



Received: 2014.08.12
Accepted: 2014.09.05
Published: 2015.01.10

Authors' Contribution:

- A** Study Design
- B** Data Collection
- C** Statistical Analysis
- D** Data Interpretation
- E** Manuscript Preparation
- F** Literature Search
- G** Funds Collection

Case Report of Fire Eater's Pneumonia in Adolescent Female Patient – Evolution of Radiologic Findings

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Summary	
Background:	We present a case of a 16-year-old girl with fire-eater's pneumonia (hydrocarbon pneumonitis). The goal of this report was to assess evolution of radiological findings.
Case Report:	The reported case was unique because that was the first completely described case of fire-eater's pneumonia reported in an under-aged person. Moreover, this disease is very rare even in adults and only a few scientific reports can be found, mostly because of a small occupational group.
Conclusions:	The aim of this report was to show that the problem of fire-eater's pneumonia can occur in under-aged patients and should be taken into consideration in case of severe pneumonia. Another objective was to point out that chest radiograph is not sufficient to depict the evolution of radiological manifestations.
MeSH Keywords:	Pediatrics • Pneumonia, Lipid • Tomography, Spiral Computed
PDF file:	http://www.polradiol.com/abstract/index/idArt/892227

Background

Lipoid pneumonia in terms of the source of inflammation can be divided into two types: exogenous and endogenous. Endogenous lipoid pneumonia (cholesterol pneumonia, golden pneumonia) occurs as a complication of a cancer, chronic pneumonia, etc. [1]. Chronic diseases damage tissues and cells, which release lipids after death. Lipid accumulation activates alveolar macrophages that consume them. Fire-eater's pneumonia also known as hydrocarbon pneumonitis or diesel siphoner's lung is a form of exogenous lipoid pneumonia. Although the first case of the lipoid pneumonia was described almost a century ago [2], this term is still poorly known and underdiagnosed. It was reported that lipoid pneumonia (both exogenous and endogenous) was present in 1.0–2.5% of all autopsy studies, where the exogenous one was more frequent [1,3]. Fire-eater's pneumonia is an acute condition resulting from unintentional aspiration of massive amounts of liquid hydrocarbons (e.g. paraffin, petroleum, turpentine) during the act of fire eating [4]. Characteristic clinical symptoms are cough, dyspnea, chest pain and fever. Perihilar consolidations, smooth circumscribed nodules, and pneumatoceles

(well-defined cavitory nodules), are frequently observed on chest radiography and computer tomography [5,6]. Fire-eating performers constitute a small occupational group and therefore there are only several dozen of cases in adult patients reported on so far and only one in under-aged male patients [7]. Unfortunately, that report does not include any follow-up and shows only radiological manifestations presented on admission.

Case report

A 16-year-old female patient with a history of asthma was admitted to hospital with a fever of 40 degrees Celsius, persistent cough and a chest pain. The examination revealed wheezes and coarse rales over the lungs – mostly on the right side. Lab tests were performed: white blood cell count $27.5 \times 10^9/L$, C-reactive protein 12.2 mg/dL and erythrocyte sedimentation rate 34 mm/h. Chest radiograph showed heterogeneous congestion of the lungs (Figure 1). Treatment with antibiotics, analgesics, and hydration was instituted but the condition of the patient over the following 7 days worsened and that was a reason for her transfer to the Pediatric Clinic of Cardiology and Allergology

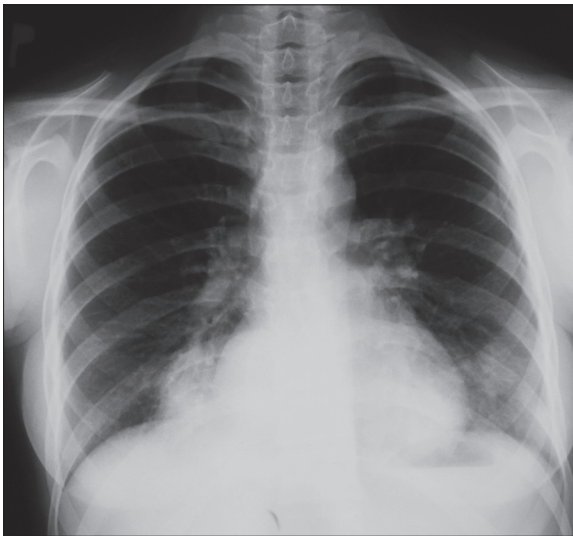


Figure 1. Initial X-ray reveals heterogeneous congestion of both lungs, mostly in the lower right lobe.

