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Case Report

Endogenous lipoid pneumonia presenting as solitary pulmonary nodule: a case report

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Abstract: A 63-year-old woman complained of hemoptysis was admitted to our hospital. Chest computed tomography (CT) showed a solitary pulmonary nodule (SPN) arising from the lower lobe of the right lung which was considered as lung malignancy. The patient underwent video-assisted thoracoscopic surgery (VATS) of pulmonary wedge resection to remove the nodule. Diagnosis of lipoid pneumonia was established by multiple lipid-laden macrophages found in surgical specimen. As there was no history of inhalation or aspiration of lipid containing substances, she was diagnosed as endogenous lipoid pneumonia. The patient discharged from our hospital after surgery and with no recurrence in 9 months period.

Keywords: Lipoid pneumonia, endogenous, exogenous, solitary pulmonary nodule

Introduction

Lipoid pneumonia, also called 'cholesterol pneumonia', is a rare lung inflammatory disease. It can be divided into the exogenous lipoid pneumonia and the endogenous lipoid pneumonia according to the mechanism [1, 2]. Exogenous lipoid pneumonia was relatively reported more which was related to inhalation or aspiration of various fatty substances, such as petroleum jelly, mineral oils, few laxatives etc [3, 4], whereas endogenous lipoid pneumonia was very rare and the pathogenesis of the disease was unclear. It is thought that the effect of various factors like bronchial obstruction, chronic lung inflammation and hypoxia makes damage to alveolar epithelial cells, active secretion of alveolar epithelial cells, formation of excessive endogenous cholesterol, degeneration and release of cholesterol was swallowed by macrophages and accumulation of foamy cells in the alveolar cavity or alveolar wall [2]. We present a case of endogenous lipoid pneumonia confirmed by pathological study which initially diagnosed of lung malignancy with the manifestation of solitary pulmonary nodule (SPN) in the lower lobe of the right lung in computed tomography (CT) image.

Case report

A 63-year-old woman complained of intermittent hemoptysis and slight cough for last one month was admitted to our hospital in August 11, 2014. There was no fever, chills, pain or tightness of chest, dyspnea, night sweats or fatigue. Computer tomographic scan of chest showed SPN with sign of lobulation in the lower zone of the right lung which was considered with the possibility of lung cancer initially (**Figure 1**). She denied smoking before and with history of type 2 diabetes for more than 20 years. On examination, the patient was well built and nourished with pulse rate 73/minute and blood pressure 133/77 mm of Hg. There was no pallor, icterus, cyanosis, clubbing or lymphadenopathy. Clinical examination of the respiratory, cardiovascular, gastrointestinal, and nervous systems was normal. Her routine laboratory results including blood total cholesterol and tumor markers were normal. Pulmonary function tests revealed a forced expiratory volume in one second ($FEV_{1.0}$) of 1.92

