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Cavitary Lung Disease: Not Always due to Tuberculosis! Primary Lung Cancer with Smear Positive Pulmonary Tuberculosis- A Case Report

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Abstract Pulmonary Tuberculosis is the leading cause of cavitary lung disease globally. Although clinical scenario of majority of the disorders causing cavitation and hemoptysis are overlapping, special emphasis should be given on smoking history and concomitant clubbing especially in elderly population. CT thorax will differentiate probability of malignancy as cause of cavity by delineating its pericavitary nodularity, irregular wall, thickness and size. Bronchoscopy is must in all the cases, will help to confirm the diagnosis and ruling out underlying malignancy. Squamous cell carcinoma is known to cause cavitation and the only histological lung cancer type causing such radiological abnormality. In this case report we described a elderly male patient presented with persistent intermittent hemoptysis with chest pain and clubbing on clinical evaluation. Initially diagnosed as a case of smear positive pulmonary tuberculosis finally we confirmed as Primary Lung cancer of Squamous cell origin. High index of suspicion is must in such cases, with bronchoscopy and cytopathology expertise in lung histopathology will be crucial in confirming diagnosis.

Keywords: *cavitary lung disease, tuberculosis, bronchoscopy, squamous cell carcinoma*

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1. Introduction

The association of TB with carcinoma was initially described about 200 years ago by Bayle who considered 'cavitation cancereuse' as one of the various types of TB. [1,2] Ever since, the potential association between TB and subsequent development of cancer has been investigated. Since both disorders are common, we support the notion that in most cases their co-existence may be explained by chance alone. In general, chronic inflammatory conditions have been thought to create the appropriate microenvironment for malignancy development through a number of mechanisms; i.e. the higher rate of cell turnover is thought to increase the risk for genetic errors [3].

Clinicians need to be aware of the myriad manifestations of TB and resist the temptation of premature diagnostic closure. [4] The diagnosis of a tuberculous infection remains challenging and requires a high index of suspicion, especially when it complicates the clinical presentation of cancer patients.

2. Case Report

66 YR male with history of intermittent hemoptysis, cough with minimal sputum and low grade dull aching chest pain since 6 month's. Initially consulted a general physician and investigated as chest xray, CT thorax, and sputum microscopy.

2.1. CxR PA View done in Initial Visit

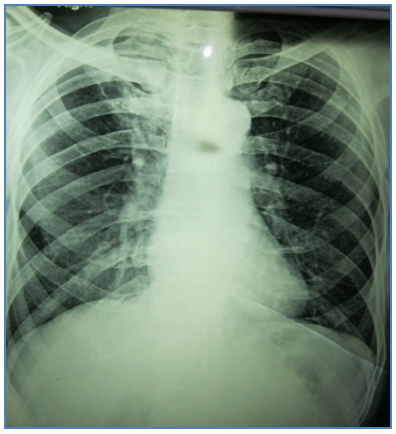

Figure 1.

Figure 1 Chest x-ray PA- A good quality inspiratory film, features of COPD like increased lung volume, flattened and downward placed diaphragm , tubular heart, hyperlucent lung fields, abrupt tapering of vessel marking on peripheral third and Inhomogeneous ill-defined

opacity in right upper zone .Also look calcified foci at hilum on both sides. Mostly look like fibrosis.

2.2. HRCT Thorax done in Initial Visit

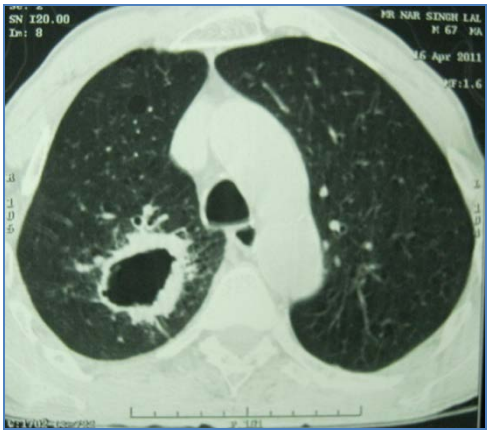

Figure 2. Lung window

Figure 2 Lung window - moderate to thick walled Cavity with pericavitary consolidation mostly look like reactivation Tuberculosis, also note irregular inner rim with pericavitary nodularity.

