Case Report

Exogenous lipoid pneumonia due to silent aspiration following surgery and radiotherapy for cancer of the tongue

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Abstract

A man with a history of cancer of the base of the tongue presenting with hemoptyis, recurrent pneumonia and crazy-paving patterns on CT was ultimately diagnosed with lipoid pneumonia, subsequently found to be associated with use of fish oil capsules and possible Parkinson's disease. Pulmonary alveolar proteinosis and invasive mucinous adenocarcinoma as differential diagnoses were considered and dismissed. Risk of aspiration and lipoid pneumonia should be considered in patients with similar radiological findings and history.

1. Introduction

Lipoid pneumonia is a rare respiratory disease with presence of lipids in free form or as vacuoles in macrophages in the alveoli resulting in a foreign-body reaction. Lipoid pneumonia is divided into exogenous or endogenous lipoid pneumonia, defined by the source of lipids. We report a case of exogenous lipoid pneumonia (ELP) associated with sequelae from prior surgery, radiotherapy and suspected Parkinson's disease (PD).

2. Case

A 60-year-old man was referred to a regional hospital from general practice due to hemoptyis for one week. Less than a year prior to referral, the patient had been surgically treated for cancer of the base of the tongue followed by radiotherapy. Since then, the patient had experienced intermittent coughing. The patient was known with type-1 diabetes with diabetic neuropathy and used to smoke (15 pack years), having quit more than 35 years ago.

Computed tomography (CT) of the lung showed no sign of malignancy, but non-specific opacities in the upper lobe of the right lung were detected (Fig. 1). Bronchoscopy found irregularity of the hypopharyngeal mucosa, but no abnormal findings in the lower airways. Culture from bronchoalveolar lavage (BAL) was positive for E. Coli. Cytology and histology were not performed. Spirometry showed mild obstruction with forced expiratory volume in 1 s (FEV1) of 66% of predicted, forced vital capacity (FVC) was 76% with a FEV1/FVC ratio of 0.68 (Fig. 2). Follow-up due to mixed restrictive OBstructive lung disease was recommended, but no further investigations were initiated as the CT findings were interpreted as postinfectious.

A new CT examination 15 months later found ground-glass opacities with crazy paving patterns bilaterally in the lower and middle lobes. The patient complained of coughing with brownish sputum, aggravated by supine position and during eating and drinking.

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Chest X-ray four weeks later showed slight regression of the pulmonary infiltrates. The patient was referred to our university hospital for a high-resolution CT (HRCT) followed by a bronchoscopy with cryobiopsy.

HRCT showed bilateral infiltrates, suspicious for multifocal invasive mucinous adenocarcinoma, bleeding, infection and alveolar proteinosis (Fig. 3). Cryobiopsy from bronchoscopy showed macrophages localized to the alveolar and interstitial space with fine vacuoles (Fig. 4). Staining for CMV was negative. The BAL differential count showed 16% neutrophils, 10% eosinophils, 2% lymphocytes and 71% macrophages. Vacuolated macrophages were found in bronchoalveolar lavage, occasionally with large intracytoplasmic vacuoles (Fig. 4). The HRCT, BAL and cryobiopsy did not support suspicion of malignancy.

Three months later, a new CT showed stable distribution of crazy paving patterns (Fig. 5). The patient reported improvement of cough and dyspnea, while spirometry was unchanged. The diagnostic work-up was discussed at a multidisciplinary conference. The patient was diagnosed with ELP based on lipid-laden macrophages in the BAL and in the alveoli and interstitium on histology, probably caused by aspiration and/or dysphagia due to sequelae from previous cancer treatment.

The patient was followed with regular CT scans, spirometry and clinical control in the outpatient clinic every three months for the next two years. During these two years, the patient suffered at least three known incidents of pneumonia with *Legionella* and *Klebsiella*.

Four years after referral, HRCT showed progression of ground-glass opacities and consolidation, which raised new suspicions of possible pulmonary alveolar proteinosis in contrast to earlier bronchoscopy (Fig. 6). A new bronchoscopy with cryobiopsy and BAL confirmed the diagnosis of ELP showing lipid-laden macrophages with microvacuoles. Second opinion at Hospidale Morgagni, Forlì, Italy together with the HRCT confirmed the ELP diagnosis.
The patient was again informed of the diagnosis. He denied use of laxatives, vaping, eating oily food or regular use of nose drops, but did ingest fish oil capsules regularly. The patient did not report to experience dysphagia. He was referred for a fiberoptic endoscopic evaluation of swallowing (FEES) concluding silent aspiration for normal liquids, milk, yoghurt and impaired cough reflex. At follow-up two months after the FEES, the patient had no respiratory complaints.