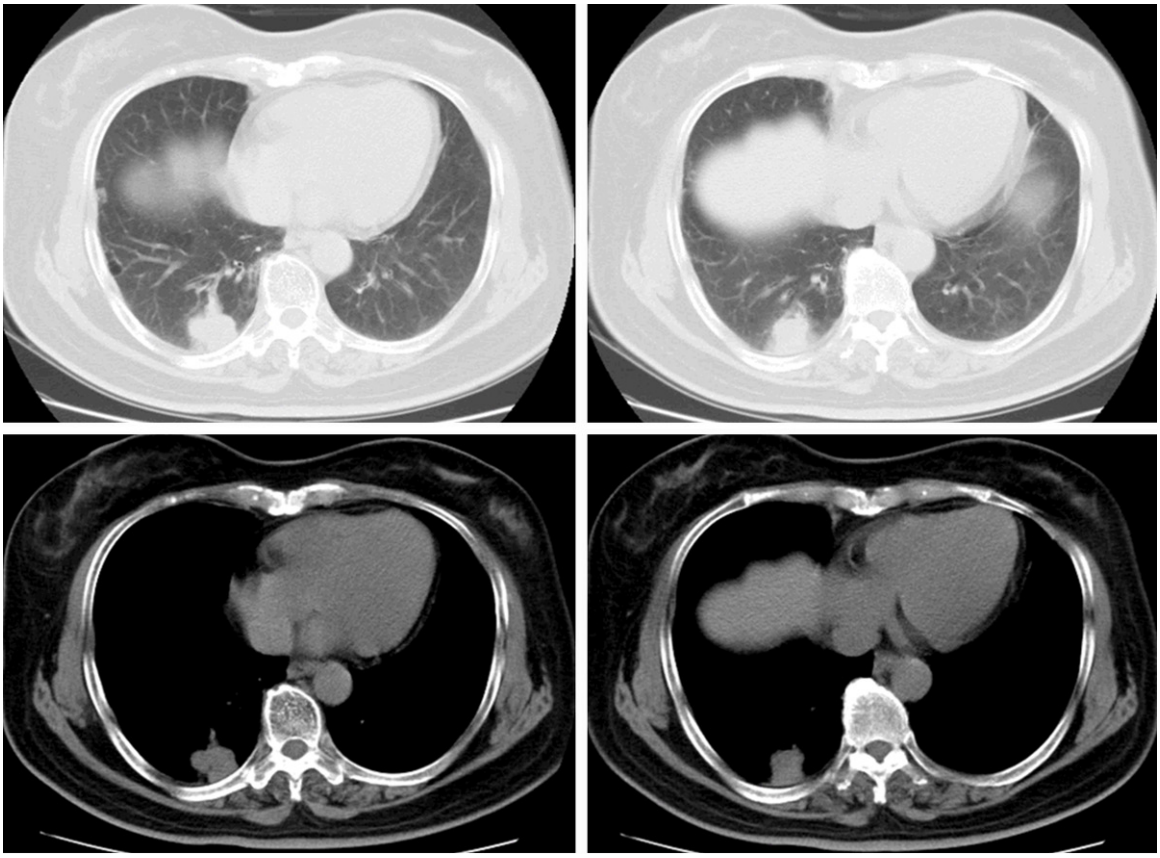

Figure 1. Computed tomography (CT) image revealing a solitary pulmonary nodule in the right lower lobe of the lung.

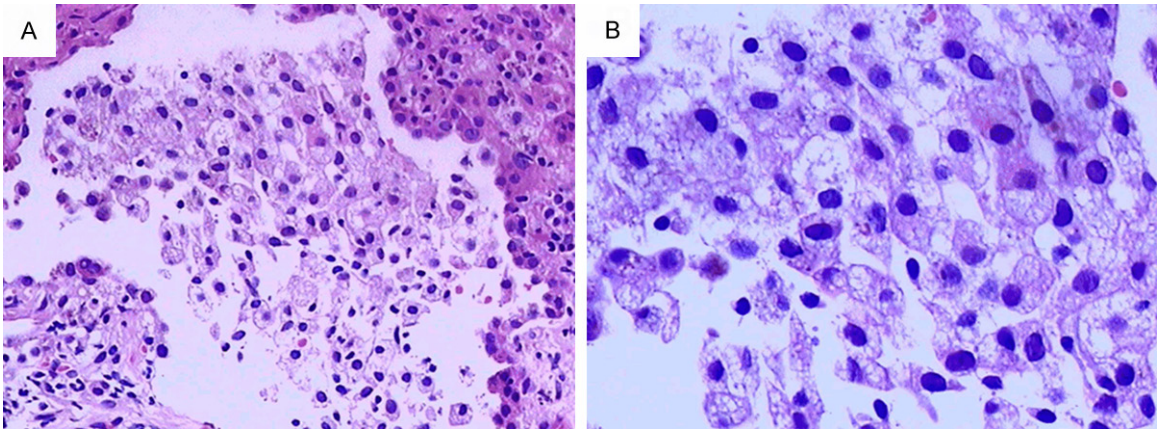

Figure 2. Histopathology shows the presence of multiple lipid-laden macrophages in the alveolar cavity, with infiltration of lymphocytes and collagenzation of interstitial lung tissue. Hematoxylin and eosin stain. A. 200 × original magnification. B. 400 × original magnification.

L (91.0% of predicted), a $FEV_{1.0}$ to FVC ratio of 87.3%. Flexible bronchoscopy examination was normal.

The patient underwent video-assisted thoracoscopic surgery (VATS) of pulmonary wedge resection to remove the nodule. The histopathology after surgery showed a sharply marginated nodule, 40 × 23 × 20 mm in size, was composed of multiple lipid-laden macrophages in the alveolar cavity, with infiltration of lymphocytes and collagenzation of interstitial lung tis-

sue (**Figure 2**). Thus, the diagnosis of endogenous lipoid pneumonia was made by the patient did not contact with fatty substances before. The patient had an uneventful recovery in the postoperative period and discharged from hospital at September 2, 2014. In the brief follow-up of 9 months, she was asymptomatic and further imaging of his chest did not show any recurrence.

