CASE REPORT

Endobronchial obstruction resulting in severe respiratory failure – A rare manifestation of chronic lymphocytic leukemia

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SUMMARY

Pulmonary involvement in chronic lymphocytic leukemia (CLL) has been previously described and is usually characterized by lymphocytic infiltration in the peribronchial interstitium. Endobronchial involvement is a very rare pulmonary manifestation of CLL unless a transformation to high-grade lymphoma occurs. In the present case we describe an elderly patient with indolent CLL in whom endobronchial involvement led to severe acute respiratory failure.

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Chronic lymphocytic leukemia (CLL) is a monoclonal disorder characterized by a progressive accumulation of functionally incompetent lymphocytes, and is the most common form of leukemia found in adults in Western countries. Pulmonary parenchymal involvement in CLL has been previously described and is characterized by lymphocytic infiltration in the peribronchial and perivascular interstitium. On the other hand, endobronchial involvement is a very rare pulmonary manifestation of CLL unless a transformation to high-grade lymphoma occurs.

In the present case we describe an elderly patient with indolent CLL in whom endobronchial involvement led to severe acute respiratory failure.

The patient is a 79-year-old female with CLL that was diagnosed in 2006 based on cervical lymph node biopsy. Upon presentation her white-blood cell (WBC) count was $25.4 \times 10^9/L$ with 70% lymphocytes, hemoglobin 14.7 g/dL, and platelet count $228 \times 10^9/L$. Since she was a symptom-free patient apart from mild cervical lymphadenopathy no treatment was advised at that time.

The patient was referred on February 2008 with a 1-week history of new nonproductive cough and dyspnea on effort.

On physical examination, the patient had temperature of 37.2 °C, heart rate of 112 beats/min, and blood pressure of 125/60 mmHg. Her respiratory rate was 26 breaths/min,
with oxygen saturation of 91% on ambient air. Bilateral inspiratory and expiratory wheezes were heard upon lung auscultation. Initial laboratory data revealed WBC count of $10.2 \times 10^9/\text{L}$ with 45% lymphocytes, hemoglobin 11.5 g/dL, and platelet count $130 \times 10^9/\text{L}$. Chest radiograph on admission (Fig. 1) revealed complete collapse of the left upper lobe (LUL), that was confirmed by a CT scan of the chest (Fig. 2) that demonstrated a large LUL mass suspicious of tumor infiltration or collapse secondary to obstruction of the LUL bronchus. The patient underwent fiberoptic bronchoscopy (FOB) under conscious sedation using midazolam. FOB revealed diffuse infiltration of LUL and right middle lobe bronchi. The mucosal surface of the bronchi was hyperemic and easily bleeding upon contact with fragile necrotic debris. The LUL bronchus was nearly totally occluded by endobronchial tumor lesion. Six endobronchial biopsies were taken from the obstructing lesion in the LUL bronchus and lavage fluid was taken for cytological examination. Forty-eight hours following FOB the patient’s respiratory status worsened and she was intubated and mechanically ventilated due to severe hypoxemic respiratory failure.

Cytologic examination of lavage fluid revealed many atypical lymphocytes highly suspicious for lymphoma, cultures were negative. Based upon these preliminary results intravenous (I.V.) dexamethasone 20 mg/d was administrated. Three days later, histopathological examination of endobronchial biopsies revealed bronchial wall infiltrated by small lymphocytic malignant lymphoma (Fig. 3). The cells were positive for: CD20, CD79A, CD5, CD23, and CD43, and negative for CD10. The proliferation index was 30%. Upon confirmation of the pathological results the patient was given in addition to I.V. dexamethasone, I.V. Vincristine 1.7 mg and I.V. Cyclophosphamide 910 mg. In addition, aggressive hydration was given to prevent tumor lysis syndrome. Despite initiating chemotherapy, the patient’s respiratory condition did not improve, and she remained mechanically ventilated through permanent tracheostomy and subsequently transferred to a long-term respiratory care center.

Discussion

Endobronchial involvement occurs rarely in lymphoma, mostly in the setting of systemic disease and much more often in Hodgkin’s disease than in non-Hodgkin’s lymphoma (NHL). A series of case reports of endobronchial NHL describes four patients all were known to have disseminated NHL when endobronchial involvement was diagnosed. In a previous report, we described eight cases of NHL presenting as an endobronchial tumor, out of whom six had diffuse large cell lymphoma.

Endobronchial lymphoma is classified into two types, according to pattern of involvement. Type I includes diffuse sub-mucosal infiltrates originating from hematogenous or lymphangitic spread in the presence of systemic lymphoma as in our patient. Type II includes airway involvement by
a localized mass due to direct spread of lymphoma from adjacent lymph nodes or arising de novo from bronchus-associated lymphoid tissue (BALT).

Pulmonary parenchymal involvement in CLL has been well described and is characterized by lymphocytic infiltrates in the peribronchial and perivascular interstitium. Lymphocytes can also be seen infiltrating the alveolar walls and septa. These changes are reported to occur in approximately one-third of patients with CLL, and are usually asymptomatic and discovered only at autopsy.5

Endobronchial disease, on the other hand, is a very rare manifestation of CLL. Previous report described two patients with CLL in whom Richter’s syndrome developed and bronchial obstruction occurred due to massive peribronchial lymphadenopathy and endobronchial leukemic infiltrates. The endobronchial involvement was of high-grade lymphoma cells.6

In our case, on the other hand, the bulky endobronchial involvement was due to CLL cells (low grade lymphoma) and not high-grade malignant lymphoma cells as in Richter’s syndrome. Hence we suggest that bronchial involvement should therefore be suspected even in patients with indolent CLL who present with cough, recurrent pneumonias, or atelectasis.

Another case report describes a woman who had been diagnosed with CLL 15 years before presentation with recurrent episodes of lingular and left lower lobe infiltrates.7 The patient was found to have endobronchial narrowing of the lingular bronchus. Biopsy specimens of the lingular bronchus revealed submucosal infiltration by malignant lymphocytes of low-grade lymphoma. The patient was effectively palliated with local irradiation and prednisone therapy for 18 months. The authors have suggested that the endobronchial infiltrates seen in their patient were an extension of a peribronchial infiltrative process. The patient described had relatively mild symptoms due to endobronchial involvement including cough mild dyspnea. The clinical course of our patient is different from the patient described by Chernoff et al. We describe an aggressive rapid course of pulmonary CLL resulting in respiratory failure necessitating mechanical ventilation due to direct endobronchial involvement. Physicians should be aware of this life-threatening course, recognize it rapidly by early FOB, and initiate aggressive chemotherapeutic therapy as soon as the diagnosis is confirmed pathologically. Corticosteroids should be administered after infection has been ruled out based upon rapid cytological examination of lavage fluid obtained during FOB.

Conflict of interest statement

We declare that we have no potential conflict of interest related to the article.

References