
CASE REPORT

Fire-eater Pneumonitis: Silent Aspiration and Spontaneous Resolution

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ABSTRACT

A 15-year-old street entertainer inadvertently and unknowingly aspirated a small volume of liquid hydrocarbon fuel during a fire breathing performance. Two days later, he developed pleuritic chest pain, fever, and vomiting. A chest radiograph revealed airspace consolidation, which later developed into a cavitating lesion consistent with exogenous lipid pneumonitis. Full recovery with spontaneous resolution of the radiological changes occurred after 6 weeks.

Key Words: Inhalation exposure; Mineral oil; Pneumonia, lipid

INTRODUCTION

This report is of a fire-eater with an exogenous lipid pneumonitis, which spontaneously resolved. The initial aspiration occurred unbeknownst to the patient and the condition remained undiagnosed until the clinical history was revealed to the treating physician. Other common household substances can also be unknowingly aspirated and cause similar pathology.

CASE REPORT

A 15-year-old male street entertainer presented to his local doctor in 2005 with worsening right-sided pleuritic chest pain, mild fever, and vomiting. He had a history of mild asthma. An initial chest radiograph demonstrated a patchy area of opacity in the right lower zone (Figure 1). He commenced a course of oral antibiotics after a provisional diagnosis of community-acquired pneumonia was made.

One week later, his symptoms had resolved, but a follow-up chest radiograph revealed a cavitating lesion with an air-fluid level within the right lower zone (Figure 2). The patient was immediately referred to a respiratory physician. Computed tomography (CT) of the chest

confirmed a 3- x 7-cm irregular thick-walled cavity within the right middle lobe (Figure 3).

The physician learnt that the patient participated in semi-professional performances of fire-breathing and surmised that he had inadvertently aspirated a small amount of paraffin oil during a flame-blowing event with no immediate adverse symptoms. The symptoms of fever and pleuritic chest pain started 2 days later.

A diagnosis of fire-eater pneumonitis was made and no active treatment was pursued. A follow-up chest CT performed 6 weeks later demonstrated near complete resolution of the cavitating abnormality in the right middle lobe (Figure 4).

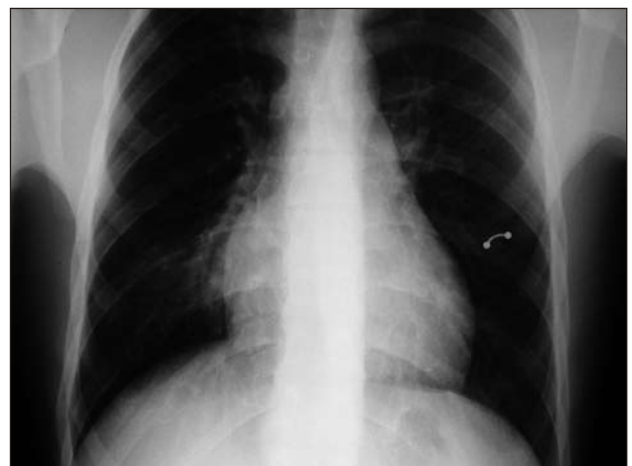


Figure 1. Initial chest radiograph showing an ill-defined air space opacity in the right lower zone.

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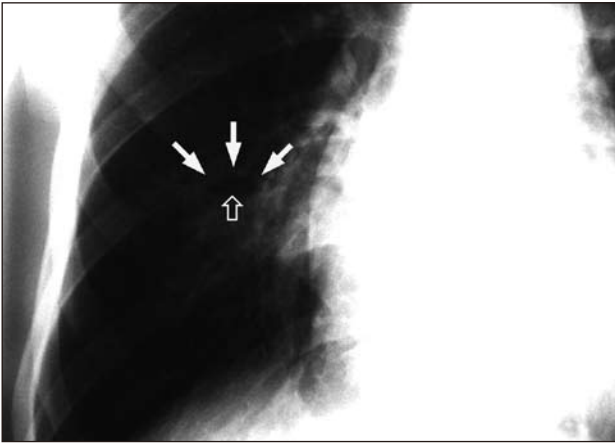


Figure 2. Magnified view of the right lower zone of the follow-up chest radiograph after 1 week showing a cavitating lesion (closed arrows) with an air-fluid level (open arrow) in the same region.