Discussion

Lipoid pneumonia can be divided into endogenous lipoid pneumonia and exogenous lipoid pneumonia. Compare to exogenous lipoid pneumonia, endogenous lipoid pneumonia is more rare and the etiology of which is not clear, may be associated with the metabolic or secretory abnormalities of cholesterol in the alveolar epithelial and the excessive release of lipid is devoured by histiocytes. The typical feature and diagnosis of the lipoid pneumonia are depended on the presence of lipid-laden macrophages (the so-called foamy cells) in respiratory samples such as sputum, bronchoalveolar lavage fluid (BALF) or fine-needle aspiration (FNA) cytology/biopsy from lung lesions [2]. In our case, the patient was confirmed as lipoid pneumonia by postoperative pathological examination and the diagnosis of endogenous lipoid pneumonia was considered because there was no history of inhalation or aspiration of lipid containing substances.

The clinical manifestations of lipoid pneumonia are nonspecific and the usual symptoms are fever, cough, expectoration, hemoptysis, chest pain, etc. Lipoid pneumonia always progress slowly and is easy to misdiagnose as bacterial pneumonia, tuberculosis, lung cancer and other pulmonary diseases. Hadda *et al* reported a case of exogenous lipoid pneumonia resulted from aspirating a mineral oil (diesel) which initially diagnosed of community acquired pneumonia, the patient was treated with prolonged course of various antibiotics without any significant response and the diagnosis of lipoid pneumonia was confirmed by finding lipid-laden macrophages in BALF and biopsy from lung lesion [5]. Lococo and coworker described another case of idiopathic lipoid pneumonia who was a 61-year-old man with a history of chronic cough, expectoration and slight dyspnea, computer tomographic scan of the chest showed a poorly marginated pulmonary lesion in the right upper lobe which was considered as lung cancer initially and idiopathic lipoid pneumonia was confirmed after CT-guided fine-needle aspiration biopsy (FNAB) of the mass was performed [6]. Radiological findings of lipoid pneumonia are diverse and the most commonly described feature in CT is alveolar consolidations of low attenuation values, ground glass opacities with thickening of intralobular septa (crazy paving pattern), or alveolar nodules [7, 8]. Some scholars believe that CT or magnetic resonance (MR) detect fat density opacities within the lesion area of lung tissue may be helpful for the diagnosis of lipoid pneumonia [1, 2, 4]. Lee *et al* analyzed the manifestations of chest radiograph and CT in nine patients with squalene-induced extrinsic lipoid pneumonia and found that the most frequent pattern of parenchymal abnormalities were ground glass opacities, consolidation, poorly defined centrilobular nodules and crazy paving [9]. Lipoid pneumonia is often misdiagnosed as lung cancer when the radiological findings of it present as SPN or soft tissue mass [6, 10]. Talwar *et al* reported a case of lipoid pneumonia which presented as a SPN and had a high standard uptake value on positron emission tomography (PET) scan, thereby mimicking a lung malignant process [11]. As in our case, an elderly woman with hemoptysis was found a SPN with sign of lobulation in right lower lobe of the lung through CT. She was considered as lung cancer when admitted but lipoid pneumonia was confirmed by postoperative pathological examination.

According to the different causes, the etiologies of endogenous lipoid pneumonia can be categorized into obstructive, idiopathic or systemic [12]. Systemic endogenous lipoid pneumonia is always associated with systemic diseases and has extrathoracic signs or symptoms, such as rheumatoid arthritis, Hodgkin's lymphoma, and Wegener's granulomatosis [12]. Obstructive and idiopathic endogenous lipoid pneumonia generally present with intrathoracic symptoms, the former is related to the local lung obstructive inflammation [2], but the pathogenesis of the latter is unclear. The case we reported with no systemic diseases and did not find any obstructive changes in the imaging, so it should be classified as idiopathic endogenous lipoid pneumonia.

Currently, there have no clinical guidelines for the management of lipoid pneumonia can be followed. Usage of systemic corticosteroids [5,

6], immunoglobins [13] and whole-lung lavage [14, 15] may be effective in some cases, whereas surgical resection is the treatment option when lipoid pneumonia presenting as pulmonary nodules or masses. Lipoid pneumonia generally does not advocate surgical operation due to its slow progress unless there is a high suspicion of lung cancer.

In conclusion, endogenous lipoid pneumonia is very uncommon. The patient we described belonged to idiopathic endogenous lipoid pneumonia that was suspected lung malignancy initially and received VATS of pulmonary nodule resection. Lipoid pneumonia was confirmed by the postoperative pathological study, patient was in good condition for the 9 months follow-up duration, but longer follow-up is necessary to confirm the absence of recurrence or malignant transformation.

Disclosure of conflict of interest

None.

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