Five and a half years after referral, the patient was hospitalized for pneumonia, tendency of falling and loss of function over a two-week period. Treatment with antibiotics was initiated but the patient suffered a rapid decline and died ten days after admission. During the last hospitalization, suspicion of Parkinson’s disease (PD) was brought up due to falls, difficulty in walking and rigidity, but a diagnosis of PD was never established. Until hospitalization, the patient was undergoing diagnostics for dementia initiated by the general practitioner, with a MMSE score of 19 found before hospitalization. The patient’s brother had previously been diagnosed with PD (Fig. 7).

3. Discussion

Lipoid pneumonia usually presents with nonspecific respiratory symptoms such as dyspnea and/or cough. Radiological findings associated with lipoid pneumonia are ground-glass opacities and crazy-paving patterns [1]. The diagnosis is susceptible to be overlooked unless suspicion is raised and should always be confirmed by demonstration of lipid-laden macrophages in BAL and biopsy [1].
This patient case is important when trying to distinguish between exogenous and endogenous etiology and cause of lipoid pneumonia. Common causes of ELP are ingestion of mineral oil used to treat constipation, nasal drops, vaping and fish oil [2,3]. Suspicion of dysphagia and possible aspiration is often raised by the patient, their next of kin or nursing staff reporting symptoms such as coughing when eating and drinking. However, objective quantification for evaluation of dysphagia is needed as dysphagia may be silent as was the case in our patient [4].

This patient case may provide relevant information about pre-existing conditions with increased risk of dysphagia, thus increasing the risk of aspiration. Both surgery and radiotherapy for head and neck cancer (HNC) have been shown to increase risk of aspiration.

Kanayama et al. [5] found that aspiration pneumonia accounted for over one fifth of non-cancer related causes of death in patients with hypopharyngeal and supraglottic cancer treated with definitive radiotherapy. Huang et al. [6] found that patients with tongue cancer had a significantly increased risk of aspiration after surgery with a reported incidence of postoperative silent aspiration of 6.25%.

Wong et al. [7] reported two cases of lipoid pneumonia associated with a history of cancer of the base of the tongue treated either with hemiglossectomy or hemiglossectomy followed by adjuvant chemo-radiotherapy. Both patients when questioned on possible origin of the lipids reported practiced oil-pulling where oil is swirled around in the mouth and spat out. These cases highlight that risk of aspiration in patients with a history cancer of the base of the tongue should not be ignored when these patients present with symptoms or radiological findings compatible with lipoid pneumonia.

During the last hospitalization, the patient in our case report was suspected to have PD. As patients with PD have a high prevalence of oropharyngeal dysphagia, undiagnosed PD could have been a contributing factor to dysphagia. A meta-analysis found that four of five patients with PD suffer from dysphagia based on objective measurements with a relative risk compared to controls of 3.2 [8].

In summary, the patient in this case report may have had an increased risk of ELP, as he had been treated for cancer of the base of the tongue with both radiotherapy and surgery. Moreover, he might have suffered from undiagnosed PD; both reasons constitute a very high risk of aspiration and thus of ELP.
| July 2016 Referral | October 2020 | March 2021 |
|-------------------|-------------|-----------|
| • CT: Non-specific opacities of upper lobe of right lung | • Cryobiopsy and BAL: Pulmonary alveolar proteinosis was dismissed. Lipid-laden macrophages confirm lipid pneumonia. | • FEES: Silent aspiration and impaired cough reflex. |
| November 2017 | September 2020 | December 2021 |
| • CT: Ground-glass opacities bilaterally of the lower lobes and the middle lobe of the right lung. Crazy paving pattern was observed. | • HRCT: Progression of ground-glass opacities and consolidation. Suspicion of pulmonary alveolar proteinosis. | • Hospitalization and death. |
| December 2017 | September 2018 | |
| • HRCT: Unchanged bilateral ground-glass opacities. Suspicion for multifocal invasive mucinous adenocarcinoma. | • Chest X-ray: Total regression of opacities in the left lung, partial regression of opacities in the right lung. | |
| January 2018 | May 2018 | |
| • Cryobiopsy: Suspicion of malignancy dismissed | • HRCT: Unchanged Crazy paving pattern. Conclusion: Lipoid pneumonia | |

![Fig. 7. Timeline of diagnostic imaging, endoscopies and biopsies.](image)

4. Conclusion

We report a case of lipoid pneumonia associated with ingestion of fish oil capsules in a patient treated for cancer of the base of the tongue and suspected PD. Possible aspiration and lipoid pneumonia should be considered in patients with a similar history and presenting with similar radiological findings.

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Patient consent

Obtained from the patient.

Declaration of competing interest

None regarding this manuscript.

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