

Pulmonary *In Situ* Adenocarcinoma with Mosaic Paving Pattern

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Abstract

CONTEXT: Adenocarcinoma already comprises half the cases of lung cancer. Its insidious clinical evolution contributes to the fact that, in absolute numbers, lung tumor is the cancer with the highest mortality in the world. When still *in situ*, the adenocarcinoma is even quieter, making its typical presentation on the computerized tomography of an irregular semisolid nodule smaller than 3.0 cm. It is often diagnosed in a finding of examination in an asymptomatic patient. The prevalence of *in situ* adenocarcinoma (ISA) is less than 5% of pulmonary malignancies and its radiological presentation with a diffuse mosaic paving pattern is even more unusual, mimicking other conditions more frequent to this finding. **CASE REPORT:** We describe the case of a 44-year-old male patient with a history of chronic smoking admitted to the emergency room at a referral hospital in São Paulo on 12/16/2016 with a complaint of progressive dyspnea associated with dry cough for 3 months, intermittent fever and weight loss of 8 kg in 2 months. A chest X-ray and computed tomography showed discrete focal points of peribroncovascular consolidation, predominantly central, areas with frosted glass attenuation associated with smooth thickening of the interlobular septa, sometimes interspersed with areas of preserved parenchyma, giving an aspect of “crazing paving” with diffuse distribution by the pulmonary parenchyma. The patient underwent a biopsy with the anatomicopathological diagnosis of primary Adenocarcinoma *in situ* of the lung. **CONCLUSION:** We emphasize that the “crazing paving” of adenocarcinoma *in situ* pulmonary should be considered and known by the radiologist, because although isolated it is a rare condition, its early distrust in cases of atypical evolution of the most common injuries can avoid a diagnosis in phases more advanced and higher mortality.

Keywords

Adenocarcinoma *In Situ*, Lung Adenocarcinoma, Lung Cancer, Mosaic Attenuation, Tomography

1. Introduction

Worldwide cancer represents the second most common cause of death. About 8.8 million deaths in the 2015 were caused by cancer [1]. It was estimated that in the year 2008 the lung cancer accounted for more than breast, colon, rectal and pancreatic cancer combined [2].

Lung cancer is the most common cause of cancer-related deaths worldwide (1.69 million deaths) [1]. ISA is defined as a localized adenocarcinoma of less than 3.0 cm and exhibits a lipid pattern with neoplastic cells along the alveolar structures, but without stromal, vascular or pleural invasion.

The high mortality rate is explained by the fact that detection is usually performed in advanced stages when symptoms begin to appear. Although its most typical presentation on computed tomography is of irregular semisolid nodule, it can seldom present itself as a mosaic paving pattern, making it a diagnostic challenge due to the amount of injury that manifests itself with this radiological signal.

This article aims to show the challenge of the radiologists when faced with atypical presentations of a pathology with great impact on public health.

2. Case Report

A 44-year-old male patient from São Paulo, a bricklayer, with a history of chronic smoking (20 packs/year) and an HIV-positive spouse, is admitted to emergency room (ER) with complaint of progressive dyspnea associated with dry cough, intermittent fever and weight loss of 8 kg in 2 months.

A chest X-ray was performed (**Figure 1**), which showed a diffuse interstitial infiltrate of reticular appearance, with thickening of the right oblique fissure. Computed tomography (**Figure 2**) demonstrated centers of peribroncovascular consolidation, predominantly central, areas with attenuation in frosted glass distributed diffusely by the pulmonary parenchyma, associated with smooth thickening of interlobular septa, sometimes interspersed with areas of preserved parenchyma, conferring a aspect of mosaic paving.

In addition to evidence of multiple mediastinal lymph node enlargement. Serology for syphilis and HIV were negative. Bacterioscopy of bronchial lavage and BAAR screening with three sputum samples were also negative. The patient underwent transbronchial biopsy (**Figure 3**) and the histopathological result confirmed the diagnosis of primary adenocarcinoma of the lung. The patient follow-up with the oncological medical team.

