Case Report

Hypertrophic pulmonary osteoarthropathy: In coexistent lung cancer with pulmonary tuberculosis

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ABSTRACT

Association of lung cancer with pulmonary tuberculosis is approximately 1-2% and pulmonary tuberculosis is associated with lung cancer in approximately 1-5% of cases. A 46-year-old male presented to us with low-grade fever for 3 months, increased severity of cough for 2 months, and painful swelling of fingers with both wrist joints for 1 month. Chest X-ray PA view revealed a homogenous opacity in the right upper and mid zone. Contrast-enhanced CT scan of the thorax showed soft tissue density, enhancing lesion (11.5 × 8.6 cm) with areas of necrosis in the right upper lobe. The patient suffered from squamous cell lung cancer as well as active pulmonary tuberculosis. As a complication of these two coexisting conditions, the patient developed hypertrophic pulmonary osteoarthropathy.

Key words: Hypertrophic pulmonary osteoarthropathy, lung cancer, pulmonary tuberculosis

INTRODUCTION

Hypertrophic pulmonary osteoarthropathy (HPOA) or else Pierre-Marie-Bamberger syndrome is characterized by clubbing of fingers and toes with arthritis and periostosis of the long distal bones. There is presence of bilateral symmetric painful swelling of the affected limbs. It may be primary, occurs as a familial condition mainly in males with a chronic course, or may be secondary to an underlying pulmonary, cardiac, hepatic, or intestinal disease with a more rapid course. Pulmonary causes of HPOA are lung cancer, pulmonary tuberculosis, mesothelioma, pulmonary fibrosis, and empyema. The coexistence of lung cancer and active pulmonary tuberculosis in the same lobe of lung, which both lead to hypertrophic osteoarthropathy, is very rare. As the incidence of pulmonary tuberculosis has increased in the elderly, coexisting pulmonary tuberculosis and lung cancer has become a matter of great interest. Here we report a rare case of lung cancer and active pulmonary tuberculosis in the same lobe causing HPOA.

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CASE REPORT

A 46-year-old male was admitted to our hospital with low-grade fever for 3 months and painful swelling of fingers and both wrist joints for 1 month. He also complained of cough and shortness of breath (SOB) for the last 3 years, severity of which increased in the last 2 months. The SOB was initially mMRC (modified medical research council) grade 1 in nature, persistent, progressive to reach mMRC grade 3 dyspnea at the time of admission. He was a chronic smoker, taking 20-25 cigarettes per day for the last 30 years. On general survey, the patient had moderate anemia with grade IV clubbing of fingers and swelling of both wrist joints, which was tender. On respiratory system examination, a dull percussion note was present on the right side from second to fourth inter-costal space along the mid-clavicular line with decreased vesicular breath sound over the same area and in other areas of both lung vesicular breath sound with prolonged expiration and polyphonic diffuse rhonchi was present. There was no mediastinal shift. On spirometry there was the presence of irreversible moderate obstructive airway disease (post-bronchodilator FEV_1/FVC -62%, FEV_1 - 65% of predicted, FVC -80% of predicted).

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A chest x-ray PA view revealed a homogenous opacity in the right upper and mid zone [Figure 1a]. Contrast-enhanced CT thorax showed a heterogenous enhancing lesion (11.5 × 8.6 cm) with areas of necrosis in the right upper lobe and enlarged right hilar lymph nodes [Figure 1b]. Sputum for acid-fast bacilli (AFB) smear was negative for 6 consecutive days and culture for mycobacteria was also negative. CT-guided FNAC (fine-needle aspiration cytology) from space occupying lesion (SOL) in the right upper lobe demonstrated degenerating, foamy histiocytes, chronic inflammatory cells, and granulomatous collections of epithelioid cells with background caseous necrosis [Figure 2a]. Z-N (Ziehl–Neelsen) staining of the aspirate showed the presence of acid-fast bacilli. A diagnosis of mycobacterial lesion was made. The patient was put on antitubercular chemotherapy (ATD) in a daily dose consisting of isoniazid 300 mg, rifampicin 450 mg, pyrazinamide 1250 mg, and ethambutol 800 mg. Even after antitubercular treatment for 1 month, there was clinical deterioration and the chest X-ray remained unchanged. CT-guided true cut biopsy from the right lung SOL was suggestive from squamous cell carcinoma [Figure 2b]. On immunohistochemistry, the biopsy material was positive for cytokeratin 5, p63, and 34betaE12 but negative for thyroid transcription factor 1 [Figure 3]. The patient was advised to have surgery but denied. The patient was put on chemotherapy regimen consisting of carboplatin and paclitaxel.

