Pyopneumothorax following suicidal kerosene ingestion

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SUMMARY

Liquid hydrocarbons derived from petroleum are widely used in household and industry. Many hydrocarbons in kerosene, such as hexane, naphthalene, octane and phenanthrene, are toxic to humans. Pulmonary toxicity is the major cause of morbidity and mortality followed by central nervous-system and cardiovascular complications.¹ As kerosene is a mixture of chemicals, there is no definitive absorption, distribution, metabolism and excretion. The major route of exposure is by inhalation of liquid (aspiration). Kerosene vapours may be mildly irritating to the respiratory system and spray applications of kerosene may provoke signs of pulmonary irritation such as coughing and dyspnoea. Kerosene aspiration leads to inflammation and loss of surfactant. Secondary effects in the lungs include pneumothorax, pneumatocele or bronchopleural fistula. Here, we are presenting a case of pyopneumothorax after kerosene consumption.

BACKGROUND

Complications of kerosene poisoning include aspiration pneumonitis, pneumothorax and pleural effusion. Although incidence of hydrocarbon pneumonitis has decreased, it still remains a problem in developing countries such as India. Till now, hydro-pneumothorax has not been reported as a possible complication of kerosene poisoning; henceforth, we are reporting this case.

CASE PRESENTATION

A 22-year-old non-smoker woman, with an alleged history of about 100 ml kerosene ingestion, 1 day back, presented to the emergency department, with chief complaints of progressive breathlessness and non-productive cough since kerosene ingestion.

On initial examination, the patient was dehydrated, anaemic with a respiratory rate of 34/min and oxygen saturation of 90%. Her blood pressure was 112/80 mm Hg and pulse rate was 110/min. Chest movement was equal on both sides. Trachea was central and apex beat in fifth intercostal space medial to the mid-clavicular line. On auscultation, bilateral coarse crepitations were present. Evaluation of rest of the systems was within normal limits. Chest skiagram showed bilateral homogeneous opacities which was suggestive of bilateral mid-zone and lower-zone consolidation (figure 1).

A provisional diagnosis of bilateral chemical pneumonitis was made and the patient was managed conservatively on antibiotics and oxygen supplementation. The patient was discharged after 7 days in a satisfactory condition. Four days after discharge, the patient again came to us with complaints of sudden onset right-sided chest pain with increased

breathlessness and cough. On examination, chest movement was decreased on right side with decreased breath sounds on right. Chest x-ray postero-anterior view was performed which showed right-sided air fluid level suggestive of hydropneumothorax (figure 2).

INVESTIGATIONS

Diagnostic thoracentesis revealed turbid yellow fluid on gross appearance. Pleural fluid examination showed total cells, 1840/mm³, differential counts, polymorphs, 75%; lymphocytes, 25%; protein, 5.36 g/dl; sugar, 56 g/dl, Gram stain, negative; acid-fast bacteria stain, negative and adenosine deaminase, 75.4. Culture of pleura was sterile after 24 h of incubation.

TREATMENT

Intercostal tube drainage was carried out (figure 3).

OUTCOME AND FOLLOW-UP

Pyopneumothorax did not respond completely after 2 weeks, hence was referred to surgery for further management.

DISCUSSION

Kerosene is a mixture of chemicals produced from the distillation of crude oil. It is a major component of aviation fuels and used extensively for cooking, heating, lighting and as a solvent. Accidental kerosene poisoning is common in childhood mostly in those aged 5 years or below. Suicidal poisoning is also common due to easy availability of fuel especially in low socioeconomic areas. Like most chemicals the amount of kerosene exposed to, must be above a certain level to cause adverse health effects. Breathing large quantities of kerosene vapours or drinking kerosene-based liquids may cause non-specific signs such as dizziness, headache and vomiting. A short, one-off exposure to kerosene is unlikely to result in any long-term effects. However, a severe form of lung injury called pneumonitis may occur, if liquid kerosene is inhaled directly into the lungs, for example, while manually siphoning a tank or from inhaling vomit after swallowing kerosene. Type II pneumocytes are the most affected resulting in decreased surfactant production. This decrease in surfactant results in alveolar collapse, ventilation-perfusion mismatch and hypoxaemia. Loss of epithelial integrity permits air to enter the interstitium, causing pulmonary interstitial emphysema. Persistent elevated transpulmonary pressure facilitates the dissection of air towards the visceral pleura or hilum via the peribronchial and perivascular spaces. Rupture of the pleural surface allows the adventitial air to decompress into the pleural space

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Figure 1 Chest x-ray showing bilateral homogeneous opacities.

causing pneumothorax. While kerosene vapours may be mildly irritating to the respiratory system,² exposure is not likely to be fatal³ as the low volatility of kerosene⁴ limits air concentrations to below 100 mg m^{-3} ,⁵ which is the approximate NOAEL (no observable adverse effect level) in several animal species.³ However, whereas exposure within a confined space at elevated temperature may induce narcotic effects, such as narcolepsy, catalepsy and confusion,^{2,6} spray applications may result in exposure to high concentrations of kerosene aerosol⁷ which may provoke signs of pulmonary irritation such as coughing and dyspnoea,⁶ in addition to mild central nervous system depression.

Inhalation of water contaminated with kerosene may occur when swimming or as a result of near-drowning incidents and has been associated with 'exogenous lipid pneumonia'.⁸ Aspiration of kerosene-contaminated vomitus is a secondary source of pulmonary exposure that may lead to chemical pneumonitis.⁹ Management of pneumonitis includes supportive care

Figure 2 Chest x-ray postero-anterior view showed right-sided air fluid level.

Figure 3 Postintercostal tube drainage chest x-ray.

with oxygen inhalation and antibiotics. Steroids may be effective in necrotising pneumonitis.

Learning points

- ▶ The most frequent adverse effect of any hydrocarbon poisoning is due to aspiration.
- ▶ Chemical pneumonitis can result from direct injury to the lung parenchyma and is usually interstitial and bilateral.
- ▶ Type II pneumocytes are the most affected resulting in decreased surfactant production resulting in alveolar collapse, ventilation-perfusion mismatch and hypoxaemia.
- ▶ Symptoms and radiological findings resolve rapidly after cessation of exposure and corticosteroid therapy.
- ▶ Rare pulmonary complications include the development of a pneumothorax, pneumatocele or bronchopleural fistula.

Competing interests None.

Patient consent Obtained.

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