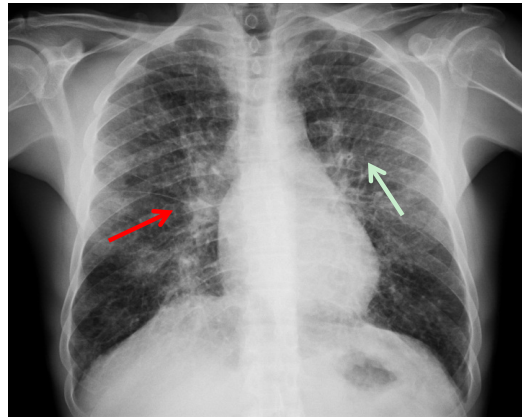


Figure 1. Chest X-ray showing diffuse interstitial infiltrate of reticular aspect (with the arrow), with thickening of the right horizontal fissure (red arrow).

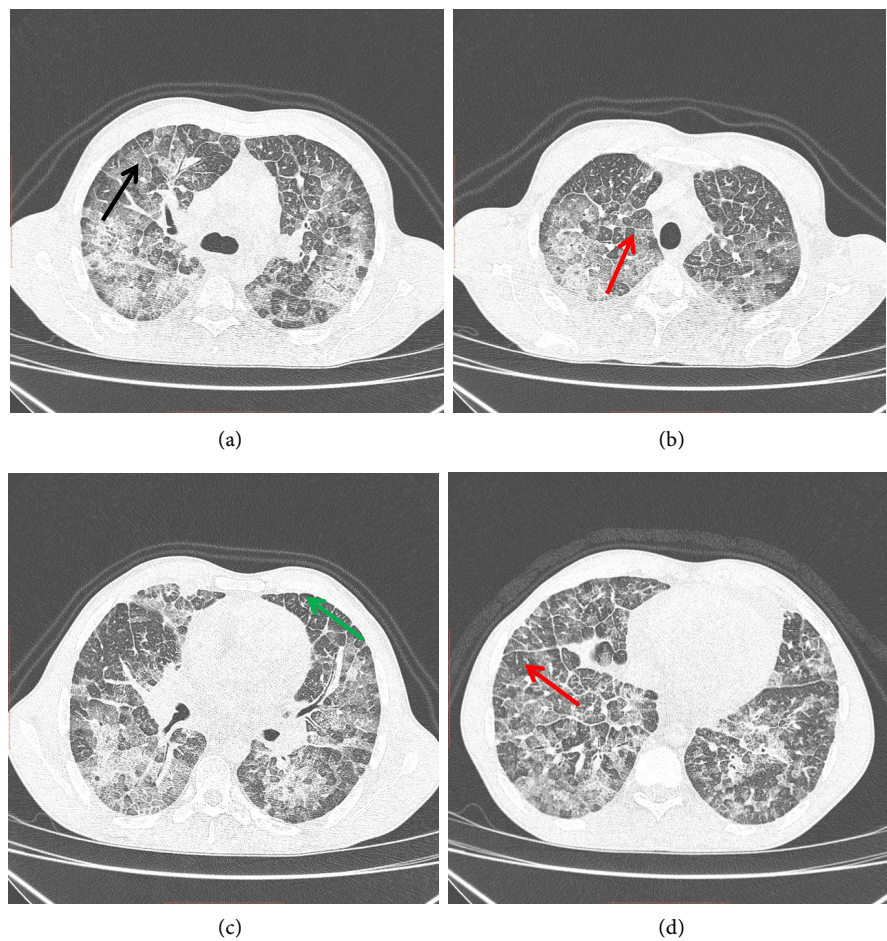


Figure 2. Thoracic tomography shows diffusely parenchyma areas with attenuation in frosted glass, associated with smooth thickening of interlobular septa, sometimes interspersed with areas of preserved parenchyma, giving a mosaic paving appearance. (a) (b) The ground-glass attenuation reflects the low-density intraalveolar material (reflecting the lepidic growth) (black and red arrow); (c) Areas of lower attenuation represent the normal lung (green arrow); (d) Reticular attenuation and thickening of interlobular septa is due to infiltration of the interstitium by inflammatory or tumor cells (red arrow).

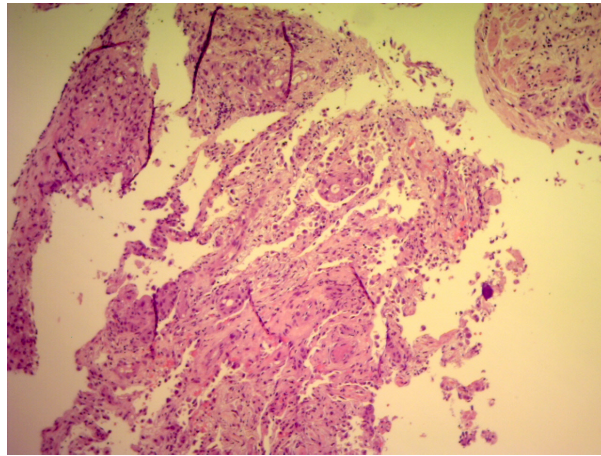


Figure 3. Microscopic study stained with the hematoxylin eosin technique with a 100× magnification of a pulmonary parenchyma specimen, evidencing adenocarcinoma.

