



Tuberculosis and lung Cancer: A Case Report

Authors

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Abstract

Lung cancer is the most prevalent cancer in men and the third-most common cancer among women and being so common it is responsible for mortality of around 1 million people per year around the globe. And when this is combined with another deadly disease like tuberculosis, the mortality goes even higher. Symptoms such as cough or expectoration, fever, haemoptysis, weight loss and appetite loss are common to both tuberculosis and lung cancer and this leads to misdiagnosis or missing of either of the disease when both occur together, leading to delay in proper treatment to the patient. A high clinical suspicion is hence important to diagnose the disease. Here we present a case of development of tuberculosis in a patient on treatment for lung cancer.

Keywords: Tuberculosis, Lung Biopsy, Lung Malignancy.

Introduction

Tuberculosis (TB) is a serious public health problem in developing countries, with India bearing highest burden. According to global tuberculosis report 2016 of WHO, TB affects more than 9 million people and causes the death of 1.8 million people each year, especially in developing countries.

Lung cancer is a deadly type of cancer seen worldwide and in India and represents a major public health problem. There were 1.8 million new lung cancer cases estimated to occur in 2012.⁽¹⁾ In India, lung cancer constitutes 6.9% of all new cancer cases and 9.3% of all cancer-related deaths with men having more predilection for development of lung cancer and cancer related mortality.⁽²⁾ Another major cause of morbidity and mortality, especially in developing countries, is tuberculosis.⁽³⁾

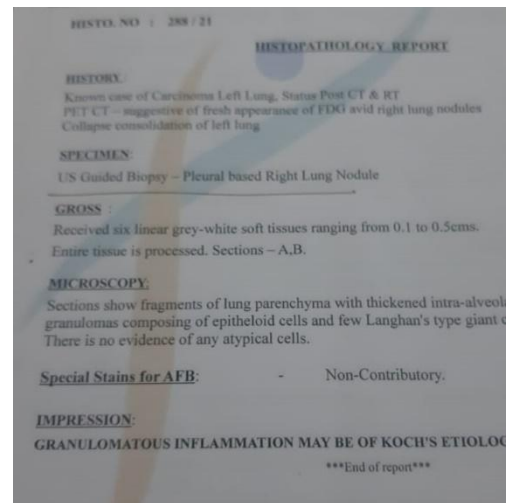
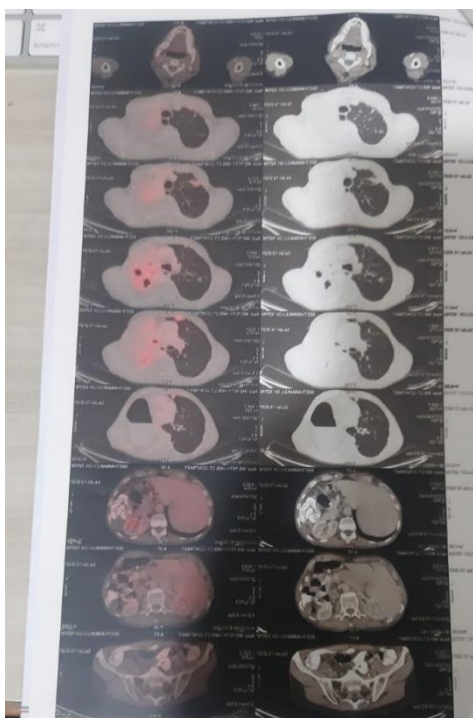
Lung cancer and its treatments result in immunosuppression which attracts the bacillus to infect the victim^[4]. Thus cancer-induced or chemotherapy-induced immunosuppression can lead to increased rates of tuberculosis reactivation in patients with solid tumours.⁽⁵⁾

Both diseases do co-exists producing diagnostic dilemma and treatment controversies. The simultaneous or sequential occurrence of pulmonary tuberculosis and lung cancer in the same patient has been reported in various case series and case-control studies.^(6,7) The association between these two diseases is important, since both are quite prevalent and have a major impact on public health.

Case Report

A 62 year old male came with complaints of cough associated with whitish expectoration,

evening rise of temperature, associated with myalgia and loss of appetite since 1 month, weight loss approximately 2 kg in 3 months. He is known case of Carcinoma lung on chemotherapy & radiotherapy. He is smoker, smokes 6 cigarettes / day since 40 yrs. General examination revealed grade III clubbing, vitals were spo2 93% at Room air, Pulse Rate 75/minute, Blood pressure was 110/70 mmHg and Respiratory rate 21/min. Physical examination revealed deviation of trachea to left & decreased Vocal fremitus & decreased vocal resonance on left side & decreased breath sounds in left Supra scapular area, Inter scapular area and infra axillary area. PET CT was done as for follow-up which revealed collapse consolidation of left lung with moderate effusion on left side and parenchymal nodules were noted in the right lung with level II cervical lymph nodes enlargement. Ultrasound guided biopsy of the parenchymal lung nodules was done & send for histopathological examination, which revealed granulomatous inflammation likely of Koch's aetiology. Thus the diagnosis of tuberculosis in pre-existing lung cancer was made & was started on Anti tuberculous treatment according to weight band along with his chemotherapy & radiotherapy for lung cancer.



