

# A rare case of lipoid pneumonia mimicking lung malignancy on radiological imaging: A case report

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## Abstract

Lipoid pneumonia is a rare benign lung disease pathologically characterized by the presence of lipids in the alveoli. It may mimic lung malignancy on radiological imaging. In this case report we present a case of lipoid pneumonia that radiologically manifested as a lung mass and summarize the typical investigation findings and the management of the disease from the literature review to serve as a reminder of and refresh our knowledge of this rare disease entity.

## KEYWORDS

lipoid pneumonia

## INTRODUCTION

Lipoid pneumonia is an uncommon lung disease characterized by the presence of lipids in the alveoli. It is usually asymptomatic and may mimic lung malignancy on imaging. In this case report, we present a case of lipoid pneumonia that was managed with surgical resection.

## CASE REPORT

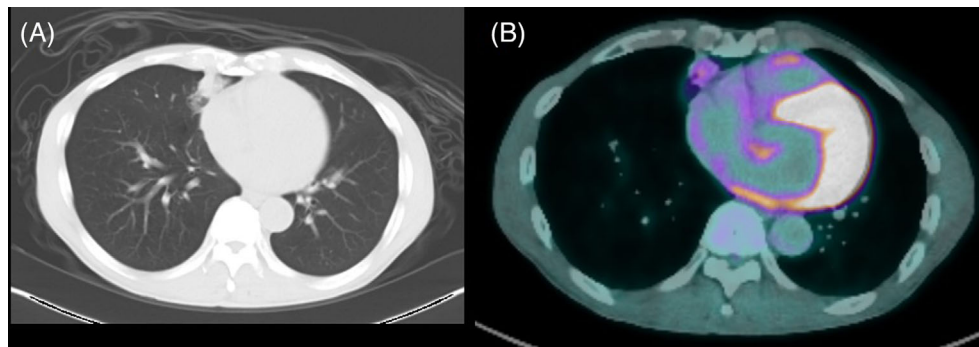
Our patient, a 69-year-old chronic smoker and employed as an interior-decoration designer, was incidentally found to have a  $3.7 \times 1.7 \times 3.4$  cm irregular soft tissue mass in the right middle lobe on the computed tomography in January 2023 during a lung-cancer screening program (Figure 1A). There were several small solid nodules up to 0.6 cm scattered in both lungs. He underwent a positron emission tomography-computed tomography (PET-CT) 1 month later, which showed hypermetabolic activity in the right middle lobe lesion (Maximum standardized uptake value SUV<sub>max</sub> 3.4), worrisome of a neoplastic lesion (Figure 1B). Mildly active lymph nodes in the mediastinum and right hilum were found (SUV<sub>max</sub> from 2.1 to 3.2; size up to 1.2 cm). There was no evidence of distant metastasis on PETCT. Bronchoscopy showed no endobronchial lesion. The acid-fast bacilli smear and culture of the bronchial aspirate were negative. No malignant cells were seen in the

cytology of the bronchial aspirate. Endobronchial ultrasound (EBUS) guided needle biopsy of right interlobar, left interlobar and subcarinal lymph nodes found no malignancy. Computer tomography (CT) was reviewed by a radiologist and it was decided that CT-guided biopsy was not feasible, as the lesion was in close proximity to the heart. Lung function was satisfactory. Forced expiratory volume in 1 s (FEV<sub>1</sub>) was 2.95L, 127% of the predicted value; diffusing capacity of the lungs for carbon monoxide (DLCO) was 62.4% of the predicted value. The patient was offered surgery for the right middle lobe lesion in view of possible malignancy. Right video-assisted thoracoscopic surgery was performed on 3 April 2023. He underwent wedge resection of the right middle lobe lesion. A frozen section of the lesion suggested inflammation and lipoid pneumonia with no evidence of malignancy. Therefore the operation was concluded and lobectomy was not proceeded with. In retrospect, our patient reported that he was frequently exposed in his workplace to inhaled aerosol that might contain oily substances. Though a chronic smoker, he had no vaping history. He had a good recovery following the operation and was discharged on post-operation day 6.

