

## CASE REPORT

# Primary pulmonary peripheral T-cell lymphoma: A case report and review of the literature

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## Keywords

Case report; primary pulmonary lymphoma; T cell lymphoma.

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## Abstract

Primary pulmonary T-cell lymphoma is a rare condition characterized by fever, cough, dyspnea, and bilateral pulmonary nodules, usually diagnosed by transbronchial biopsy or computed tomography (CT) guided needle biopsy and pathology. In view of its poor prognosis, it is critical to distinguish and diagnose this disease as early as possible. We report here a case of a 39-year-old man who presented with fever, cough, expectoration with multiple nodules, and patch shadow in both lungs by chest CT. Tissue samples were taken by CT guided needle biopsy. The histological sample and immunohistochemistry showed peripheral T-cell lymphoma-not otherwise specified (PTCL-NOS). After the patient was treated by chemotherapy for two courses, his condition deteriorated rapidly and he died 2.3 months after the onset of the disease.

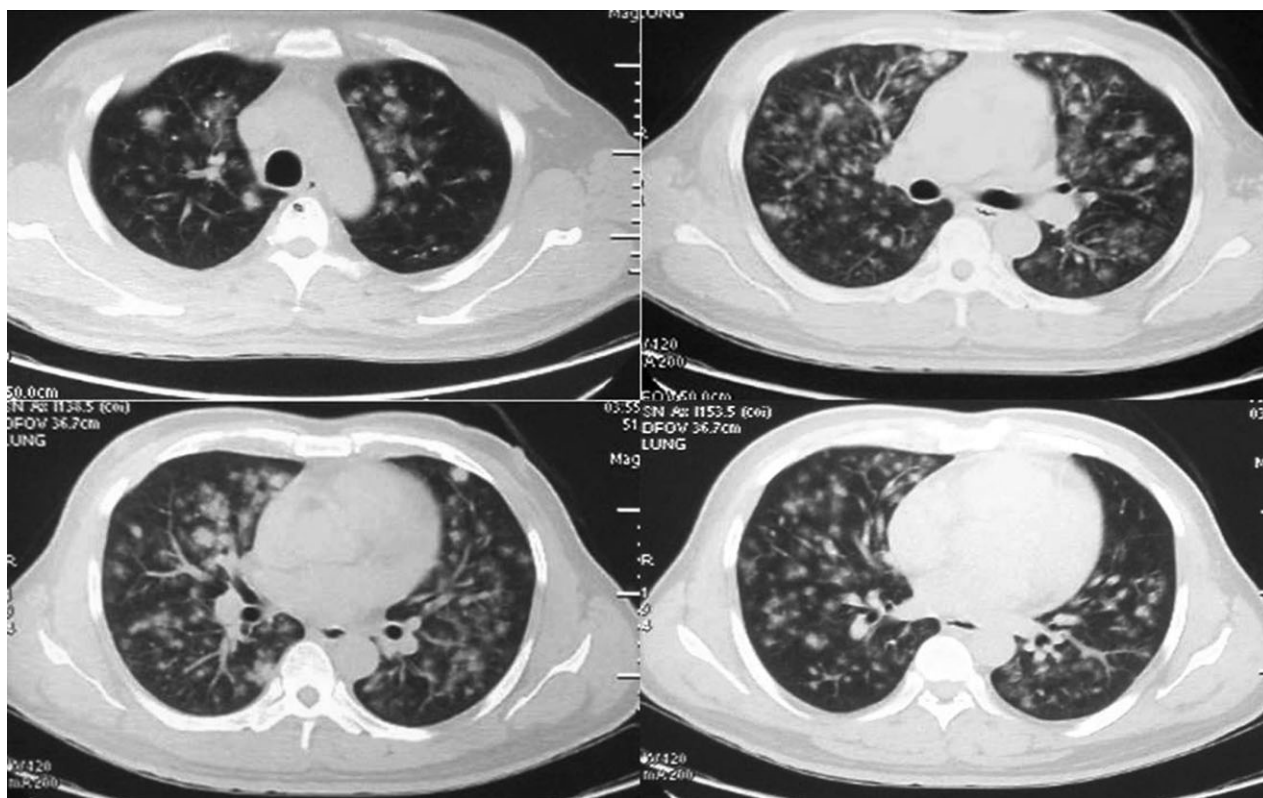
## Introduction

Primary pulmonary lymphoma (PPL) is uncommon and accounts for only 0.5–1% of all primary pulmonary malignancies, less than 1% of all cases of non-Hodgkin's lymphoma (NHL).<sup>1</sup> Seventy to 80% of PPL cases are B cell origin and commonly arise from bronchial mucosa associated lymphoid tissue (MALT).<sup>2</sup> Very few cases of pulmonary T-cell lymphoma have been reported and the imaging features of this rare cancer have not been well defined. We report here a new case of primary pulmonary peripheral T-cell lymphoma diagnosed by computed tomography (CT) guided needle biopsy, followed by histology and immunohistochemistry, in a 39-year-old male who presented with fever, cough, and expectoration. After he received two courses of chemotherapy, his condition deteriorated rapidly and he died about 70 days after the onset of the disease.

