

## Case Report

# Adenocarcinoma of Lung Presenting as Interstitial Lung Disease

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## Abstract

Interstitial lung diseases (ILDs) presenting as lung cancer have been reported rarely from India. The present case describes a possibly primary lung cancer in a non-smoker who presented radiologically as a case of ILD. The possible mechanisms available in the literature are discussed. [Indian J Chest Dis Allied Sci 2015;57:239-241]

Key words: Interstitial lung disease, Adenocarcinoma.

## Introduction

Interstitial lung diseases (ILDs) constitute a heterogeneous group of inflammatory and fibrotic lung disorders that are associated with a variety of known and unknown risk factors. Among various diseases, a clinically important association has been reported with lung cancer. The association between the two diseases poses a challenge in diagnosis and management. We report a case of adenocarcinoma with a radiological picture simulating ILD.

## Case Report

A 72-year-old male was admitted to the hospital with complaints of dyspnoea and decreased appetite for the last three months. The breathlessness was gradually progressive with effort tolerance gradually decreased to walking 50-100 meters. He was a non-smoker and had retired from an office job. He had type II diabetes mellitus that was stable on oral drugs since last three years. There was no history of haemoptysis or chest pain or past history of anti-tubercular therapy. On examination, he was of a thin built and had mild pallor. Bilateral infra-scapular inspiratory crackles were heard on auscultation. Cardiovascular, nervous system and per abdominal examination were grossly normal. High resolution computed tomography (CT) of thorax showed bilateral interlobular septal thickening more on the periphery along with ill-defined lower lobe and sub-pleural opacities suggestive of an ILD (Figures 1 and 2). Haemogram and other routine investigations were normal. Transbronchial lung biopsy yielded the diagnosis of 'well-differentiated adenocarcinoma' (Figure 3). Prostatic specific antigen level and ultrasonography of prostate were normal. Ultrasonographic-guided fine needle aspiration cytology of the pelvic lymph node also revealed metastatic adenocarcinoma. Due to his advanced



Figure 1. Chest radiograph showing increased haziness with bilateral poorly-defined reticulo-nodular shadow in lower and mid zones.

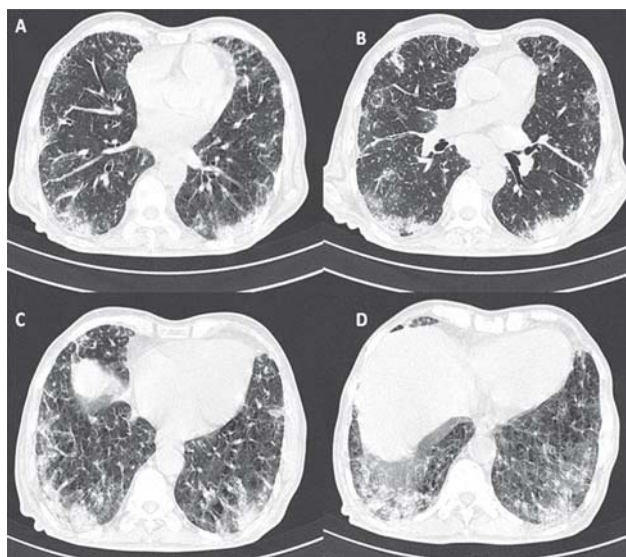


Figure 2. HRCT sections from lower chest showing bilateral Interstitial fibrosis, sub-pleural consolidation, inter-lobular septal thickening.

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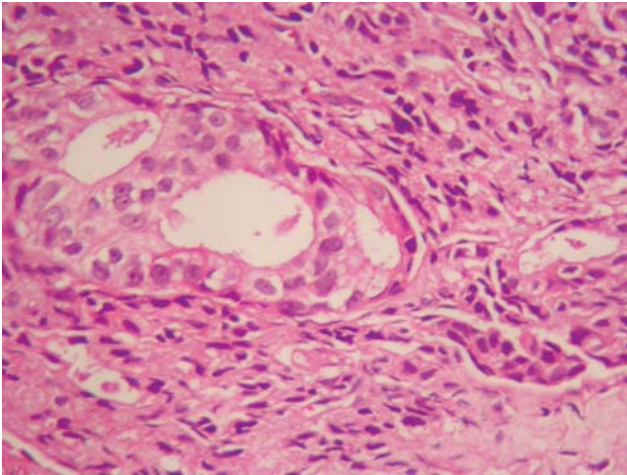


Figure 3. Photomicrograph of bronchoscopic lung biopsy showing malignant glands having hyperchromatic and prominent nuclei suggesting adenocarcinoma (Haematoxylin and Eosin  $\times$  200).

metastatic condition combination chemotherapy comprising of pemetrexed and carboplatin was given for initial 3 cycles.

