Lung abscess rather than pneumatocele following kerosene ingestion

Introduction

Accidental kerosene ingestion or poisoning is a well-recognized problem. Children are at higher risk especially when kerosene oil is easily available. This is particularly in rural areas in Malaysia and the Far East where it is commonly used for cooking and lighting. Kerosene is a low viscosity liquid hydrocarbon and the main toxicity is its potential to cause pneumonitis when aspirated (Ratageri and Shepur, 2005). There have been few reported cases of lung empyema following kerosene poisoning (Annobil and Ogunbiyi, 1991), while more than 40 cases of pneumatoceles following hydrocarbon aspiration or poisoning have been reported (Bergeson et al, 1975; Harris and Brown, 1975; Stones et al, 1987; Bray et al, 1998; Thalhammer et al, 2005). Other complications of kerosene poisoning include CNS impairment such as drowsiness, irritability, convulsion and stupor, and gastrointestinal disturbance such as vomiting.

The authors reviewed the literature and noticed reported cases of lung abscess as a complication of accidental kerosene ingestion are scarce in comparison to the occurrence of pneumatoceles.

Discussion

Kerosene is a low viscosity liquid hydrocarbon obtained from fractional distillation of petroleum at 150–250°C. The tendency of a hydrocarbon to cause pneumonitis is inversely proportional to its viscosity. Being a low viscosity hydrocarbon, small quantities of kerosene will spread rapidly across a surface and cover a large area of the lung when aspirated. The pulmonary lesions are caused not by gastrointestinal absorption but by aspiration of the kerosene (Harris and Brown, 1975; Thalhammer et al, 2005).

The common presenting symptoms when aspirated were cough (70.6%), tachypnoea (59.6%) and fever (55.1%) (Abu Ekteish, 2002). The main areas in which kerosene was being stored when accidental consumption occurred were under the stairs (36.7%), in the kitchen (33.4%) and in the bathroom (11.7%). The main containers used for kerosene storage were soft drink bottles, water jugs and water glasses (Abu Ekteish, 2002). In the present case the predominant symptoms were tachy-pnoea and fever, which

Figure 1. Chest X-ray taken on admission did not show any abnormality.

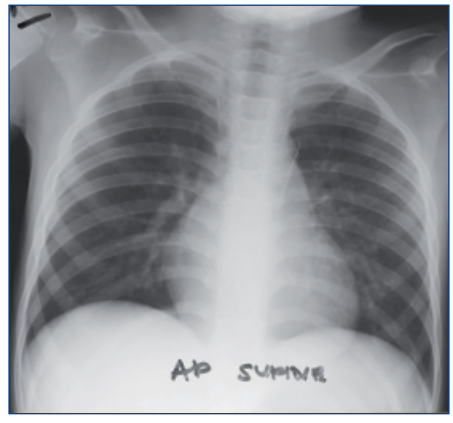
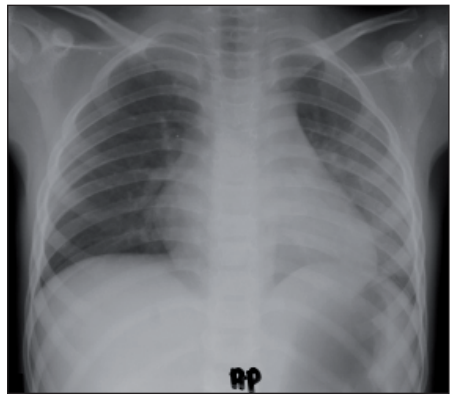


Figure 2. Chest X-ray taken after the patient became febrile and more tachypnoeic showed haziness at the middle and lower zones of the left lung including at the retrocardiac region, suggestive of pneumonitis.



Case Report

A 5-year-old Malay boy was admitted to the authors' hospital for accidental kerosene oil ingestion with possible aspiration. He accidentally ingested kerosene oil which had been kept in a mineral water bottle but the amount ingested was not known. He then had several episodes of vomiting and subsequently became tachypnoeic. There was no history of seizures.

On physical examination, he was conscious but tachypnoeic with a respiratory rate of 50 per minute. There was a smell of kerosene from his mouth. He was afebrile and other vital signs were normal. His oxygen saturation ranged from 97% to 99%. Respiratory system examination did not show other abnormalities. Examination of other systems was unremarkable.