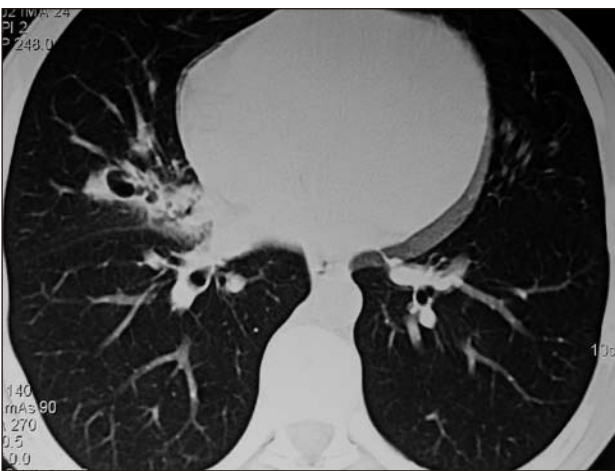


Figure 3. Axial computed tomography scan confirmed the presence of an area of consolidation in the right middle lobe with a pneumatocele measuring 3 x 7 cm.

DISCUSSION

An exogenous lipid pneumonitis is an inflammatory pulmonary syndrome secondary to aspiration of a liquid hydrocarbon. In these uncommon instances of fuel aspiration during attempted fire-blowing performances, the performer would be aware of the initial aspiration if the amount was substantial or, as for this patient, unaware if the amount was small. Thus, the clinical history would be essential for determining the radiological differential diagnosis.

Although the condition is also widely known as ‘fire-eater’ pneumonitis, this cause is relatively uncommon as various oil-based household products are more often implicated. These substances can glide down the respiratory tract without stimulating the cough reflex, resulting in situations in which the offending agent is not apparent. Exogenous lipid pneumonitis is usually

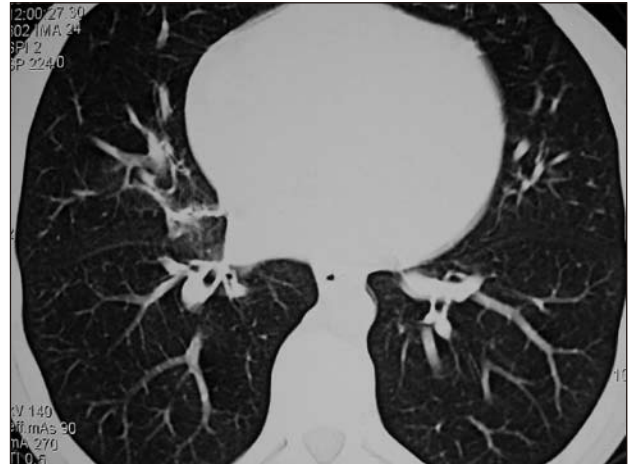


Figure 4. Axial computed tomography scan demonstrated spontaneous resolution of the right middle lobe lesion after 6 weeks.

caused by accidental poisoning in children or aspiration of mineral oil-based laxatives.^{1,2} However, this condition has occurred secondary to regular facial or nasal application of petrolatum jelly such as Vaseline™ or Vicks Vaporub™.^{3,4} Similarly, cod liver oil capsules, oil-based eye drops, and even lip gloss have been implicated in this condition, which may be readily reversed with cessation of use of the offending agent.⁵⁻⁷

The clinical presentation can mimic a chest infection, the commonest symptoms being cough, dyspnoea and fever.⁸ However, patients may remain asymptomatic.

After aspiration, the lipid is emulsified in the alveoli by lung lipase and, subsequently, phagocytosed by macrophages. A granulomatous foreign body reaction then results in cavitation, which is due to pneumatoceles secondary to bronchial wall thickening and distal air trapping.⁴ If chronic, the fibrosis may also wall-off coalesced pools of lipid droplets creating tumour-like masses appropriately termed ‘paraffinomas’.⁹ Pathological confirmation of the diagnosis is achieved via identification of lipid-laden alveolar macrophages on sputum analysis or bronchoalveolar lavage.

