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Title: Lung adenocarcinoma presented with extensive pulmonary calcification

Running Title: Calcified adenocarcinoma of the lung

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Abstract:

Lung lesions' calcifications include many differential diagnoses and usually indicate a benign course. However, its interpretation is challenging due to many etiologies. Radiological visualization of extensive calcification in bronchogenic carcinoma is not familiar and may cause confusion and misdiagnosis; however, It may be rarely seen and has also been reported. We documented a case of a lung adenocarcinoma with extensive calcification in computed tomography (CT) of chest and diagnosed as mucinous adenocarcinoma of lung by bronchoscopic lung biopsy.

Keywords: Lung adenocarcinoma; Lung cancer with calcification; Calcified adenocarcinoma of lung, lung calcification; pulmonary calcification.

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Introduction:

Calcification in lung lesions usually indicates a benign course especially when the pattern of calcium deposition is of the popcorn, diffuse, laminated or central type (1). Radiological visualization of extensive calcification in bronchogenic carcinoma is not familiar and may cause confusion and misdiagnosis; (2) however; It may be rarely seen and has also been reported (3).

Patient presentation:

A female patient aged 71 years old, complained of exertional dyspnea and dry cough for one year. CT chest showed right side pleural effusion with underlying lung calcification (Figures 1A, 1B, 1C). Tuberculin skin test was negative. Pleural fluid aspiration was serosanguinous and exudative. Transthoracic ultrasonography was done and showed right massive complex non septated pleural effusion, no pleural thickening or nodulation and hyperechogenic collapsed lung that favoured presence of calcification (Figure 2). Pleural fluid cytology revealed atypical cells with adenocarcinoma. The patient underwent bronchoscopy to confirm the diagnosis of malignancy and the lateral wall of intermediate bronchus of the right bronchial tree was infiltrated by multiple nodules. It was also circumferentially narrowed. The bronchoscope could not be introduced inside it. Multiple biopsies were obtained from the mucosa of intermediate bronchus for histopathology (Figure 3). Histopathology showed malignant glandular structures with mucin secretion. Also solid clusters of atypical cells mixed with scattered psammomatous like calcification are seen that confirmed the diagnosis of mucinous moderately differentiated adenocarcinoma (Figure 4).

Discussion: Lung carcinoma is often diagnosed late and vary widely in symptoms, pathology and prognosis (4). Lung adenocarcinoma is often seen in non-smokers and females (5). It commonly

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presents as ill-defined lung nodules in chest radiography and can be usually confused with atypical infections (6, 7).

The extent and distribution of calcification are important factors while assessing a solitary pulmonary nodule; however, this is difficult and confusing. Central, solid and laminated form of calcification is specific to previous granulomatous infection such as tuberculosis. Popcorn calcification indicates cartilage component in the nodule (e.g: hamartoma and cartilage tumors). Eccentric calcification can present as a calcified granuloma engulfed by a malignancy or dystrophic malignant calcification respectively (1-3). Literatures' reviews revealed that reported cases of calcified lung cancer are uncommon and still rare (8).

Calcification within lung cancer occurs by the following mechanisms: (A) calcified scars or granuloma engulfed by tumour, (B) dystrophic calcification in the necrotic parts of tumour and (C) calcium deposition by the secretory function of carcinoma itself (e.g mucinous adenocarcinoma) as in our case (1, 9). Histologically, Psammoma bodies are uncommon in lung adenocarcinoma. Interestingly it may predict a good response to tyrosine kinase inhibitors (10).

Conclusion:

Lung calcification is not easy to be interpreted and may cause confusion. Detection of underlying disease should not be taken lightly. Although extensive lung calcification is rare in lung malignancy. It should be considered in the differential diagnosis.

Ethical disclosures:

Protection of human and animal subjects: The authors declare that no experiments were performed on humans or animals for this study.

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Confidentiality of data: The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent: The authors declare that no patient data appear in this article.

Consent: the patient gave consent before publishing.

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Conflicts of interest:

The authors have no conflicts of interest to declare.