## Case report

A 39-year-old man who had a fever, cough, and expectoration, for a period of two weeks, and who demonstrated no response to antibiotics, was referred to our department. The physical examination did not provide significant information. No enlargement in the superficial lymph nodes was found. The main blood test results were: white blood cell (WBC)  $2.48 \times$

$10^9/L$ ; hemoglobin 124 g/L; and blood platelet  $90 \times 10^9/L$ .  $\beta_2$ -Microglobulin 6.45 mg/L. Antineutrophil cytoplasmic antibody (ANCA) and blood sputum and urine cultures were negative. Electrolyte, renal function, tumor markers and urine analysis were normal. Moreover, no abnormal blood cells were detected in the bone marrow. Chest CT revealed multiple bilateral pulmonary nodules and patch shadow, with no mediastinal adenopathies (Fig. 1). Cerebral and abdominopelvic CT, and the ultrasonic inspection of abdominal organs, thyroid and the prostate gland, were all normal. Therefore, the patient initially received symptomatic treatment. The body temperature fluctuated from 36.2°C to 39.0°C. CT guided transthoracic needle biopsy of the nodule lesion was conducted for further diagnosis. Cytological examination revealed cancer cells. The pathological examination revealed a proliferation of small round cells in the alveolar wall (Fig. 2A). To determine the cell type, a series of lymphocyte-associated antigens were detected by immunohistochemistry. Immunohistochemical analysis revealed positive cell proliferation in LCA, CD3 and CD45RO (Fig. 2B,C), and negative in CD20, CD30, ALK, CD79 $\alpha$ , TdT, CD56, P63, CEA, CK5/6 and TTF-1. The patient was diagnosed with primary pulmonary peripheral T-cell lymphoma-not otherwise specified (PTCL-NOS). Because of the double lung involvement and obvious fever, the diagnosis was PTCL-NOS, staging IVB. The patient was treated with chemotherapy (500 mg cyclophosphamide,



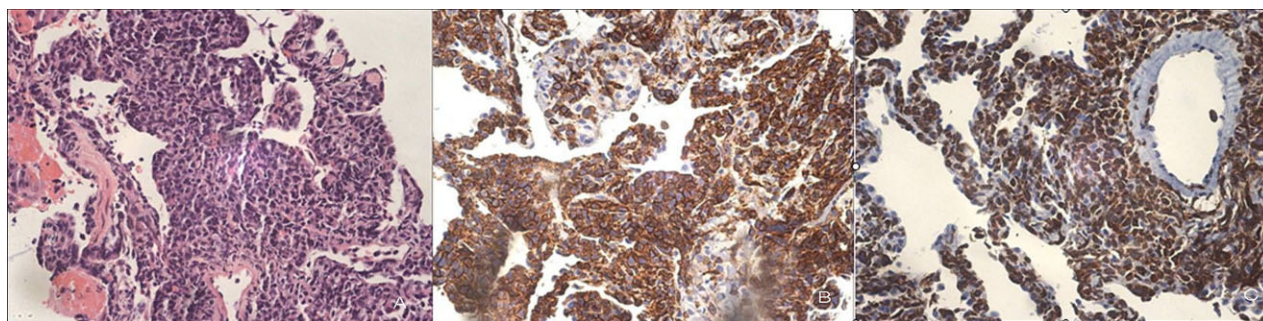
**Figure 1** Chest computed tomography (CT) revealed multiple bilateral pulmonary nodules and patch shadow.

30 mg adriamycin, 2 mg vincristine for the first day, and 40 mg/d prednisone for five days) for two courses. However, his condition deteriorated rapidly. Approximately two months after the attack of the disease, he died of pulmonary infection as a result of myelosuppression.