There is no characteristic radiographic pattern in the acute stage, and the presentation may be similar to infection. Findings include patchy airspace consolidation with a predilection for the lower lobes. In the subacute stage, pneumatoceles often develop. Internal fat attenuation values on CT and T1 hyperintensity on magnetic resonance imaging may also be useful to detect the presence of lipid material.¹⁰ In the chronic setting, the paraffinomas manifest as ill-defined nodular opacities mimicking tumours.⁸ A ‘crazy-paving’ pattern can also

be seen on thin-section lung CT due to intra-alveolar and interstitial accumulation of lipid-laden macrophages and hyperplasia of type 2 pneumocytes lining the alveoli.¹¹

Treatment is as simple as ceasing to use the causative agent, whereby spontaneous resolution of both the symptoms and radiographic changes occurs over a period of weeks to months. The routine use of corticosteroids and antibiotics is controversial and is generally reserved for severe conditions.¹²

Fire-eater pneumonitis is an exogenous lipid pneumonitis caused by aspiration of liquid hydrocarbon. It is not often due to fire-eating related causes and, in such instances, the performer may be unaware of the causative aspiration. Exogenous lipid pneumonitis can also be caused by unknowing aspiration of various lipid-containing agents, including common household personal care products. Therefore, obtaining an appropriate clinical history is vital.

It is important to recognise exogenous lipid pneumonitis, regardless of the causative agent, as the condition is readily reversible without active treatment by stopping use of the offending substance. Reversion of the condition occurs despite an apparent worsening of the radiological appearance, which may lag behind clinical improvement, as shown by this patient. These characteristics distinguish

exogenous lipid pneumonitis from other forms of the disease.

REFERENCES

1. Franquet T, Gimenez A, Roson N, Torrubia S, Sabate JM, Perez C. Aspiration diseases: findings, pitfalls, and differential diagnosis. *Radiographics*. 2000;20:673-85.
2. Wright BA, Jeffrey PH. Lipoid pneumonia. *Semin Respir Infect*. 1990;5:314-21.
3. Cohen M, Galbut B, Kerdel F. Exogenous lipid pneumonia caused by facial application of petrolatum. *J Am Acad Dermatol*. 2003;49:1128-30.
4. Brown A, Slocum P, Putthoff S, Wallace W, Foresman B. Exogenous lipid pneumonia due to nasal application of petroleum jelly. *Chest*. 1994;105:968-9.
5. Dawson JK, Abernethy VE, Graham DR, Lynch MP. A woman who took cod-liver oil and smoked. *Lancet*. 1996;347:1804.
6. Prakash U, Rosenow E. Pulmonary complications from ophthalmic preparations. *Mayo Clin Proc*. 1990;65:521-9.
7. Becton DL, Lowe JE, Falletta JM. Lipoid pneumonia in an adolescent girl secondary to the use of lip gloss. *J Pediatr*. 1984;105:421-3.
8. Gondouin A, Manzoni P, Ranfaing E, et al. Exogenous lipid pneumonia: a retrospective multicentre study of 44 cases in France. *Eur Respir J*. 1996;9:1463-9.
9. Sundberg RH, Kirschner KE, Brown MJ. Evaluation of lipid pneumonia. *Chest*. 1959;36:594-601.
10. Kukafka DS, Kaplan MA, Criner GJ. A 77-year-old man with a lung mass. *Chest*. 1997;111:1439-41.
11. Franquet T, Giménez A, Bordes R, Rodríguez-Arias JM, Castella J. The crazy-paving pattern in exogenous lipid pneumonia: CT-pathologic correlation. *AJR Am J Roentgenol*. 1998;170:315-7.
12. Gentina T, Tillie-Leblond I, Birolleau S, et al. Fire-eater's lung: seventeen cases and review of the literature. *Medicine (Baltimore)*. 2001;80:291-7.