## Discussion

The association of pulmonary fibrosis and lung cancer has been recognised since 1939 when Friedrich described the occurrence of peripheral carcinomas in areas of focal lung scarring.<sup>1</sup> Several forms of ILDs have been associated with the development of lung cancer, notably systemic lupus erythematosus<sup>2</sup>, occupational lung diseases like asbestosis<sup>3</sup> and idiopathic interstitial pneumonia (IIP),<sup>4,5</sup> etc. Among all IIPs, idiopathic pulmonary fibrosis (IPF) has been evaluated as a plausible risk factor for lung cancer. Studies report a wide range of association of IPF with lung cancer. In one study,<sup>6</sup> lung cancer was present in 4.8% of patients who died with a diagnosis of IPF, whereas in other autopsy study<sup>7</sup>, its prevalence was found to be considerably high at 48%. The cumulative incidence of lung cancer in IPF also increases with duration of follow-up after the initial diagnosis of IPF and has been found to be 3.3%, 15.4% and 54.7% in 1, 5 and 10 years of follow-up, respectively.<sup>4</sup>

In spite of this documented association, the pathogenetic mechanisms of the two concurrent diseases have not been elucidated. Three hypotheses must be considered while discussing the inter-relationship between the two diseases: one disease preceding and causing the other and both developing concurrently due to common pathogenetic mechanisms.<sup>8</sup> Repeated cycles of damage and repair secondary to recurrent inflammation in ILD may cause injury and genetic damage to local epithelial cells that may predispose to cancer through sequential cellular morphologic alterations of atypia, metaplasia, dysplasia, and eventually carcinoma.<sup>9,10</sup> On the

molecular level, tumorigenesis could result from point mutations in *p53* and *ras* genes in epithelial cells of IPF patients. By the use of highly polymorphic microsatellite markers, genetic errors like microsatellite instability and loss of hetero-zygosity have been detected in patients with IPF.<sup>11</sup> *Vice versa*, surgery<sup>12</sup>, radiotherapy<sup>13</sup> and chemotherapy<sup>14</sup> in the treatment of lung cancer have also been implicated in the development of ILD. Among the common mechanisms, smoking and occupational exposures of mineral and wood dust have been hypothesised as risk factors for the synchronous but independent development of lung cancer and ILD.<sup>15</sup> The ILD leading to lung cancer or independent occurrence of two diseases are the possible pathogenetic mechanisms in our case.

Lung cancer occurring in association with ILD is usually located peripherally and is more common in men.<sup>16</sup> Age, smoking index at initial diagnosis and lack of treatment of ILD are important factors associated with the development of cancer.<sup>4</sup> However, except age, we could not attribute any other risk factor for the development of ILD and cancer in our patient.

In our case with sub-pleural opacity, septal thickening and generalised involvement on CT scan, a diagnosis of lymphangitic carcinomatosis is a possibility. In lymphangitic carcinomatosis, the spread of tumour cells to the pulmonary lymphatic system or the adjacent interstitia causes thickening of the bronchovascular bundles and septa. However, in our case, no neoplastic cells were found in peri-vascular, peri-bronchial and sub-pleural lymphatics along the septal vessels. Although there were thickening of interlobular septa on CT scan, absence of polygonal arcades with thickened limbs from thickened septa of adjacent lobules does not favour classical lymphangitic carcinomatosis. Moreover the histopathologic confirmation in this case was consistent with adenocarcinoma. In the absence of any CT evidence of mass lesion, it is likely that adenocarcinoma lung in the patient presented as ILD. With the limited available transbronchial lung biopsy sample, the possibility of coexistent adenocarcinoma and ILD in our patient can not be ruled out.

