

# Primary pulmonary Hodgkin's lymphoma

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A 21-year-old man presented to hospital with a two-month history of productive cough with no other symptoms. Radiology revealed a cavitating lesion in the left upper lobe for which a variety of diagnoses were considered. A biopsy revealed primary pulmonary Hodgkin's lymphoma. Primary pulmonary Hodgkin's lymphoma is an uncommon initial presentation; lung lesions usually occur later in the course of the disease. Following diagnosis, the patient began chemotherapy and full remission was achieved.

**Key Words:** *Cavitated injuries; Chest x-ray; Hodgkin's lymphoma; Lung*

The initial presentation of Hodgkin's lymphoma as a primary pulmonary injury is very uncommon; fewer than 100 cases have been reported (1,2). In the evolution of Hodgkin's disease, pulmonary involvement is not rare (3). The appearance of cavitated injuries after treatment is not uncommon; however, detecting them before chemotherapy is exceptional.

## CASE PRESENTATION

A 21-year-old man presented to hospital with a two-month history of productive cough with purulent sputum production. He did not have fever, dyspnea or chest pain, but complained of asthenia and weight loss without anorexia.

The patient had a 2.5 pack-year history of smoking. He was a social drinker and worked in a supermarket. There was no history of dental manipulation, hospitalizations or surgical procedures.

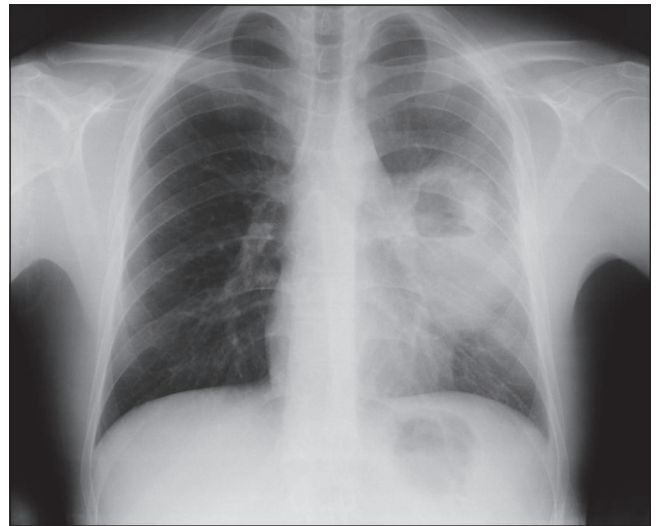
The patient's father had been diagnosed and treated for Hodgkin's disease (a type of nodular sclerosis) 20 years previously, but was now in complete remission. His mother had undergone an operation for esophageal leiomyoma. His two brothers were healthy.

On presentation, the patient's body temperature was 36°C (96.8°F). His blood pressure was 136/76 mmHg, with a heart rate of 110 beats/min. The physical examination was normal.

His hemogram showed a hemoglobin level of 107 g/L; a hematocrit of 31.1%; a white blood cell count of  $23.6 \times 10^9/L$  (84% neutrophils and 9.3% lymphocytes) with no other abnormalities; and an erythrocyte sedimentation rate of 113 mm/h. A coagulation examination showed a Quick index of 54%; a prothrombin time of 16.6 s; and a partial thromboplastin time of 38.6 s. A special coagulation investigation revealed positive lupus anticoagulant, with no other abnormalities. Biochemistry did not show abnormalities except for a low serum iron level 21.48  $\mu\text{mol/L}$ , a ferritin level of 707.80 pmol/L, an albumin level of 25 g/L and a lactate dehydrogenase level of 301 U/mL. A cavitated lesion appeared in the upper lobe of the left lung on the chest x-ray (Figure 1).