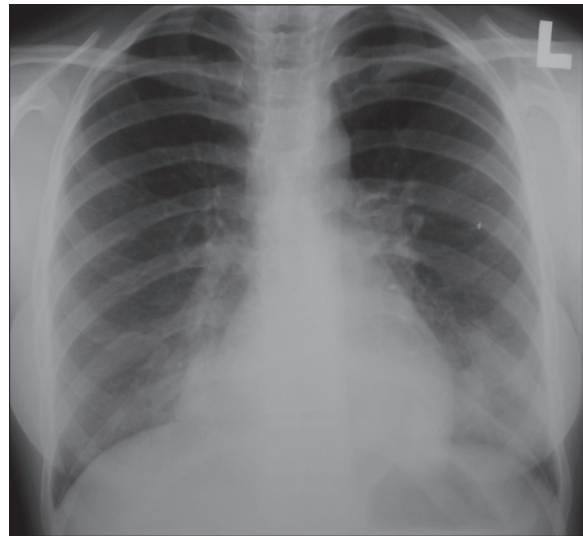


Figure 2. Control X-ray: multifocal inflammatory and atelectatic areas are seen in the right lobe which was defined as progression of pathological changes. Similar changes are also present in the left lower lobe.

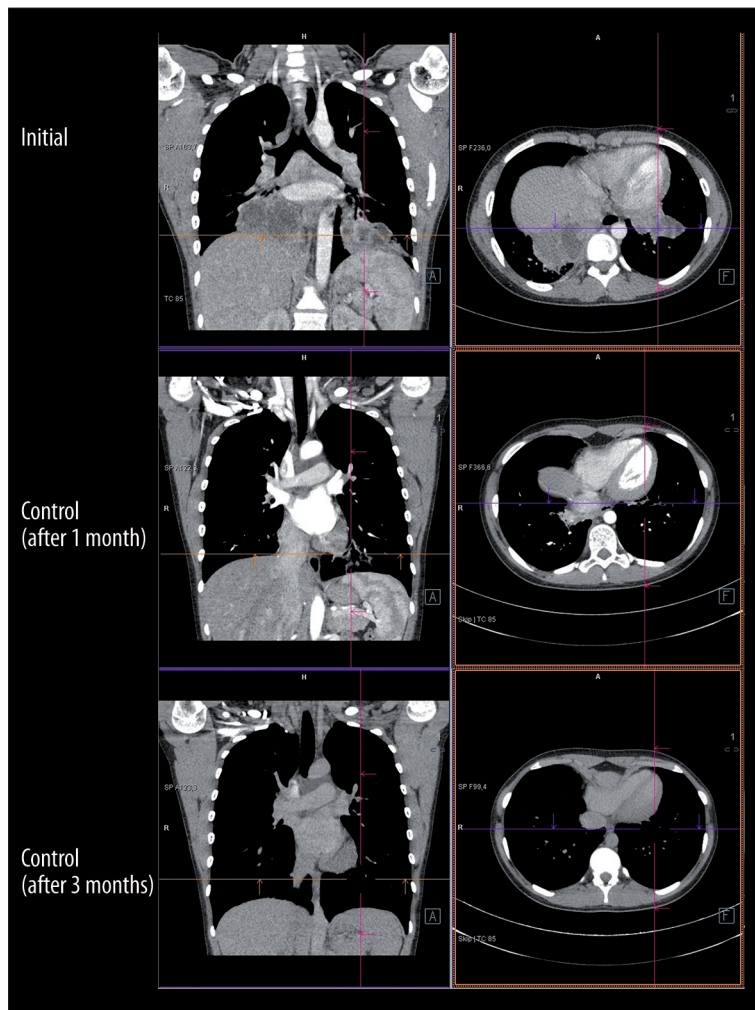


Figure 3. CT. Initial examination shows massive hypodense, irregular area of lung tissue consolidation in the basal lobes of the right and left lung. After 1 month a control scan revealed almost complete regression of radiological findings in the lungs. The last scan after 3 months showed only pleural parenchymal scarring and no other findings.