The diagnostic work-up for lung cancer in patients with IPF is similar to that for lung cancer alone. However, when the two occur together, high resolution CT picture may be unusual. In view of the peripheral location and relatively early diagnosis, such patients may be eligible for conservative surgical management, but such treatment is associated with significant post-operative morbidity and mortality.<sup>17</sup>

The present case highlights an uncommon presentation of lung cancer. In view of scanty epidemiological data on ILD as well as its association with lung cancer, this case strengthens this rare presentation and emphasise the need for its heightened awareness while managing cases with unusual presentation.

## Reference

1. Friedrich G. *Periphere Lungenkrebse auf dem Boden pleuranaher Narben*. *Virchow's Arch Path Anat* 1939;304:230-47.
2. Ramsey-Goldman R, Mattai SA, Schilling E, Chiu YL, Alo CJ, Howe HL, *et al*. Increased risk of malignancy in patients with systemic lupus erythematosus. *J Investig Med* 1998;46:217-22.
3. Mossman BT, Gee JB. Asbestos-related diseases. *N Engl J Med* 1989;320:1721-30.
4. Ozawa Y, Suda T, Naito T, Enomoto N, Hashimoto D, Fujisawa T, *et al*. Cumulative incidence of and predictive factors for lung cancer in IPF. *Respirology* 2009;14:723-8.
5. Sato T, Yamadori I, Fujita J, Hamada N, Yonei T, Bandoh S, *et al*. Three cases of non-specific interstitial pneumonia associated with primary lung cancer. *Intern Med* 2004;43:721-6.
6. Wells C, Mannino DM. Pulmonary fibrosis and lung cancer in the United States: analysis of the multiple cause of death mortality data, 1979 through 1991. *South Med J* 1996;89:505-10.
7. Matsushita H, Tanaka S, Saiki Y, Hara M, Nakata K, Tanimura S, *et al*. Lung cancer associated with usual interstitial pneumonia. *Pathol Int* 1995;45:925-32.
8. Daniels CE, Jett JR. Does interstitial lung disease predispose to lung cancer? *Curr Opin Pulm Med* 2005;11:431-7.
9. Haddad R, Massaro D. Idiopathic diffuse interstitial pulmonary fibrosis (fibrosing alveolitis), atypical epithelial proliferation and lung cancer. *Am J Med* 1968;45:211-9.
10. Fraire AE, Greenberg SD. Carcinoma and diffuse interstitial fibrosis of lung. *Cancer* 1973;31:1078-86.
11. Vassilakis DA, Sourvinos G, Spandidos DA, Siafakas NM, Bouros D. Frequent genetic alterations at the microsatellite level in cytologic sputum samples of patients with idiopathic pulmonary fibrosis. *Am J Respir Crit Care Med* 2000;162:1115-9.
12. Tanita T, Chida M, Hoshikawa Y, Handa M, Sato M, Sagawa M, *et al*. Experience with fatal interstitial pneumonia after operation for lung cancer. *J Cardiovasc Surg (Torino)* 2001;42:125-9.
13. Morgan GW, Breit SN. Radiation and the lung: a reevaluation of the mechanisms mediating pulmonary injury. *Int J Radiat Oncol Biol Phys* 1995;31:361-9.
14. Limper AH. Chemotherapy-induced lung disease. *Clin Chest Med* 2004;25:53-64.
15. Baumgartner KB, Samet JM, Stidley CA, Colby TV, Waldron JA. Cigarette smoking: a risk factor for idiopathic pulmonary fibrosis. *Am J Respir Crit Care Med* 1997;155:242-8.
16. Aubry MC, Myers JL, Douglas WW, Tazelaar HD, Washington Stephens TL, Hartman TE, *et al*. Primary pulmonary carcinoma in patients with idiopathic pulmonary fibrosis. *Mayo Clin Proc* 2002;77:763-70.
17. Kumar P, Goldstraw P, Yamada K, Nicholson AG, Wells AU, Hansell DM, *et al*. Pulmonary fibrosis and lung cancer: risk and benefit analysis of pulmonary resection. *J Thorac Cardiovasc Surg* 2003;125:1321-7.