## Un lymphome de Hodgkin pulmonaire primitif

Un homme de 21 ans a consulté à l'hôpital parce qu'il avait une toux productive dénuée d'autres symptômes depuis deux mois. La radiologie a révélé une lésion cavitaire dans le lobe supérieur gauche, à l'égard de laquelle divers diagnostics ont été envisagés. Une biopsie a révélé un lymphome de Hodgkin pulmonaire primitif. Ce lymphome est une présentation initiale peu courante, car les lésions pulmonaires se manifestent généralement plus tard dans l'évolution de la maladie. Après le diagnostic, le patient a entrepris une chimiothérapie et s'est complètement rétabli.



**Figure 1** X-ray showing a cavitated injury in the upper lobe of the left lung

After admission, many noninvasive examinations were performed including a series of blood cultures, and pneumococcal and legionella antigen urine cultures. All were negative. Flexible bronchoscopy did not demonstrate airway abnormalities. Bronchial washings showed an abundance of inflammatory macrophages and siderophores, as well as scaly mature cells and cylindrical ciliated cells. Cytology revealed no malignant cells.

Microbiological testing of bronchial alveolar lavage fluid and bronchial washings did not reveal any pathogens. Serology for hepatitis and the assessment for HIV were negative.

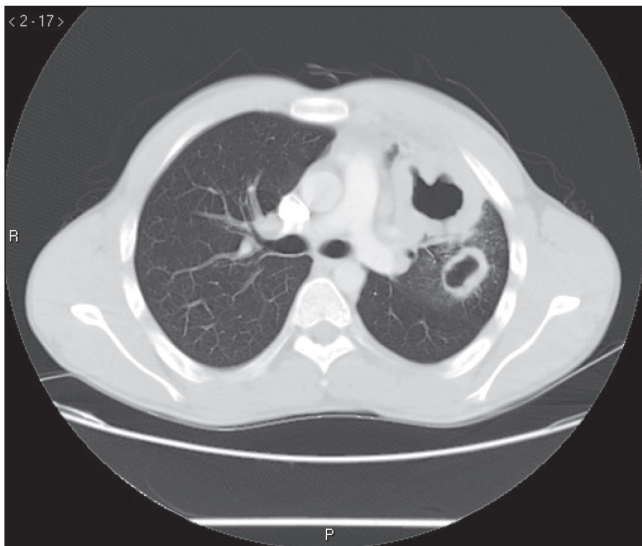
Thoracoabdominal computed tomography (CT) revealed three thick-walled cavitated lesions (Figure 2), 35 mm, 55 mm and 52 mm in size in the lingula and upper segment of the left lower lobe without air-fluid levels. Adjacent to the lesions were areas with a ground-glass appearance and air bronchograms.

In the basal segment of the left lower lobe, two pseudonodular injuries 9.6 mm and 3.6 mm in size were observed. In

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**Figure 2)** Computed tomography scan of the chest showing three thick-walled cavitated injuries in the left lower lobe of the lung

addition, lymphadenopathy was observed in the prevascular space and precarinal area, but not in other locations (Figure 2).

The patient received antibiotics due to the possibility that the cavitated injuries had been caused by a pulmonary abscess.

In spite of mild improvement, the persistence of radiological evidence prompted a reconsideration of the diagnosis. Transthoracic fine-needle aspiration of the lesions showed Reed-Sternberg cells on cytological examination.

A whole-body positron emission tomography (PET)/CT scan was performed. Fludeoxyglucose imaging revealed pathological deposits, which indicated a malignant proliferating mass in the left lung. A small accumulation in the upper left forward lateral rib cage wall with low metabolic activity (maximum standardized uptake value = 1.2) was observed and not specific for malignancy. There were no other significant results.

To confirm the diagnosis, the patient was referred to thoracic surgery for a pulmonary biopsy using video-assisted thoracoscopic surgery, which diagnosed pulmonary Hodgkin's lymphoma nodular sclerosis type E (clinical stage IVB, International Prognostic Index score = 5 [4]).

Following the diagnosis, the patient began an eight-cycle polychemotherapy treatment consisting of adriamycin (doxorubicin), bleomycin, vinblastine and dacarbazine. After the fourth cycle, a PET/CT scan indicated complete remission.

