Case Report

Pseudotumour presentation of pulmonary tuberculosis

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SUMMARY

Pulmonary tuberculosis manifesting as a mass lesion, thus, mimicking a lung carcinoma is an unusual radiographic presentation of tuberculosis (TB). The common radiologic patterns and clinical presentations are well known and documented. We report two cases of pulmonary tuberculosis with a neoplastic appearance on chest imaging diagnosed histologically. A 21 – year old female with cough, weight loss, anorexia and an unremarkable physical examination. Chest radiography showed a right apical mass suggestive of lung cancer. Histology of the lesion revealed parenchymal pulmonary tuberculosis. A 49–year old male with left-sided chest pain, cough, anorexia, weight loss, mild pallor with an unremarkable chest examination. Chest imaging showed a left apical mass and mediastinal lymphadenopathy. Microscopic examination of the mass confirmed pulmonary tuberculosis. Pseudotumour pulmonary tuberculosis is a rare clinical entity that can lead to diagnostic challenges and must be considered in the differential diagnosis when mass lesions are seen on chest imaging, especially in TB endemic areas.

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INTRODUCTION

Pulmonary tuberculosis (PTB) accounts for approximately 80% of all forms of tuberculosis (TB) in adults and characterized by a wide range of radiological and clinical features.[1] It is the commonest form of tuberculosis in Ghana and constitutes about 92% of newly diagnosed and relapsed cases. About 44 000 new cases of tuberculosis was reported in 2018.[2]

The common radiological manifestations of PTB are well known and documented but can sometimes present with atypical or unusual radiological patterns which results in diagnostic quagmires culminating in delayed diagnosis and treatment.[3] A distinct radiographic manifestation of PTB mimicking a lung carcinoma is pseudotumoural pulmonary tuberculosis.[4,5] Pseudotumoural pulmonary tuberculosis is rare and occurs in 3.5 % to 4.5 % of immunocompetent patients even in TB endemic regions of the world.[6,7]

Diagnosis is usually challenging because of non–specific clinical features and radiological similarities to lung cancer and other lung pathologies.[8,9] Short course anti–tuberculous treatment as for other forms of pulmonary tuberculosis consisting of isoniazid (INH), rifampicin (RIF), ethambutol (EMB) and pyrazinamide (MPZ) has been found to be effective in controlling the disease and reducing the size of the mass.[10,11]We present two cases of pulmonary tuberculosis mimicking lung carcinoma.

CASE REPORT 1

A 21 – year old female patient with complaints of cough productive of scanty whitish sputum, fever, weight loss and anorexia of three months duration. She had unsuccessfully received multiple antibiotic courses for the cough. On physical examination, she looked well, afebrile with evidence of weight loss and had a normal chest examination. The biochemical, immunological and haematological tests were normal (Table 1). The erythrocyte sedimentation rate (ESR) was elevated (39 mm/hr), however, sputum for acid–fast bacilli (AFB) and GeneXpert (GeneXpert Dx System Version 4.8) did not show the presence of mycobacterium tuberculosis.

A well–defined smooth, homogenous right apical opacity was observed on the posteroanterior (PA) chest x–ray (Figure 1a). Computed tomography scan (CT scan) of the chest revealed a spiculated right upper lobe mass.The mass measured 31.4 × 35.3 × 2.75 mm with anterior pleural attachment and satellite nodular opacifications around it suggesting a bronchogenic carcinoma (Figure 1b).

There was no associated mediastinal lymphadenopathy. Microscopic examination of lung tissue obtained via CT guided biopsy showed diffuse chronic inflammatory changes with multiple small necrotizing granulomata and interstitial fibrosis consistent with tuberculosis. Standard anti – tuberculosis treatment was initiated and resulted in complete resolution of the lesion as well as her symptoms (Figure 1c).

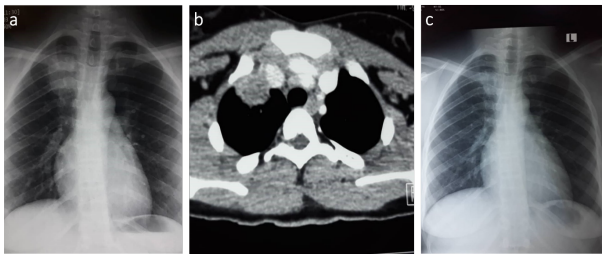

Figure 1 Radiological images for Case 1

- **a.** Chest x – ray showing a well – defined left apical opacity.
- **b.** Contrast – enhanced CT scan shows an irregular, spiculated anteroapical mass.
- **c.** Chest x – ray showing resolution of the opacity post treatment.