for further treatment. In a carefully-taken history, the patient admitted that she had been a fire-eater for the last

3 years and during the last performance aspiration of large amounts of petroleum occurred. An immediately performed

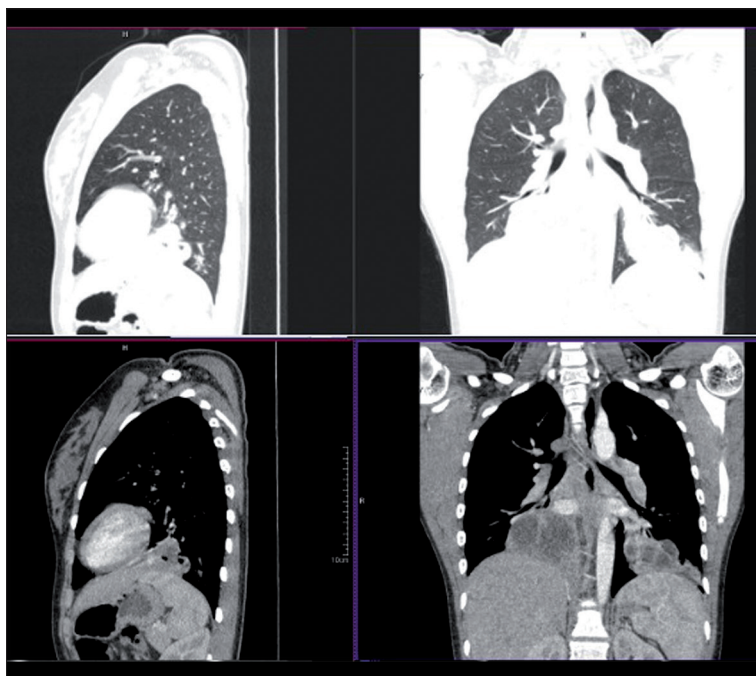


Figure 4. CT scans – consolidations in the basal lobes of both lungs in the pulmonary and mediastinal window.

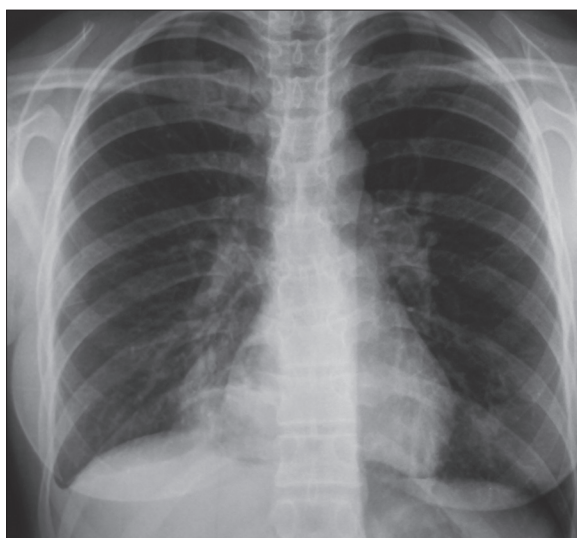


Figure 5. Control X-ray shows partial regression of inflammatory lesions in both lungs.