DISCUSSION

According to a recent report, lung cancer was associated with pulmonary tuberculosis in approximately 1-2% of cases and pulmonary tuberculosis was associated with lung cancer in approximately 1-5% of cases.[1,2] As the incidence of pulmonary tuberculosis has increased in older patients, the presence of concomitant tuberculosis and lung cancer has generated great interest. It was reported that the characteristic features of these patients were that they were males over 60 years of age who smoked heavily.[3]

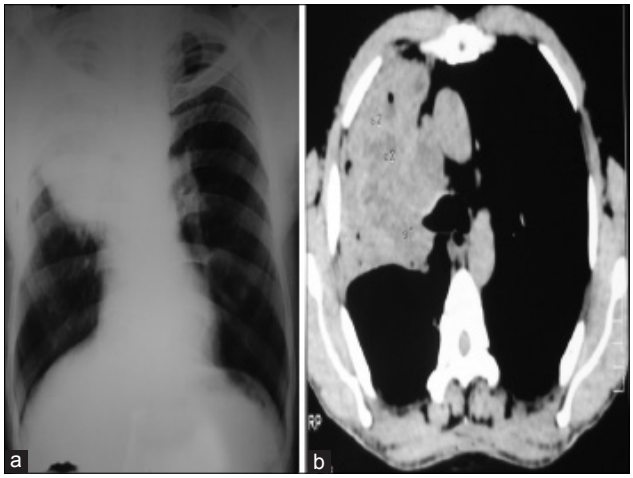

Figure 1: Chest X-ray PA view (a) showing a homogenous opacity in right upper and mid-zone and CECT thorax (b) showing a heterogenous enhancing lesion (11.5 × 8.6 cm) with areas of necrosis in the right upper lobe and enlarged right hilar lymph nodes

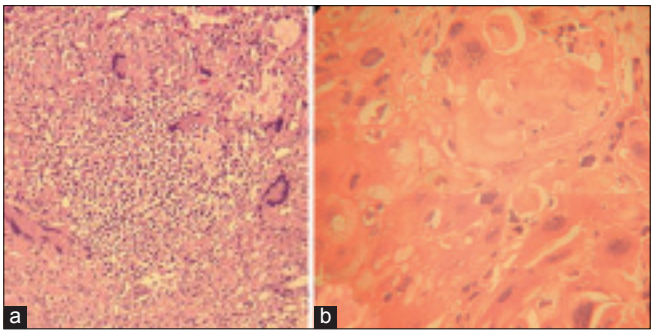

Figure 2: CT-guided FNAC from SOL in the right upper lobe (a) showing caseating granuloma and CT-guided true cut biopsy from right lung SOL (b) showing nuclear hyperchromasia with pleomorphism and keratinization pearl suggestive of squamous cell carcinoma of lung (H and E, 200×)

