
15. Krishan Vij, Textbook of Forensic Medicine and Toxicology Principles and Practice, Sixth Edition, Elsevier, A division of Reed Elsevier India Private Limited, 2014; P-516.