Table 1 Laboratory results

Laboratory investigation	Case 1	Case 2
Haemoglobin (g/dL)	12.0 (11.5 – 16.5)	10.2 (13.0 – 18.0)
Mean corpuscular volume (fL)	88 (76 – 99)	86(76 – 99)
Mean corpuscular haemoglobin (pg)	29.8 (26 – 34)	28(26 – 33)
Platelets (x 10^9/l)	271 (150 – 450)	330 (150 – 450)
Total white cell count (x 10^9/l)	5.3 (4.0 – 12.0)	4.3 (4.0 – 12.0)
ESR mmfall/hr	39 (≤ 20)	(≤ 15)
Sputum GeneXpert	No MTB	No MTB
Bronchial wash GeneXpert	-	No MTB
Sputum for AFB	No AFB	No AFB
Serum angiotensin converting enzyme	27.8 (0 – 52)	-
Serum ionised calcium	1.18 (1.06 – 1.30)	-
HIV 1 and 2	Non – reactive	Non – reactive

MTB=Mycobacterium tuberculosis; AFB=Acid – fast bacilli

CASE REPORT 2

A 49–year old male with left-sided chest pain and a productive cough (copious whitish sputum) of three months duration associated with anorexia, lethargy, significant weight loss and an episode of haemoptysis. Chest pain was of moderate severity, non–radiating, pleuritic and relieved temporarily with analgesics. He looked chronically ill and cachexic with mild pallor on physical examination. Chest and other systems examination was unremarkable.

Laboratory tests showed normochromic normocytic anaemia and a normal ESR. Mycobacterium tuberculosis was not detected on examination of sputum (Table 1).
The chest x – ray showed a well – defined opacification of the upper third of the left lung field abutting the mediastinum and mildly displacing the distal trachea and carina to the right suggesting a filling defect in the distal trachea (Figure 2a). A mass with irregular margins and a few linear and circular lucencies in the apex of the left lung measuring 70.0 × 36.5 mm was noted on CT scan of the chest. The mass abutted the arch of the aorta and descending aorta as well as the main pulmonary trunk (Figure 2b and 2c). Mediastinal lymphadenopathy was also noted. Bronchoalveolar lavage for acid – fast bacilli and GeneXpert were also negative. Microscopic examination of lung tissue obtained via CT guided percutaneous biopsy showed few caseating epithelioid granulomas with some showing central neutrophilic debris and moderate lymphoplasmacytic infiltrates in the interstitium suggestive of pulmonary TB.

He received standard anti – tuberculosis treatment with complete symptom and radiological resolution of lung mass after 5 months of treatment (Figure 2d).

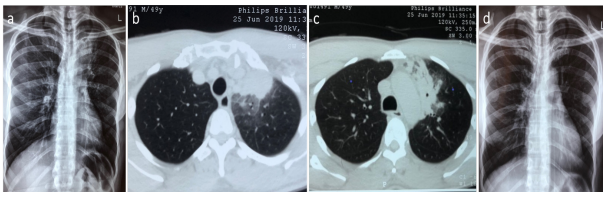

Figure 2. Radiological images for Case 2

- **a.** Chest x-ray showing well – defined left upper – lobe opacity.
- **b.** Contrast – enhanced CT scan showing the mass and enlarged mediastinal lymph nodes.
- **c.** Contrast – enhanced CT scan showing the mass abutting the ascending aorta.
- **d.** Chest x – ray showing resolution of the mass after 5 months of treatment

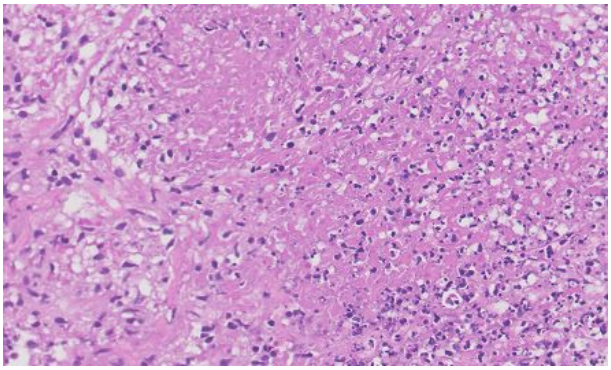

Figure 3. Histology of lesion of Case 2 showing epithelioid granulomas with caseous necrosis and moderate lymphoplasmacytosis

DISCUSSION

Tuberculosis is currently one of the most important infectious diseases globally and is the leading cause of death from a single infectious agent accountable for an estimated 1.6 million deaths in 2017.[12] Tuberculosis affects all organs of the body with the lungs being the most frequently affected.[1] Lung cancer is the most commonly diagnosed cancer and the leading cause of cancer – related deaths globally and is responsible for 1.8 million deaths in 2018.[13,14]

