

A Limp Left Lung

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While “on call” one night in the QEII radiology department the following radiograph (see Fig. 1 and Fig. 2) is brought to you by one of the technologists . Inside, the requisition gives the following information:

45 yr. old female with hx of renal tumor, now dyspnea x2 wks

Previous films taken 8 months ago (not shown) appear normal.

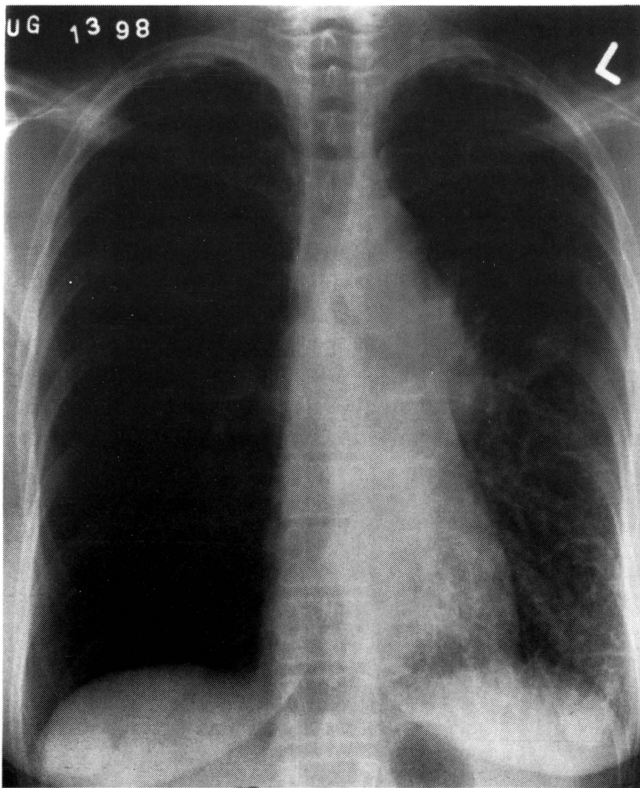


Figure 1. PA Chest

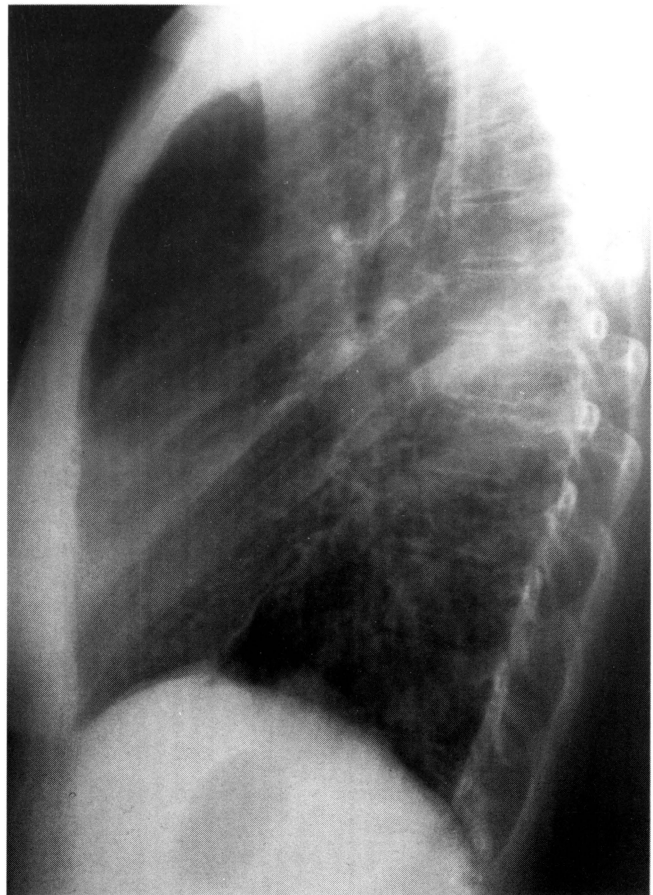


Figure 2. Lateral Chest

- Q1: Can you identify the abnormalities?**
Q2: Provide a differential diagnosis.
Q3: What investigations (radiological) would you recommend at this time?