chest radiograph showed multifocal inflammatory lesions in both lungs, and atelectatic areas in the right one which was defined as progression of pathological changes compared to the previous examination (Figure 2). After 2 days HRCT of the chest was performed. It showed a massive hypodense, irregular area of lung tissue consolidation in the basal lobes of the right lung (Figures 3 and 4). Within that lesion small amounts of air were visible. Smaller lesions of the same kind were located in the basal segments of the left lung. Moreover, a small amount of pleural effusion and a small cavity between segment 4 and 5 of the left lung were found. Those radiological findings were also reported on by other authors and are considered to be typical [7–9]. The same day bronchoscopy was performed. It showed massive inflammation of airway mucosa and presence of lipid-laden macrophages in bronchoalveolar lavage

fluid. During the procedure purulent secretion from segmental bronchi was siphoned off. Because of further aggravation of patient's condition (severe dyspnea and respiratory failure) she was transferred to Intensive Care Unit. Surgical intervention was taken into consideration due to the risk of lung abscesses, but on the basis of radiological examinations, a decision on conservatory treatment was undertaken.

The next chest radiograph showed partial regression of inflammatory lesions in both lungs (Figure 5). Also the general condition of the patient started to improve. A control chest HRCT revealed almost complete regression of radiological findings (Figure 3). Only residual area of lung tissue consolidation in the 6th segment of the right lung and bilateral pleural parenchymal scarring in basal segments were displayed. The patient was discharged and a follow-up HRCT in 3 months was recommended. It showed only pleural parenchymal scarring and no other findings (Figure 3).

Discussion

Fire-eater's pneumonia is a rare condition with characteristic evolution of radiological findings: massive lesions in the lower and middle lobes and their almost complete regression within the space of time (resolution of opacities is variable and usually occurs within 2 weeks to 8 months) [8]. Radiological methods play a major role in diagnostics and therapy. Doctors dealing with adolescent patients should consider fire-eater's pneumonia in the differential diagnosis in case of severe pneumonitis, because more and more under-aged people are trying to perform fire-eating. A precise and careful patient history should always be taken. There are no treatment guidelines, and different drugs are administered. It is possible that patients would get better even without any treatment. Kadakal et al. described a case of a 28-year-old fire-eater in 2010. The patient rejected the treatment regimen and, although he only used analgesics,

both clinical and radiological improvements were observed. There was complete regression of cystic-cavitary lesions in a CT scan after a 4-month follow-up. Resolution was complete, although minimal scarring occurred [9].

References:

1. Baron SE, Haramati LB, Rivera VT: Radiological and clinical findings in acute and chronic exogenous lipoid pneumonia. *J Thorac Imaging*, 2003; 18: 217–24
2. Laughlen GF: Studies on pneumonia following naso-pharyngeal injections of oil. *Am J Pathol*, 1925; 1: 407–14.1
3. H adda V, Khilmani GC: Lipoid pneumonia: An overview. *Expert Rev Respir Med*, 2010; 4: 799–807
4. Brander PE, Taskinen E, Stenius-Aarniala B: Fire eater’s lung. *Eur Respir J*, 1992; 5: 112–14
5. Burkhardt O, Merker HJ, Shakibaei M, Lode H: Electron microscopic findings in BAL of a fire-eater after petroleum aspiration. *Chest*, 2003; 124: 398–400
6. Franquet T, Gomez-Santos D, Gimenez A et al: Fire eater’s pneumonia: radiographic and CT findings. *J Comput Assist Tomogr*, 2000; 24: 448–50
7. Kitchen JM, O’Brien DE, McLaughlin AM: Perils of fire eating: an acute form of lipoid pneumonia or fire eater’s lung. *Thorax*, 2008; 63: 401, 439
8. Kadakal F, Uysal MA, Gülhan NB: Fire-eater’s pneumonia characterized by pneumatocele formation and spontaneous resolution. *Diagn Interv Radiol*, 2010; 16: 201–3
9. Pielaszkiwicz-Wydra M, Homola-Piekarska B, Szcześniak E et al: Exogenous lipoid pneumonia – a case report of a fire-eater. *Pol J Radiol*, 2012; 77(4): 60–64

Conclusions

Fire-eater’s pneumonia is an extremely rare acute condition that typically occurs in fire eaters. The presented case shows that this disease can also be found in pediatric patients. It proves the importance of detailed anamnesis.