## Discussion

PPLs are defined as lymphomas affecting one or both lungs (parenchyma and/or bronchi and/or trachea) with no evi-

dence of extrapulmonary extension in the three months following their appearance.<sup>1</sup> Maehara *et al.* and Asano *et al.* reported the first cases of T-cell non-Hodgkin's lymphoma (NHL) in the lung in 1991.<sup>3,4</sup> Until 2009, only 14 T-cell PPLs cases had been reported. Bernabeu Mora *et al.*<sup>5</sup> reviewed 12 T-cell PPLs<sup>3,4,6–11</sup> from 1991 to 2009; most of the patients were Japanese. The age of onset ranged from 29–75, and seven cases were over 65 years old. The female/male ratio was 1:2. The majority had symptoms of fever, cough, and dyspnea. There was another review of four T-cell PPLs from 2008 to



**Figure 2** (A) Small round cell proliferation in alveolar wall (hematoxylin and eosin [HE], 400×). (B) Positive expression of leukocyte common antigen (LCA) marker by immunohistochemistry (×400). (C) Positive expression of CD3 T-cell marker by immunohistochemistry (×400).

**Table 1** Summary of primary pulmonary T-cell lymphoma cases reported since 2008

Year	Reference	Age	Sex	Clinical symptoms	Radiological findings	Diagnostic tool	Treatment and response
2009	Bernabeu Mora <i>et al.</i> <sup>5</sup>	70	F	Fever, chest pain	Multiple pulmonary nodules and pleural effusion	Transbronchial biopsy	Chemotherapy, death
2010	Minomo <i>et al.</i> <sup>12</sup>	68	M	Cough, dyspnea	Reticular shadow and pleural effusion	Transbronchial biopsy	Chemotherapy
2010	Liang <i>et al.</i> <sup>13</sup>	33	M	Fever, cough, chest pain, weight loss	Multiple pulmonary nodules and air bronchogram	CT guided needle biopsy	Chemotherapy, died in three months
2010	Shin <i>et al.</i> <sup>14</sup>	52	M	Fever, cough, sweating	Masses with portion of central necrosis	CT guided needle biopsy	Chemotherapy, death

CT, computed tomography.

2012.<sup>5,12–14</sup> The age of onset in this review ranged from 33–70 years old (Table 1). Three of the four patients were Asian and most of them were over 50 years of age. The pathological histology showed a large number of abnormal lymphocytes in the lung tissue. Immunohistochemistry showed expression of T lymphocyte-associated antigens. Among them, positive expression of CD3 was the most specific one for T lymphocyte. Expression of CD2, CD5, CD43, and CD45RO were positive. Expressions of B lymphocyte-associated antigens were negative, including CD20, CD19, and CD79a. In addition, the TdT (except for lymphoblastic lymphoma), CD56 (except for NK/T cell lymphoma), and ALK (except for anaplastic large cell lymphoma), were also negative. Although treated with effective chemotherapies, all four of the patients died shortly afterward. PTCL-NOS commonly occurred in lymph nodes and/or extra-nodal sites, including the spleen and liver,<sup>15</sup> with no specific clinical manifestation.<sup>16</sup>

Malignant lymphoma of T-cell origin in the lung is very rare, therefore, diagnosis depends on pathology and immunohistochemistry. The histomorphology is very broad, including a mixture of large and small tumor cells, clear cytoplasm, and a common appearance of vessels and eosinophils in stroma. Most PTCL-NOS immunophenotypes were not disease-specific,<sup>17</sup> and commonly presented as a loss of one or more broad-spectrum antibodies against the T cell. In our report, the patient was definitively diagnosed as peripheral T-cell lymphoma based on the immunohistochemistry, which consisted of positive expressions of T cell-associated antigen, including LCA, CD3 and CD45RO, and negative expressions of CD56, CD20, CD79a, ALK and TdT, together with negative expressions of P63, CEA, CK5/6 and TTF-1.

For most of the subtypes of T-cell PPL, first line therapy is typically cyclophosphamide, hydroxydaunorubicin, oncovin, and prednisone (CHOP)-based chemotherapy. Adult T-cell lymphoma has a poor prognosis as a result of the life-threatening complications, such as infections and tumor progression. Among five patients (including our report), four patients died of intrapulmonary infection after chemotherapy as a result of myelosuppression, and one patient had an unknown prognosis. Several recent clinical studies showed

CHOP could provide about 60% complete remission and a 30–50% five-year survival rate<sup>18–20</sup> in PTCL-NOS treatment. No significant difference in survival was determined between those with bilateral or unilateral disease.

In summary, primary pulmonary T-cell lymphoma is a rare entity with generally nonspecific clinical and roentgenographic signs. Therefore, it's crucial to distinguish and diagnose as early as possible. Overall, these lymphomas are associated with a poor prognosis and more aggressive chemotherapy regimens may be considered for recurrent bilateral disease.

## Disclosure

No authors report any conflict of interest.

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