SECOND PRIMARY CANCER IN A PATIENT WITH CHRONIC LYMPHOCYTIC LEUKEMIA

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Introduction

Respiratory illnesses account for significant morbidity and mortality in patients with chronic lymphocytic leukemia (CLL). Pulmonary infiltrates are common radiographic findings and are primarily caused by infections such as pneumonia. The second most common cause of pleural effusion is cancer and is known as malignant pleural effusion. Malignant effusions due to CLL are rare (9%) and are uncommon to find two primary cancers as the main source. We report an unusual case of a patient with CLL presenting with dyspnea, found to have malignant pleural effusion and a concomitant diagnoses of lung adenocarcinoma by pleural cytology.

Case

A 93-year-old female, with a significant history of untreated, stage 0 chronic lymphocytic leukemia (CLL) and deep vein thrombosis, presented to the ED with dyspnea on exertion. Her shortness of breath had been increased for about 2 weeks with no relief. The patient denied cough, fever, and recent respiratory infections and has no smoking history.

Vital signs were normal except for heart rate of 120 bpm and oxygen saturation of 92% on room air. Physical examination was significant for reduced breath sounds at right lung base and bilateral pitting edema of lower extremities. CT pulmonary angiography was negative for PE but revealed a right-sided pleural effusion with the collapse of middle and lower lung lobes (figure 1). Pan CT scan was negative, ruling out other malignancies.

Therapeutic thoracentesis was performed and 1,400 mL of serosanguinous fluid was collected. The pleural fluid/serum LDH ratio was 10 and pleural fluid/serum protein ratio was 0.7, indicating an exudate. Two days later, the fluid had reaccumulated in the same region and approximately 1 L of pleural fluid was drained via CT guided pigtail placement. Flow cytometry of the effusion was consistent with small lymphocytic lymphoma/chronic lymphocytic leukemia. Clonal B-cells were detected expressing CD5, CD20, CD23, and surface kappa light chain, comprising 70% of lymphocytes. Tumor markers from the pleural fluid, however, stained positive for TTF-1 and napsin, suggesting lung adenocarcinoma (figure 2). CEA levels were elevated (96 ng/mL) and CA19-9 and 125 were within normal limits. Chemical pleurodesis with doxycycline was performed and the patient subsequently started on chemotherapy for lung adenocarcinoma with pemetrexed and nivolumab before discharge.

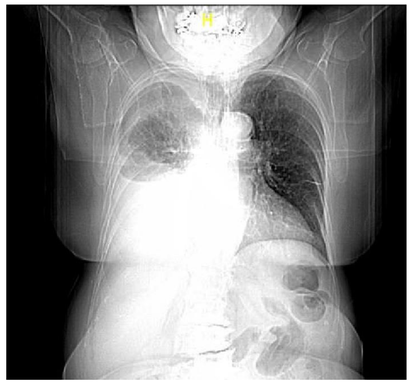

Figure 1. CT pulmonary angiography showing right-sided pleural effusion with the collapse of middle and lower lung lobes.

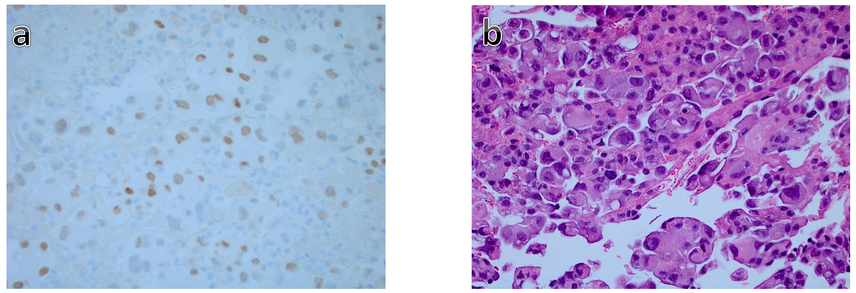

Figure 2. Pleural fluid **(a)** immunohistochemical stain showing mixture of nuclear TTF-1 Ag (magnification 400 x) and **(b)** H&E stain showing sheets of malignant cells with prominent nucleoli and vacuolated cytoplasm (magnification 400 x).

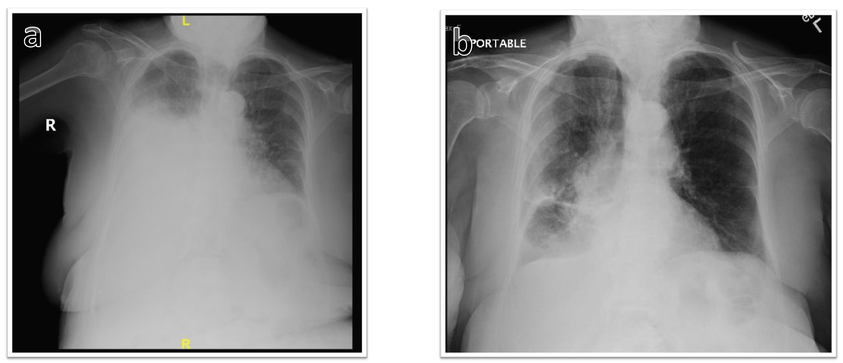

Figure 3. Chest x-ray **(a)** on admission revealing moderate sized right sided pleural effusion and **(b)** after thoracentesis.

Discussion

Very rarely do patients present with a unilateral pleural effusion that stems from more than one malignancy. In this case, our patient's pleural studies suggested that the pleural effusion came from both lung adenocarcinoma and CLL.

Patients usually have a diagnosis of CLL long before a pleural effusion occurs. The effusion is mainly from leukemic pleural infiltration, and may sometimes be hemorrhagic such as in our case. If hemorrhagic, the pleural analysis can show lymphocytes identical to the lymphocytes in the blood and bone marrow. Pleural effusions that come from CLL show lymphocytes that are predominantly B cells while pleural effusions that come from other etiologies such as tuberculosis and pulmonary emboli will show predominantly T cells.

If CLL is suspected in a patient with a new pleural effusion, two methods can be used to diagnosed CLL - cytology and flow cytometry. Using both cytomorphology and flow cytometry has almost 100% sensitivity and specificity in diagnosing CLL.

However, in our case, despite having a clear etiology of the pleural effusion, other malignancies must be entertained. Our patient tested positive for both TTF-1 and napsin-A, strongly suggesting the presence of lung adenocarcinoma in the pleural effusion. TTF-1 is useful in detecting lung adenocarcinomas due to its high specificity while napsin-A is known to be both sensitive and specific for lung adenocarcinomas, and it can been found positive when TTF-1 is negative. Studies have shown that a combined double staining for TTF-1 and napsin should be used together to achieve sensitivity and specificity.

We present this case to raise awareness and exemplify that more than one cancer may be present as the source of a newly diagnosed pleural effusion. Although a patient may have an obvious etiology, such as CLL in this case, it is imperative that one be aware to investigate for other malignancies to ensure proper treatment.

References:

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