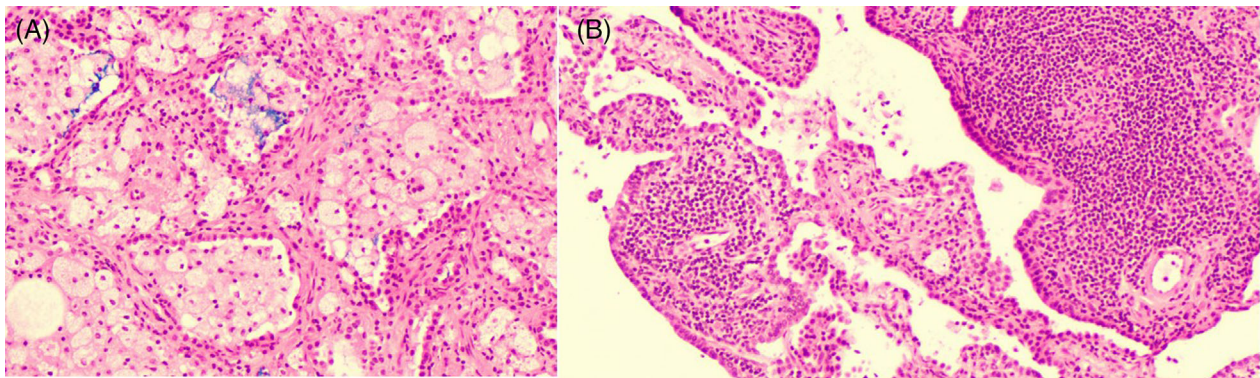
The formal pathology section showed evenly distributed alveolar-like structures filled with foamy histiocytes (Figure 2A). Between the alveolar-like structures abundant reactive lymphoid follicles were seen (Figure 2B). The overall features were inflammation with lipoid pneumonia-like features and florid lymphoid proliferation. Our patient was

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**FIGURE 1** (A) CT thorax found a  $3.7 \times 1.7 \times 3.4$  cm irregular soft tissue mass in the right middle lobe. (B) PETCT showed the right middle lobe lesion is hypermetabolic (SUVmax 3.4).



**FIGURE 2** (A) Alveolar-like structures filled with foamy histiocytes. (B) Reactive lymphoid follicles between the alveolar-like structures.

advised to avoid further exposure to aerosol used in decoration work. He is followed up at the outpatient clinic and has been well. Interval CT thorax is arranged for December 2023 as a surveillance scan.

## DISCUSSION

Lipoid pneumonia was first reported by Laughlen in 1925.<sup>1</sup> It is an uncommon disease characterized by the presence of lipids in the alveoli.<sup>2</sup> Lipoid pneumonia can be classified into exogenous and endogenous lipoid pneumonia.<sup>3</sup> Exogenous lipoid pneumonia is caused by aspiration or inhalation of fatty substances, such as mineral oil and oily nasal drops, into the airway, whereas in endogenous lipoid pneumonia, there is intra-alveolar lipid accumulation related to airway obstruction and local cellular breakdown.<sup>4</sup>

Presentation of lipoid pneumonia is usually insidious and most patients are asymptomatic. Some may have cough, dyspnoea or haemoptysis.<sup>5</sup> The patient in our case report was asymptomatic and presented as an incidental finding of lung lesion on computer tomography (CT) during the lung cancer screening program. Typical radiological findings on CT include consolidations with areas of fat attenuation (negative attenuation value of less than  $-30$  Hounsfield units), ground-glass opacities with superimposed thickening of the

interlobular and intralobular interstitia (crazy-paving pattern) and lung nodules.<sup>6-8</sup> Positron emission tomography-computed tomography (PET-CT) usually shows significant uptake, mimicking lung malignancy.<sup>9</sup> The lesion of the patient in our case report was hypermetabolic on PET-CT, therefore surgery was offered in view of possible malignancy. Pathologically, intra-alveolar lipid and lipid-laden macrophages can be found in sputum, bronchoalveolar lavage or lung biopsy.<sup>10</sup>

To date, there is no protocol or guideline for treatment for this rare disease. Avoiding exposure to the offending agent, such as mineral oil or oily nasal drops, is the mainstay of management of the disease. However, according to a case series, only a small proportion of patients improved clinically or radiologically despite the offending agent being identified and discontinued.<sup>11</sup> There are reports of treating lipoid pneumonia with corticosteroids,<sup>12</sup> immunoglobulin<sup>13</sup> and whole lung lavage.<sup>14</sup> Repeated whole lung lavage is useful for paediatric patients.<sup>15</sup> Surgical resection is performed when there is suspicion of cancer.<sup>16</sup> Prognosis of the disease is commonly indolent, although it can be progressive, especially if the patient has concurrent debilitating illness and further exposure to the causative agent.<sup>2</sup> In view of the indolent nature of the disease and the absence of risk factors for progression, the patient was advised to avoid further exposure to the possible offending aerosol and no further medical treatment was required after the surgery.

It can be learned from this case that a suspicious lung mass should not be assumed to be malignant, even though it is hypermetabolic on PETCT, and that it is important to take a full history of the patient, especially any history of exposure to aerosol substances, which may help us to diagnose the rare benign disease entity.

#### AUTHOR CONTRIBUTIONS

**Chi Sum Yuen:** Conception or design of the work; acquisition; analysis and interpretation of data for the work; drafting the work and revising the work critically for important intellectual content. **Tong Zhu, Shun Him Colin Chu:** Final approval of the version to be published.

#### CONFLICT OF INTEREST STATEMENT

None declared.

#### DATA AVAILABILITY STATEMENT

Data available on request due to privacy/ethical restrictions

#### ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

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