His chest radiograph on admission (*Figure 1*) showed no abnormal findings. He was observed in the ward and managed conservatively. He became more tachypnoeic and developed a high grade fever of about 39°C 12 hours after admission. His repeated chest radiograph (*Figure 2*) suggested pneumonitis of the left lung. Intravenous cefuroxime was instituted.

He showed clinical improvement and was asymptomatic 1 week later. However, a chest radiograph taken before discharge (*Figure 3*) showed a thick wall cavity approximately 3 x 2.5 cm in size with evidence of air–fluid level in the left lower lobe. Computed tomography of the thorax (*Figure 4*) showed that only one cavity was present. This was presumed to be a partially treated lung abscess and intravenous ceftriaxone was commenced. He completed 2 weeks of intravenous ceftriaxone and a further 2 weeks of oral cefuroxime. He responded well to the antibiotics and a chest radiograph taken on follow-up about 5 months later showed the cavity in the left lower lobe had completely resolved.

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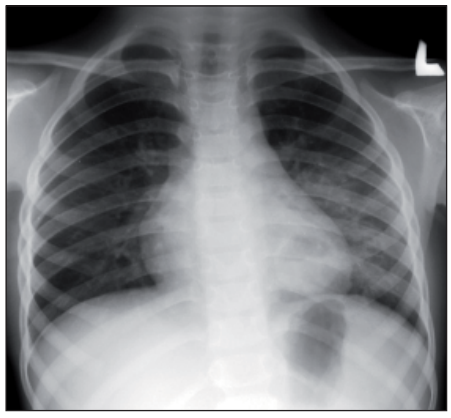

Figure 3. The chest X-ray taken when the patient was asymptomatic revealed a relatively thick walled cavity with air–fluid level in the left lower lobe, which suggest a lung abscess.

Figure 4. Computed tomography of the thorax demonstrated the abscess cavity in the left lower lobe. No other cavity was identified in the rest of the lung fields.

developed 12 hours later. The kerosene oil was kept in a mineral water bottle.

As mentioned earlier, the reported cases of lung abscess complicating accidental kerosene ingestion are scarce compared to the occurrence of pneumatoceles. Radiologically, lung abscess is different from pneumatocele. The former has a thick-walled cavity and air–fluid level is usually seen as shown in the current case, whereas pneumatocele is a thin-walled air-filled cavity. There are no pathognomonic chest X-ray appearances following kerosene aspiration.

The incidence of pneumonia was greatest with kerosene than other types of hydrocarbon aspiration but it was the least severe (Harris and Brown, 1975). Aspiration pneumonitis following kerosene ingestion causes surfactant deficiency. It will cause airway collapse and respiratory failure.

Kerosene oil, which pools into the affected lobe of the lung, causes local chemical irritation and destruction of lung parenchyma by inflammatory cells. Pneumatocele is then formed from the portion of the lung which has undergone necrosis. The development of a ball-valve mechanism in the part of the lung that was destroyed resulted in progressive accumulation of air (Harris and Brown, 1975; Bray et al, 1998). Pneumatocele usually appeared late, i.e. during or after clearing of the consolidation, with the average appearance time of 9.5 days after the ingestion of kerosene (Harris and Brown, 1975). In this case, a lung abscess was detected about 9 days later, which completely resolved within 5 months following appropriate antibiotic treatment.

The abscess cavity was located in the medial segment of the left lower lobe. This is a common location for pneumatoceles as shown in previous reports, in the lower lobes (Stones et al, 1987; Thalhammer et al, 2005) and usually in the medial segment (Stones et al, 1987). It is possible in this case that a pneumatocele had developed but then turned into an abscess cavity following a secondary infection.

Prophylactic antibiotics are not recommended for prevention of hydrocarbon pneumonitis (Thalhammer et al, 2005). Antibiotics are only indicated when there are signs of secondary bacterial infection as in this case.

Conclusions

Accidental kerosene ingestion is a common cause of acute hydrocarbon poisoning in children. It causes significant morbidity to the child and commonly involves the respiratory system as a result of aspiration. Pneumatocele is a known complication of accidental kerosene ingestion in children. If secondary infection occurs, a lung abscess may develop. It is possible that in this case there was secondary infection of a pneumatocele, which could have occurred following the pneumonitis, and later progressed to an abscess cavity. Clinicians need to be aware of this complication as its development can be delayed and by this time the child may be asymptomatic and discharged without appropriate continuation of antibiotic. Most importantly health education and preventive measures need to be emphasized to protect children from this preventable domestic injury. **BJHM**

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