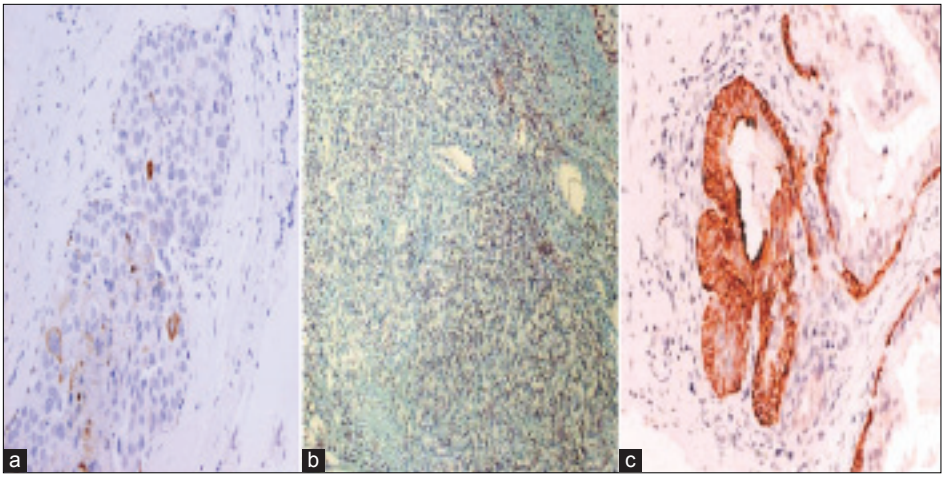

Figure 3: Immunohistochemistry staining of lung biopsy specimen showing positive staining to cytokeratin 5 (a), p63 (b), and 34betaE12 (c)

The possibility of concomitant lung cancer should be considered in patients with tuberculoma. A few reports are available regarding these lesions in different lobes or even in the same lobe, at different locations.[4] Here we report a case of coexisting lung cancer and tuberculosis in the same lesion.

Although the association of HPOA with lung cancer and pulmonary tuberculosis is well known, the exact mechanism of the syndrome is still unclear. In the case of lung diseases, congenital cyanotic heart diseases, and liver cirrhosis, megakaryocytes bypass the pulmonary circulation through arteriovenous shunting and escape fragmentation. These un-fragmented megakaryocytes stimulate the production of platelet-derived growth factor (PDGF) and vascular endothelial growth factor (VEGF) by endothelial cells, resulting in angiogenesis and endothelial hyperplasia which is manifested as clubbing of fingers and toes.[5]

Yamashita *et al.* reported that homogeneous enhancement of a nodule suggested lung carcinoma while capsular and peripheral enhancement pattern suggested tuberculoma and most of the hamartomas.[6] Swensen *et al.* reported that most malignant nodules were well enhanced, while benign nodules showed less or no enhancement.[7] When lung cancer develops against the background of pulmonary tuberculosis, symptoms are worsening of patient's general symptoms. A number of explanations were put forward for coexisting pulmonary tuberculosis and lung cancer. Several possible reasons such as depression of cell-mediated immunity in patients, an increase in the numbers of older patients, the presence of scars and cavities in the lung, and smoking history have been suspected. Carcinoma may invade the existing tubercular lesions making the tubercular lesions active. It was found previously that tuberculosis lesions became active in caseous necrosis invaded by carcinoma. Another mechanism is relapse of tuberculosis intrinsically upon contact with carcinomatosis lesions in patients with carcinoma.[8] We postulated that the first mechanism might be responsible in our case because of clinical findings and pathological features. The association between pulmonary TB and lung cancer has biological plausibility. The respiratory symptoms of TB may persist several months before TB diagnosis, and thereafter treatment typically entails 6-9 months of multidrug medication. The TB infection may induce substantial pulmonary inflammation during these extended periods. Chronic inflammation orchestrates a tumor-supporting microenvironment that is indispensable to carcinogenesis. The activation of innate immunity and inflammation results in the production of cytokines that can stimulate tumor growth and progression.[9] Coexistence of tuberculosis and lung cancer is obvious, although it is rare in the practice of thoracic surgery. In most cases, epidermoid cancer was diagnosed (52.2% of patients). Surgery is the method of choice in the treatment of combination of tuberculosis and lung cancer. The median survival of these patients is 28 ± 2 months.[10]

CONCLUSION

The possibility of concomitant lung cancer should be considered in patients with tuberculoma having risk factors like heavy smoking. Carcinoma may invade the existing tubercular lesions making the tubercular lesions active like our case. In such cases, surgery is the main treatment with ATD.

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