3. Discussion

Lung cancer is the most common cause of cancer-related deaths worldwide [1]. The high mortality rate is explained by the fact that detection is usually performed in advanced stages when symptoms begin to appear. In clinical practice, the various subtypes of lung carcinomas can be classified simply into small cell carcinoma and non-small cell carcinoma.

The latter mainly comprises adenocarcinoma, squamous cell carcinoma and undifferentiated large cell carcinoma [1] [3] [4]. The histological diagnosis of adenocarcinoma has increased in recent years, reaching more than 50% of the primary malignant tumors of the lung in some bibliographies [5].

In its most frequent subtypes, the tumor usually manifests in computed tomography (CT) as semisolid nodules and spiculated or lobed margins. However, bronchioloalveolar carcinoma (BAC), a subtype of low grade adenocarcinoma, may be characterized beyond the single or multiple nodule pattern, such as ground-glass attenuation opacities or slowly progressive consolidation areas. Less frequently, this subtype may be manifested by centrilobular nodules and pattern of mosaic paving [1] [5]. After the new WHO criteria for the diagnosis of BAC, its prevalence proved to be less than 5% of lung malignancies; the majority of cases are now considered as mixed adenocarcinomas or *in situ*, with a bronchioloalveolar component [6].

The pattern of “mosaic paving” was first characterized in 1989 and described in a study as frosted glass, with geographic distribution and smooth thickening of the interlobular septa in the HRCT of six patients with alveolar proteinosis [3] [4]. First described as characteristic of alveolar proteinosis, an article published in 1997 was described in a patient with bronchioloalveolar carcinoma and has since been studied and observed in pneumocystosis, lipidic pneumonias and in several other conditions [7].

In bronchiole-alveolar carcinoma, currently classified as adenocarcinoma *in*

situ, tumor cells lining the alveolar walls internally, without altering the parenchymal architecture. Frosted glass consolidation areas represent the presence of intraalveolar tumor growth, or mucus, low attenuation glycoprotein, produced by the mucinous tumor. The interlobular septal thickening, also characteristic of the mosaic paving pattern, is due to the network of superimposed linear opacities [3] [5].

In our report, we present a 44-year-old male, a chronic smoker with 20 packs/year, with computed tomography of the thorax with extensive attenuation in frosted glass by the parenchyma and thickening of interlobular septa, giving diffuse mosaic paving appearance without nodules suggestive of major subtypes of primary lung neoplasms. Due to the wide range of diagnostic differences between the imaging findings and the history of HIV positive spouses, the patient was first hospitalized for infectious disease research.

Although the diagnostic possibility should be considered, due to the rarity of primary lung adenocarcinoma in its mucinous/*in situ* bronchioloalveolar subtype that manifests as an extensive area of mosaic paving 1.4, the images obtained by computed tomography were not sufficient to indicate the diagnosis, and then indicated endobronchial biopsy, which in its anatomopathological evidence showed adenocarcinoma in lung parenchyma.

Akira *et al.* studied 38 patients with pathologically proven diffuse bronchioloalveolar carcinoma (currently ISA), and concluded despite the high-resolution CT features are not specific, consolidation, nodules, the coexistence of centrilobular nodules and remote areas of ground-glass attenuation are characteristic of diffuse bronchioloalveolar carcinoma [8]. In 1992 Lee *et al.* studying clinical, histopathologic and radiologic findings of the bronchioloalveolar carcinoma and their prognosis, showed bronchioloalveolar carcinoma has different radiologic manifestations, one of them is areas of ground glass attenuation [9].

4. Conclusion

We conclude from this case report that although the mosaic paving of adenocarcinoma *in situ* pulmonary is rare, it should be considered and known by the radiologist, especially if the patient has risk factors for the tumor and does not progress clinically as expected for the pathologies associated with this imaging finding. Morbidity and mortality related to adenocarcinoma in its diagnostic delay should be considered.

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