Pulmonary tuberculosis (PTB) and lung cancer may be difficult to distinguish clinically and radiologically.[15] Clinical symptoms such as weight loss, chest pain, anorexia, productive cough and haemoptysis are common in both conditions and respiratory examination may be unremarkable.[16] Majority of these symptoms were noted in both cases presented above. The radiological presentation of PTB depends on whether it is primary or post – primary TB. Primary PTB, common in children, is usually seen as dense, homogeneous, segmental, lobar, or multifocal unilateral consolidation associated with ipsilateral lymphadenopathy (TB lymphadenitis) on chest x–ray.[17] Other findings may include right – sided atelectasis, unilateral pleural effusion and miliary nodules. In contrast, post – primary pulmonary tuberculosis, common in the adult population, may manifest radiologically as patchy, heterogeneous consolidation involving the apical and posterior segments of the upper lobes and superior segments of the lower lobes with ill – defined borders and small satellite nodules.[17] Cavitations, calcifications, nodular or linear opacities, miliary nodules and unilateral loculated pleural effusion are also common findings in post–primary TB.[18]

The manifestation of PTB as a lung mass is quite rare in immunocompetent individuals and differentiation from a primary lung cancer becomes challenging especially when repeated negative sputum smears for acid – fast bacilli, sputum culture for MTB and GeneXpert occurs.[6,11] Conversely, lung cancer can also be misdiagnosed as PTB, particularly in the regions of the world where tuberculosis is endemic with a very high burden.[16,19] Anecdotal evidence in our environment adds credence to this observation as a significant proportion of primary lung cancer cases receive prior TB treatment delaying the diagnosis with abysmal outcomes. In addition, the diagnosis of lung cancer may be unnoticed when both tuberculosis and lung cancer occur concurrently in extremely rare circumstances where sputum examination for the presence of mycobacterium is positive.[16,20]

Lung cancer, on the other hand, is usually seen as a solitary pulmonary nodule or mass greater than 30 mm and may have ill – defined, spiculated, or well – defined borders with/without associated hilar and/or mediastinal lymphadenopathy. The presence of a pleural tag, amorphous calcification, feeding vessel sign, positive bronchus sign and thick-walled irregular cavities may be other features of lung cancer on chest CT scan.[21,22]

Atypical manifestations of PTB in immunocompetent individuals reported in literature include lymphadenopathy without parenchymal infiltrates, lower lobe disease without lymphadenopathy, solitary tuberculoma or mass density and the occurrence of primary disease in patients older than 40 years. These unusual patterns are largely responsible for misdiagnosis or delayed diagnosis resulting in increased mortality and morbidity.[5,6,9] It has been estimated that about 3 – 6% of pulmonary TB may present as non–calcified mass lesions which are best characterized on chest CT–scan usually measuring between 5 mm to 40 mm in the largest diameter.[18] Similarly the cases presented here were both immunocompetent individuals who presented unusually with lung masses of 35 mm and 70 mm in their largest diameter. In the case of the young lady, the size of the mass and the spiculated margins raised the suspicion of a malignant lung mass with differentials of primary pulmonary lymphoma or primary lung cancer although her age, the presence of satellite lesions and the well–defined margins of the lung mass also made inflammatory/infectious causes (PTB, atypical presentation of pulmonary sarcoid) likely.[23]

It is worth noting that a small proportion of benign lung nodules/masses may exhibit spiculated margins whereas about 20% of primary lung cancers may show well – defined margins.[24] In the case of the 49 – year old, the bigger mass size, irregular margins, proximity to the pulmonary trunk and aorta as well as the involvement of mediastinal lymph nodes heightened the suspicion of a primary lung cancer. Although rare and non – specific, mediastinal lymphadenopathy may be detected (as in our second case) in about 5% of post–primary PTB cases.[6,25] As in our cases, clinical signs are usually absent or nonspecific in parenchymal pseudotumoural PTB and microscopic examination of the sputum as well as molecular tests are often negative for MTB because of the encapsulated nature and poor oxygenation of the solid caseous lesions.[11,25] Invasive diagnostic techniques and histological examination of the mass usually clinches the diagnosis since traditional methods are usually disappointing amidst the diagnostic dilemma.

As expected for common forms of PTB, the response to anti-tuberculous regimen in pseudotumoural PTB is phenomenal judging from the post TB treatment chest images of the cases presented.[10,26]

The presentation of PTB as a mass lesion radiographically is uncommon and can be mistaken for a neoplastic formation with the similar clinical presentation compounding the diagnostic dilemma.

CONCLUSION

Pulmonary tuberculosis should always be a differential diagnosis until proven otherwise when mass lesions are observed on chest imaging regardless of the radiographic features and clinical history, especially in TB endemic areas.

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