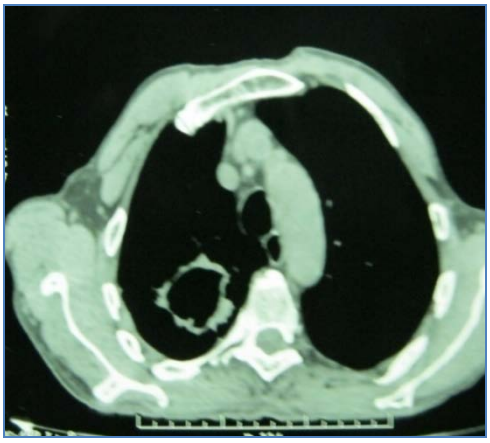

Figure 3. Mediastinal window

Figure 3 Mediastinal windows- No obvious mediastinal adenopathy.

Sputum smear microscopy done for AFB (acid fast bacilli) which was positive, and confirmed to have Pulmonary Tuberculosis. Sputum examination for exfoliative cytology for malignant cells was not perfomed. General physician started Antituberculosis treatment consisting of four drugs INH, Rifampin, Ethambutol and Pyrazinamide, which was continued for six months. During treatment duration patient's symptoms were partially relieved, referred by general Physician for Bronchoscopy after insisting by patients son for cause to recurrent persistent hemoptysis. General physician never thought for repeat CT thorax during entire course of treatment.

In outdoor department of pulmonary medicine, resident doctor assessed clinically as a case of intermittent minimal hemoptysis, with cough and increasing chest pain than before. Already pt. is on ATT since 6 months. Farmer by Occupation, Chronic Bidi addict with smoking index was 56 pack years, left smoking 6 month's back. Opium addict since 10 yr's with no history of major hospitalization in past. General physical examination revealed vital parameters stable, pallor +, clubbing GR III, no superficial lymphadenopathy & no visceral organomegaly. Respiratory system examination found to have Cavernous breathing in upper axillary area on right side, rest of the lung fields normal vesicular breath sounds with air entry preserved bilaterally.

After entire clinical and radiological evaluation, our most suspected diagnosis was underlying malignancy. We Planned for Fiberoptic bronchoscopy to confirm diagnosis, performed Fiberoptic video-bronchoscopy under topical anesthesia. During bronchoscopy we observed growth in right upper lobe bronchus. We performed bronchoalveolar lavage and bronchoscopic forcep biopsy and sent histopathology specimens for expert analysis from pathology department.

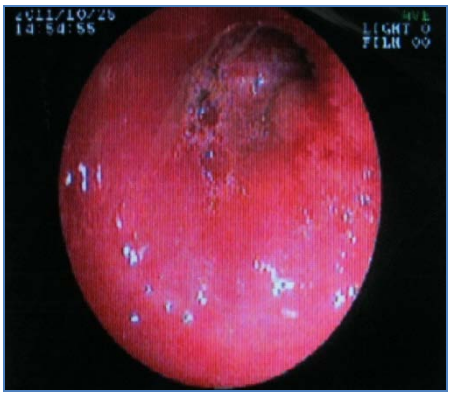

Figure 4. fleshy cauliflower like growth seen at opening of right upper lobe bronchus leading to near complete blocking of opening

3. Histopathology Analysis

BAL Cytology was showing malignant cells, highly suggestive of Squamous cell carcinoma type. **Bronchial wash** specimens were negative for AFB examination.