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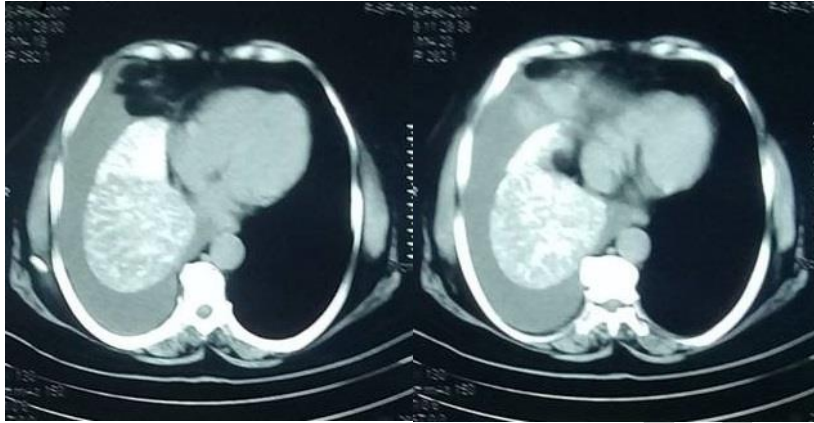
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Fig 1: CT chest shows right side pleural effusion with underlying calcified lung.



1A

1B



1C

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Fig 2: Transthoracic ultrasound shows right massive complex non septated pleural effusion, no pleural thickening or nodulation and hyperechogenic collapsed lung.



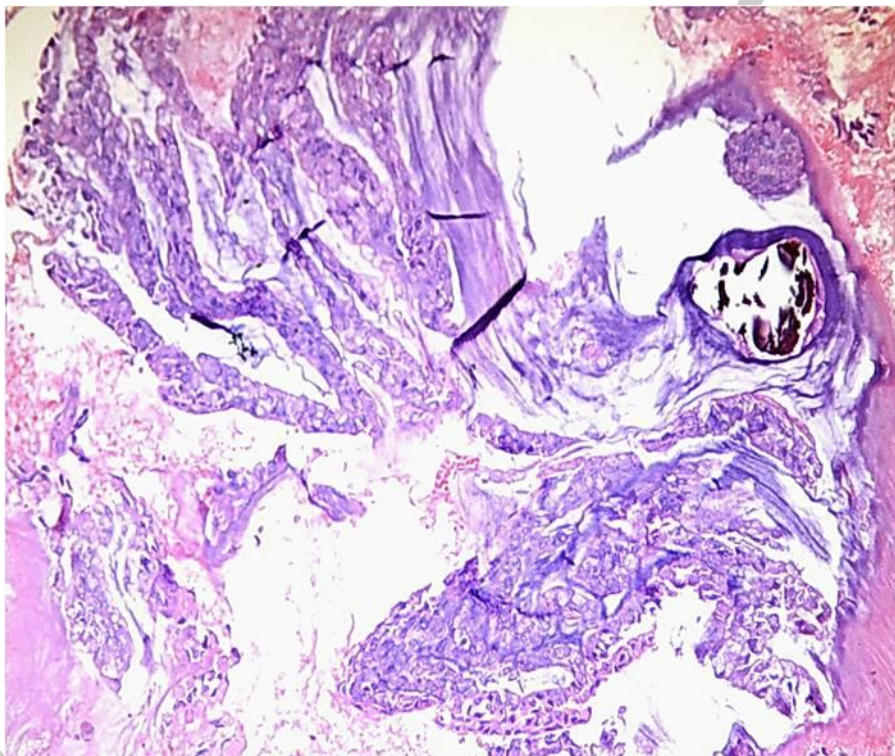
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Fig 3: Bronchoscopic view of lung mass



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Fig 4: Bronchoscopic lung biopsy histopathological examination shows malignant glandular structures with mucin secretion. Also solid clusters of atypical cells mixed with scattered psammomatous like calcification are seen that confirmed the diagnosis of mucinous moderately differentiated adenocarcinoma



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