Discussion

The risk for TB in patients with malignancy is due to immunosuppression from the cancer itself or from the chemotherapy and local structural changes in the lungs by primary lung cancer or metastasis^(12,13). The incidence of TB has been therefore reportedly increasing in patients with cancer, in both pulmonary and non-pulmonary cancers^(13,14,15). The cancer patients are among the high-risk TB population, therefore patients diagnosed with malignancy need to be targeted because their population is still growing^(8,9,10). In addition, due to advancements of current medications, the average lifespan after a diagnosis of cancer is longer than before⁽¹¹⁾. In most of the infected people, TB remains clinically asymptomatic and microbiologically inactive (latent). However, in approximately 5 to 10% of latent infected persons, the infection will cause active TB at some point during their lifetime^[16]. The risk of TB reactivation is increased in persons with immunocompromising conditions, such as HIV infection⁽¹⁷⁾, chronic renal failure^[18] or diabetes mellitus^[19], and in persons on immunocompromising medications, such as tumour necrosis factor- α (TNF- α) inhibitors^(20,21). The risk of TB reactivation increases in people with cancer, and therefore, screening for active and latent TB in this group should be considered.

The relationship between pulmonary Tuberculosis and Lung cancer has been known for years. Pulmonary tuberculosis has been found in 0.7% cases of lung cancer^[22]. Bayle in 1810 was the first to report on the co-existence of pulmonary tuberculosis and bronchogenic carcinoma^[23].

Fontenelle et al. reviewed 90 patients over a 12 year period who had co-existent bronchogenic carcinoma and pulmonary tuberculosis. Seventy-one patients (78.8%) had active tuberculosis. There is a certain connection between pulmonary TB and lung carcinoma, as it has been verified by many pathologists and clinicians. The association between these two diseases has great significance, since both are quite prevalent and have a serious impact on public health. Either of them can be primary or secondary.^[24,25] The two diseases may occur as follows:

- a. Carcinoma occurs on the TB ground, reactivating the old focus of TB
- b. Carcinoma develops from previous TB scars (scar carcinoma)
- c. Carcinoma developing by epithelium metaplasia of tuberculous cavities
- d. Both diseases are independent of each other and develop simultaneously or sequentially by chance
- e. Metastatic carcinoma developing in an old TB lesion
- f. Secondary infection of TB in a cancer patient.^{[24],[25],[26]}

There are many similarities between both diseases like they both are very common, have high prevalence, involve lung parenchyma and above all, characterised by similar symptoms.

Pulmonary TB and Lung cancer mimics each other sometimes with clinical and radiological features. The common symptoms are fever, night sweats, cough, expectoration, haemoptysis, loss of appetite, weight loss, fatigue, chest pain. Cancer cells invasion in healed TB lesions might also lead to TB reactivation by weakening the local immunity. Two diseases - Tuberculosis and cancer may be located in ipsilateral lung, contralateral lung or same lobe location or extra-pulmonary

regions. TB bacilli live at a dormant status in granulomas and induce TB sensitivity^[27]. If the local immunity is deteriorated, reactivation of a latent TB, primary mycobacterial infection, new exogenous infection may cause TB infection^(28,29,30,31). Chemotherapy, immune dysfunction, radiotherapy, severe malnutrition may lead to immune-suppression. Radiotherapy might lead to granulomas microenvironment deregulation, allowing TB mycobacteria to proliferate.^(32,33) The effects of radiation on the immune system are local tissue damage, peripheral depletion of lymphocytes and an alteration in the immune cellular balance, namely, B cells, T cells, and natural killer cells^[34].

Lymphadenopathy in setting of TB and Lung cancer should be investigated carefully as lung cancer itself can cause granulomatous reaction and or tubercular lymphadenopathy can mimic like metastatic lesion to Lymph Noderadio graphically. The lymph nodes due tuberculous lymphadenitis may lead to over staging in TNM system. The biopsy specimens reveal infiltration by cancer cell, should also be sent to a microbiology laboratory to perform stain and culture for M tuberculosis⁽³⁵⁾.

Tamura et al. analysed clinical data on 25 cases with coexisting Lung cancer and active pulmonary tuberculosis and reported that the incidence of Lung cancer among patients with active pulmonary tuberculosis is 0.7% while the incidence of active pulmonary tuberculosis in untreated Lung cancer patients is 1.9.⁽³⁶⁾

Lung cancer was associated with a six-fold increase in TB & more common with bronchogenic carcinoma .The lesion most common occurred in the upper lung zones in patients who had both carcinoma and tuberculosis .In patients suffering from both diseases, 13.7 percent of carcinomas occurred in the main bronchi, 59.7 percent in the upper lobes and 26.6 percent in the lower lobes, right middle lobe and lingular division of left upper lobe, combined. Bronchogenic carcinoma can cause activation of dormant tuberculous foci in the lung either by

erosion of contiguous areas or by lowering systemic resistance as the tumour produces cachexia and debilitation.

Patients with other solid cancers and haematological malignancies are also immunocompromised because of the disease itself, and as a consequence of chemotherapy. It is therefore reasonable to assume that the risk of TB reactivation would be increased in these people, and consider Latent tubercular infection screening and treatment in this group. The highest relative risk of TB was found in children with haematological malignancies or solid cancers.

Tuberculosis incidence was highest among patients with underlying hematologic conditions (240 cases per 100,000 persons) and varied significantly according to country of birth. The highest rate was among allogeneic hematopoietic stem cell transplant recipients followed by patients with non-Hodgkin lymphoma and patients with Hodgkin lymphoma

Among persons with an underlying solid tumour, the rate of tuberculosis was 39 cases per 1,00,000 persons and varied significantly according to country of birth. Patients with cancer of the head and neck had a substantially increased tuberculosis rate (135 cases per 100,000 persons) that was unrelated to country of birth.

The other solid cancer that has increased incidence was seen among cases with gastric cancer treated with gastrectomy, Breast and colon cancer.

Conclusion

Tuberculosis is highest burden in developing countries like India & carcinoma lung & its treatment suppress the immunity of a person thereby activating the dormant bacillus causing reactivation of a latent TB, primary mycobacterial infection, new exogenous infection causing TB infection

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