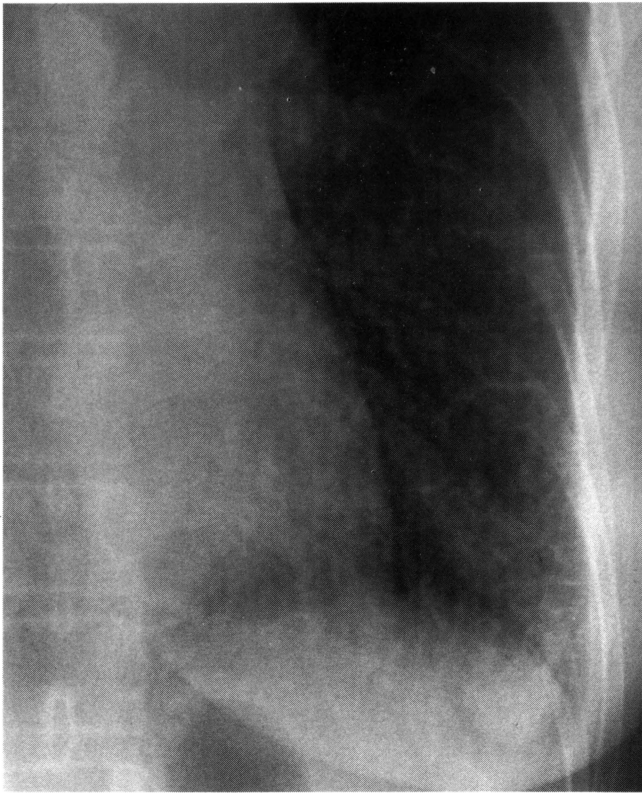


Figure 3. Left Lower Lobe

A1: The left hilum is prominent. There is opacification and abnormal convexity in the AP window*. Reticular opacities are seen in the left lower lobe. There are associated Kerley B lines‡ (see Fig. 3). The right lung and cardiac silhouette are normal.

A2: There are a number of possibilities for consideration. Given this patient's history of a malignancy, the primary concern should be metastatic involvement with invasion of the lymphatic system of the lung (lymphangitic carcinomatosis). A second malignancy like a bronchogenic carcinoma could give this appearance if there was local metastatic spread via the lymphatics. An atypical interstitial edema due to a localized obstruction could also present this way. Although it is not stated in the history, the patient may be on chemotherapy and therefore an opportunistic infection should also be a consideration.

A3: To resolve the above possibilities a High Resolution Computed Tomography (HRCT) would be helpful to further characterize the abnormalities. Below is a selected image from the HRCT series done on this patient (Fig. 4).

*The Aortopulmonary (AP) window is a region of the mediastinum inferior to the arch of the aorta and superior to the left main pulmonary artery on the anterior-posterior chest film. It is bound medially by the lower trachea and esophagus and laterally by the left lung. In a normal subject the area is radiolucent and is usually concave in its shape. It contains lymph nodes, the ligamentum arteriosum and the recurrent laryngeal nerve.

‡Kerley B lines appear as a result of fluid within the interlobular septa. These lines are usually short (<2 cm), horizontal lines commonly seen at the lateral borders of the lungs near the costophrenic angles.

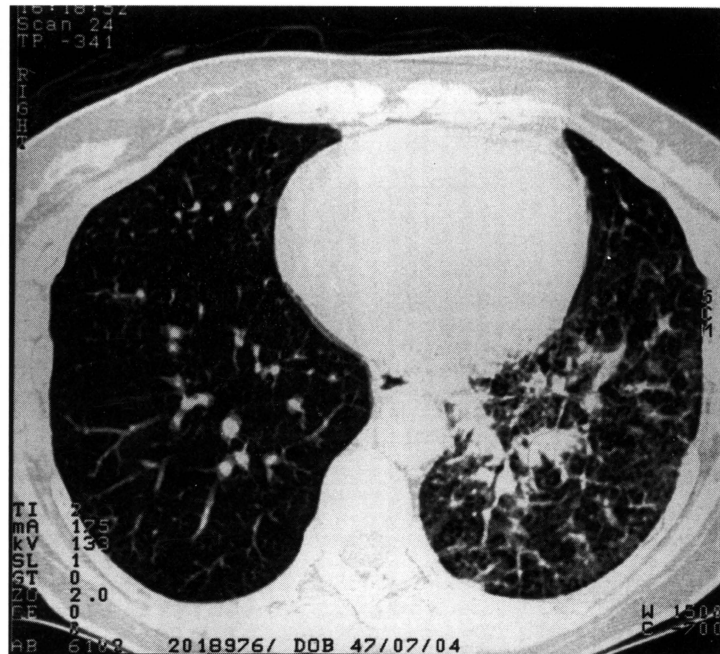


Figure 4. HRCT (lower lung zone)

Q4: Describe the findings on the images.