## DISCUSSION

Primary pulmonary Hodgkin's lymphoma (PPHL) is a rare disease. In the study by Radin (5) examining the years between 1927 and 1986, 60 cases of PPHL were reported, particularly in young women. Since the Radin review, seven new cases were published between 1990 and 2003, and five more cases observed up to 2006 can be added to this total (6).

To establish the diagnosis of PPHL, the following criteria must be fulfilled: the disease must be confined to the lung, with or without minimal hilar lymph nodes; histological results compatible with Hodgkin's disease must be present; and other pathological conditions that could explain the results must be excluded (1,2,7). The present case fulfilled all of these criteria.

**TABLE 1**  
Differential diagnosis of cavitated images in conventional chest radiology

Pulmonary abscess
Pulmonary tuberculosis
Primary bronchial carcinoma
Metastatic lung nodules
Fungal infections (eg, histoplasmosis, aspergillosis)
Hydatid cyst
Necrotic pneumonia
Pneumoconiosis
Pulmonary infarction
Wegener's granulomatosis
Bronchial cyst
Rheumatoid lung
Intralobar bronchopulmonary sequestration
Hodgkin's disease following treatment

Data from reference 9

Pulmonary involvement in Hodgkin's disease can occur in 15% to 40% of cases (3). This is caused by the extension of lymphoid follicles or by peribronchiolar adenopathies adjacent to pulmonary parenchyma (7). Although rare, the occurrence of pulmonary cavitated injuries after chemotherapy treatment have been observed (8,9).

Hodgkin's lymphoma in the lung may appear as a single nodule, as multiple nodules or as cavitated lesions (10). Cavitated lesions have a wide differential diagnosis including granulomatous diseases (Wegener's granulomatosis), pulmonary Gram-negative organisms, anaerobic bacteria or fungal infections (eg, actinomycosis, histoplasmosis or aspergillosis), pulmonary tuberculosis, necrotic pneumonia, pulmonary abscess, septic emboli, evacuated hydatid cysts, inhalational diseases (eg, coal workers' pneumoconiosis and silicosis), eosinophilic pneumonia, cavitated rheumatoid nodules and neoplastic diseases (primary bronchial carcinoma) (Table 1). Metastatic lung nodules may especially cavitate squamous cell types but also adenocarcinomas, sarcomas, melanomas and osteosarcomas (3,8,9).

Because of the wide differential diagnosis, multiple invasive and noninvasive diagnostic investigations are common. Due to these circumstances, in many cases, the injury biopsy that confirms the diagnosis is delayed (7).

Nodular sclerosis of the Hodgkin's disease variety is the most frequent histological subtype found in the PPHL presentation, which occurs more frequently in women than in men. The mixed cellularity subtype has also been described (6,11,12).

Sputum cytology or bronchial brushings may reveal Reed-Sternberg cells and establish the diagnosis of pulmonary Hodgkin's disease, thereby avoiding the need for more aggressive procedures (11). On the other hand, these cells are not common, and cells similar to Reed-Stenberg cells may be seen in non-Hodgkin's lymphoma, melanoma and some carcinomas (12).

Transthoracic fine-needle aspiration is a simple and useful method to establish the initial diagnosis in many cases (9), and is more useful in patients with a history of Hodgkin's disease in

whom pulmonary recurrence is suspected (12). The immunohistochemistry performed for the assessment of citoqueratin, S100 protein and CD30 in the extracted samples can help in the differential diagnosis when sufficient material is obtained (1). In our case, an immunohistochemistry study was successful; the atypical cells obtained from the pulmonary biopsy showed intense positivity for CD30, CD15 and p53, and some exhibited CD20 positivity. Ki-67 also existed. Ki-67 also existed. The accompanying lymphocytes were positive for CD3 and CD5. In spite of this, according to the majority of authors, a pulmonary biopsy is almost always necessary to confirm the diagnosis of PPHL (7,8). In the present case, the pulmonary biopsy was obtained using video-assisted thoracoscopic surgery, a technique associated with the fewest number of complications of open lung biopsy.

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