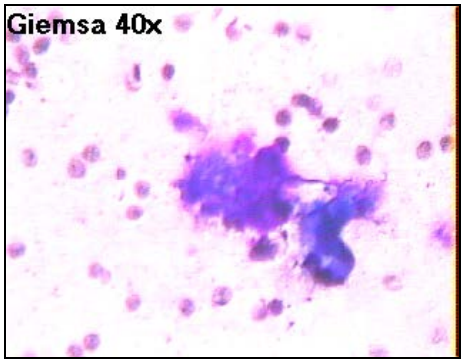

Figure 5. Cytology showing malignant cells from Squamous cell origin

3.1. Bronchial Forcep Biopsy- Histopathology

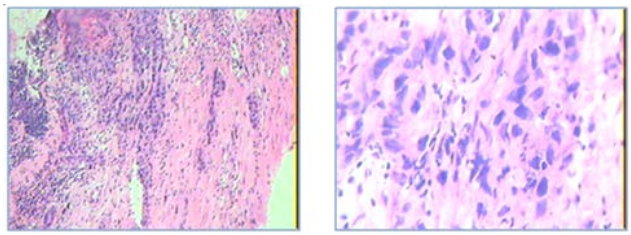

Figure 6. Moderately differentiating Squamous cell carcinoma

4. Discussion

The synthesis of the available evidence enabled us to establish three different types of association between malignancy and TB: (i) the development of cancer on a background of a previous tuberculous infection; (ii) the concurrent existence of TB and malignancy in the same patient(s) or clinical specimen(s); and (iii) the diagnostic challenges arising from the multi-faceted presentations of these two disorders. It is noteworthy that one-third of the case reports showing that TB and malignancy can be mistaken for each other on first clinical presentation (6/17 case reports showing that malignancy could mimic mycobacterial infections and 23/89 case reports where TB seemed to masquerade as a malignant tumor) came from areas of low TB endemicity [5].

Mycobacterial infections may escape the host's cellular response and killing and establish chronic and persistent inflammation. [6] There is ample experimental evidence that Mycobacterium tuberculosis is capable of inducing DNA damage. Specifically, various mycobacterial cell wall components may induce production of nitric oxide, and reactive oxygen species. It should be noted at this point that nitrative DNA damage as well as oxidative DNA damage have been implicated in inflammation-related carcinogenesis [7].

The mechanism that could associate the co-existence of TB and lung cancer is yet to be elucidated. Nevertheless, smoking is a factor predisposing to both TB and lung cancer. A recent Meta-analysis showed that smokers have increased risk of either TB acquisition or progression of TB to clinical disease. [8] The risk of TB increases with the dose of cigarettes and duration of smoking. Impairment of the clearance of secretions on the tracheo-bronchial mucosal surface as well as reduced phagocytic ability of the pulmonary alveolar macrophages and lower level of secreted pro-inflammatory cytokines might be the possible mechanisms of M. tuberculosis' escape from the first line of host defenses, which explain how exposure to tobacco smoke may predispose to TB [9].

In our case report we confirm the diagnosis of Squamous cell carcinoma of lung with the help of bronchoscopy. Sakuraba M et al [10], Yoon Y et al [11] reported similar case reports, concurrent diagnosis of Pulmonary TB and Primary lung cancer with the help of bronchoscopy. We also observed same anatomical location of primary lung cancer and Pulmonary Tuberculosis, i.e. in right upper lobe bronchus. Studies [12,13,14] that focused on the co-existence of malignant tumors with TB infection in the same site confirmed similar observation. All diagnoses were based on biopsies taken from the same site of infection and malignancy or from regional lymph nodes of the malignancy.

5. Conclusion

Not all cavitary diseases are due to Tuberculosis. Although tuberculosis is the leading cause of pulmonary cavity and hemoptysis, possibility of underlying malignancy should be kept in mind. Advanced age, high smoking index, clubbing on clinical examination and persistent hemoptysis mandates bronchoscopy in all cases to rule out malignancy. Hemoptysis in elderly population needs Bronchoscopy before starting antituberculosis chemotherapy irrespective of smear AFB status. Squamous cell carcinoma is known to cause pulmonary cavity, hemoptysis and clubbing. Malignancy will cause local immunosupression in Lung parenchyma which will increase the risk of reinfection as well as reactivation tuberculosis. Finally, Cytopathology expertise will be the crucial in confirming diagnosis and more emphasis should be given on lung cytology training.

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