Q5: Does this patient need a biopsy?

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Diagnosis: Lymphangitic Carcinomatosis (2° to renal cell carcinoma)

Lymphangitic Carcinomatosis (LC) is a process by which there is tumor growth and spread within the lymphatics of the lung (1). It occurs most commonly in patients with adenocarcinomas of the lung, breast, kidneys, gastrointestinal tract, prostate, and cervix (2). Less commonly, LC may be secondary to other malignancies such as sarcomas, melanomas, carcinomas of the head and neck, and thyroid carcinoma. LC usually results from hematogenous spread to the lung with subsequent interstitial and lymphatic invasion (2). In the case presented here, the patient had a nephrectomy 2 years prior to developing LC. The pathological report showed a Grade 3 Mixed Clear and Renal Cell carcinoma with no capsular involvement. Tumor invasion into the renal vein was demonstrated at the time of resection.

LC can also occur because of direct lymphatic spread of tumor. Malignancy with hilar lymph node involvement may spread through the lymphatics in a retrograde fashion. Bronchogenic carcinoma sometimes invades the pulmonary lymphatics directly and may give rise to segmental or lobar LC (3). Antegrade flow through the diaphragm or pleural surfaces is a less common mechanism of invasion (4).

The pathologic appearance for LC has been reported to include the following: i) gross thickening of bronchovascular bundles and interlobular septa, ii) fine accentuation of the pleural lymphatic network, iii) malignant cells in the lymphatic vessels, iv) tumor thrombi, and v) localized plaques of subpleural tumor (1).

While there are some characteristic features present on plain film radiographs, the findings are usually non-specific. X-ray manifestations of LC occur because of a combination of dilated lymphatics and interstitial edema, together with opacities caused by the tumor cells themselves. The appearance of fine septal lines in the interstitium may represent the earliest detectable radiographic sign of LC (5). Most often pulmonary involvement is bilateral and symmetric. However, the changes can be unilateral, particularly in cases resulting from lung or breast carcinoma. In about 50% of cases of pathologically proven LC, the chest radiograph is normal (2,3). Plain film findings are outlined in **Table 1**.

Not surprisingly, CT scanning (particularly HRCT) is

Table 1: Plain Film Findings of LC

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| <ol style="list-style-type: none"> 1. reticular or reticulo-nodular interstitial markings (usually with irregular contours) 2. thickening of the interlobular septa (Kerley B lines) 3. hilar and mediastinal lymphadenopathy 4. pleural effusion (common) |
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Table 2: HRCT Findings of LC

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| <ol style="list-style-type: none"> 1. peribronchovascular interstitial thickening (smooth or nodular) 2. interlobular septal thickening and fissural thickening (smooth or nodular) 3. preservation of lung architecture 4. prominence of centrilobular structures 5. lymph node enlargement and pleural effusion |
|--|

more sensitive than plain film radiography in the detection of LC (1).

A4: There is diffuse reticular opacities throughout the lower lobe of the left lung in both the peribronchovascular and interlobar regions. The lung architecture has been maintained. On other HRCT slices (not shown) enlarged lymph nodes were seen in the AP window. The HRCT findings of LC are given in **Table 2**.

A5: In a patient with a known primary tumor and a clinical history consistent with LC, typical CT findings are usually considered diagnostic and a lung biopsy is usually not performed. Without a known history of a primary tumor, further evaluation is usually necessary and CT can be helpful in selecting the most appropriate site for biopsy. Transbronchial biopsy is usually positive (2). Another diagnostic test that could be used is an open biopsy. Less invasive options include bronchoalveolar lavage, which has been used successfully in specific cases (6).

The prognosis for LC is poor. Prior to the advent of modern chemotherapy approximately 50% of patients diagnosed with LC had died within 3 months and only 15% were alive at 6 months (7). In the current era of combined chemotherapy, expected survival has increased by a few months. Regression of disease has been observed in rare cases (8). In the case at hand, the patient continued to deteriorate and developed rapid weight loss. Despite a course of palliative radiation she was eventually admitted for delirium and elevated calcium levels. The patient died approximately 3 months after the diagnosis of LC was made.

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Erratum

An error appeared on the June 1998 masthead regarding the correct title of the Medical Society of Nova Scotia. We apologize for the mistake and have corrected it on the current masthead.

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