Exogenous Lipoid Pneumonia due to Chronic Inhalation of Oily Product Used as a Lubricant of Tracheotomy Cannula

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ABSTRACT

Exogenous lipoid pneumonia (ELP) is caused by the inhalation of vaporized oily products. Long-term exposure can result in chronic disease, whereas acute form usually results from massive aspiration of fatty substances. It has an incidence of 1.0%–2.5%.

In case of symptomatic patients, the clinical presentation mainly includes acute or chronic respiratory symptoms such as dyspnea, fever, cough and less frequently chest pain, hemoptysis, or weight loss. Radiological findings are often aspecific or misinterpreted, and ELP is sometimes misdiagnosed as a malignancy of the lungs.

Patient history and radiological findings can lead to a suspicion of ELP, but histological microscopic findings of intra-alveolar lipid and lipid-laden macrophages are required to confirm the diagnosis The mainstay of treatment consists of avoiding ongoing exposure and providing supportive care as repeated whole-lung lavage, corticosteroids, and/or immunoglobulins. Surgery is reserved for cases of high suspicion of cancer or serious clinical impact (as recurrent infections).

Prognosis is benign, even if it has been reported cases of progression to severe respiratory failure, cor pulmonale, superinfection, and association with lung cancer. Here, we describe a case of ELP due to chronic inhalation of oily product (Vaseline) used as a lubricant of tracheotomy cannula.

Keywords: Lipoid pneumonia, tracheotomy, fatty lubricant

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Introduction

In 1925, Laughlen [1] first described four cases of a rare form of pneumonia caused by inhalation of fatty substances and named it exogenous lipoid pneumonia (ELP).

In 1949, McDonald et al. [2] reported an endogenous form of lipoid pneumonia that presented similar clinical, histological, and radiological findings of the exogenous form but with different pathogenesis related to chronic bronchial obstruction from chronic bronchitis, neoplasms, or other endogenous factors (as lipid storage disorder).

Since then, lipoid pneumonia, both as exogenous and as endogenous forms, has been widely studied, and an incidence of 1.0%–2.5% has been reported [2].

Recently, we treated a patient with ELP due to chronic inhalation of an oily product (Vaseline), which was used as a lubricant of tracheotomy cannula.

Because it was a very peculiar case, we consulted the medical literature to deeply understand the topic, and till date, we have found only 14 cases [3-5]; therefore, we believed it important to share our anecdotal experience which, to our knowledge, is the 15th reported case.

Case Presentation

An asymptomatic 59-year-old man, who was tracheotomized after total laryngectomy for laryngeal squamous cell carcinoma 3 years earlier, presented to our unit because chest computed tomography (CT) revealed a mass in the middle lobe of his right lung during his oncologic follow-up (Figure 1).

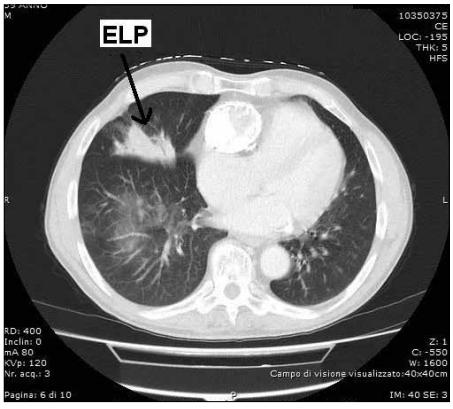

Figure 1. Chest computed tomography shows a consolidation area presenting ground glass opacity in the middle lobe of the right lung

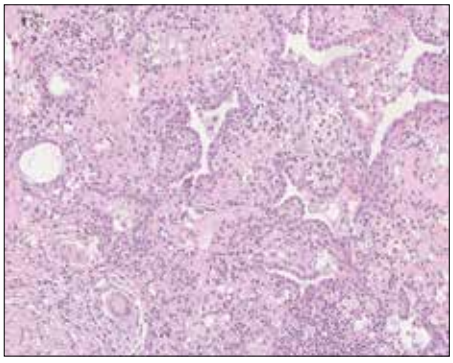

Figure 2. Pulmonary lymphoplasmacytic infiltrates associated with multinucleated giant cells containing fat clefts and intra-alveolar lipid-laden macrophages (H&E ×20)

Total-body positron emission tomography–CT confirmed the mass, and malignancy (metastatic or primitive) was suspected. Bronchoscopy, bronchoalveolar lavage (BAL) fluid analysis, skeletal scintigraphy, and tumor markers were negative.

Bronchoscopic biopsy was not feasible either endoscopically or under ultrasound guidance. Therefore, the patient consented to surgery and a thoracoscopic lung biopsy was performed, followed by a middle right lobectomy through a minithoracotomy because the middle lobe had a global malacic appearance.

Definitive histology showed characteristic features of lipoid pneumonia (Figure 2). When questioned about his habits, the patient reported the daily use of an oily product (Vaseline) to lubricate his tracheotomy cannula during changing or positioning.

Therefore, ELP was diagnosed. The patient had a normal postoperative course, but he died 6 months later because of other natural causes.

Discussion

ELP is caused by the inhalation of vaporized oily products and can be chronic when associated with long-term exposure or acute when resulting from massive aspiration of fatty substances [4].

It has been reported in all age groups and may be due to anatomical or functioning abnormality in deglutition, such as Zenker's diverticulum, cleft palate, hiatal hernia, achalasia, or other neuromuscular diseases, affecting pharyngeal motility or the cough reflex [2, 6].

In healthy individuals, it may be due to professional exposure (e.g., siphoning of mineral oils worker) or daily habits such as use of oil-based laxatives, lip balm, or flavored lip gloss [2, 6].

Among other reported curious cases, we would like to mention that of long-term exposure to vaporized paraffin from burning candles in a shrine, that of a chef specialized in tabletop "Teppanyaki/Hibachi" cooking, and the cases of fire-eaters [2-9]. The main pathological mechanism is the vaporized fat entry into the tracheobronchial tree without stimulating the cough reflex. Once in the alveoli, macrophages take up the fat after emulsification, but they cannot metabolize fatty substance and it is repeatedly released into the alveoli after the death of the macrophages. This released fat activates a giant-cell granulomatous reaction (also called lipid granulomatosis), chronic inflammation, and alveolar and interstitial fibrosis.

Histologically, ELP is characterized by the presence of intra-alveolar lipid and lipid-laden macrophages and a chronic foreign body-type reaction with inhaled exogenous lipid droplets [1, 2].

Clinically, except the cases of asymptomatic patients, ELP can have acute or chronic presentation. The former case, which is rarer, is typically due to massive aspiration of vaporized fats and may simulate infectious pneumonia with fever and/or cough. The chronic form, which is more common, is a result of long-term exposure to irritant agents and usually presents with dyspnea, restrictive pattern, chronic hypoxia, and/or cough. Some authors have described symptoms of chest pain, hemoptysis, and weight loss [2].

There are no diagnostic radiological features on chest radiography. The most common findings on chest CT are consolidations and areas of peribronchial ground glass opacities, mainly in the lung bases. Other less common radiological findings include "crazy paving" pattern in the lung parenchyma; endobronchial secretions; or unspecific areas of post-obstructive pneumonitis, pneumatoceles, pneumomediastinum, pneumothorax, and pleural effusions [3-5].

Chest magnetic resonance imaging can be useful because it shows the fat content of lesions in T1-weighted sequences and signal suppression in fat suppression sequences [4, 5].

A definitive diagnosis of ELP is obtained by detecting intra-alveolar lipid and lipid-laden macrophages in respiratory specimens. Various specimens that may be used for the confirmation of the diagnosis include sputum, BAL, transthoracic fine-needle aspiration cytology, or biopsy from the lesion [2]. Some authors are of the opinion that radiological testing may be sufficient and invasive testing procedures can be avoided [4].

The mainstay of the treatment consists of avoiding ongoing exposure and providing supportive care.

Corticosteroids are a therapeutic option only in case of severe and ongoing lung injury; other treatment options are immunoglobulins and repeated whole-lung lavage. Surgery may be performed only in cases highly suspected of cancer [2].

Usually, ELP has a benign prognosis even if it has been reported in cases of progression to severe respiratory failure, cor pulmonale, superinfection, and association with lung cancer [4].

In conclusion, some observations can be made about our experience and ELP case:

- We reported that, in this 15th case, ELP was caused by chronic inhalation of an oily product (Vaseline), which was used as a lubricant of tracheotomy cannula, and perhaps many other iatrogenic cases remain unknown and could be prevented if ELP knowledge were more widespread in medical community
- Diagnosis of ELP is very difficult because:
  - » It is not routinely suspected at the time of presentation.
  - » There are no typical clinical signs or symptoms.
  - » Imaging studies can often be inconclusive or misinterpreted.
- Preoperative diagnosis is very important to avoid unnecessary surgery.
- Definitive diagnosis is only histological.

Informed Consent: Written informed consent was obtained from patient who participated in this study

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