

An Unusual Radiological Presentation of Invasive Adenocarcinoma of the Lung

Case Report

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Abstract

Bronchoalveolar carcinoma (subsumed under invasive adenocarcinoma according to 2015 classification of World Health Organization - WHO) typically presents asymptotically, often as a solitary pulmonary nodule, and may remain unnoticed even as it disseminates. However, its presentation as non-resolving consolidation is rare. We report an unusual case of Bronchoalveolar carcinoma (BAC) in a young male, initially presenting with a productive cough, exertional breathlessness, and multifocal bilateral consolidation on chest X-ray. Further evaluation with computed tomography (CT) of the chest and bronchoscopy confirmed the diagnosis of bronchoalveolar carcinoma.

In the ensuing case report, we present an uncommon case which highlights an atypical presentation of Bronchoalveolar carcinoma, masquerading as recurrent infections or tuberculosis & importance of considering it in differential diagnoses when confronted with persistent pulmonary consolidation.

Introduction

Bronchoalveolar carcinoma is an uncommon variant of lung adenocarcinoma (subsumed under invasive adenocarcinoma according to 2015 WHO classification) characterized by highly variable clinical, radiographic, and histopathological features. It occurs more frequently in non-smokers, women, and individuals of Asian descent. Although classified under the spectrum of pulmonary adenocarcinomas, it differs markedly in its presentation, therapeutic approach, and overall prognosis, accounting for approximately 6.5% of all primary lung neoplasms [1]

Bronchoalveolar carcinoma is derived from the epithelial cells

located distally to the terminal bronchioles, and is defined as a primary lung cancer in peripheral locations. It is found growing in a lepidic (scale-like) manner near the alveolar septae without parenchymal, vascular, or pleural invasion [2]

In most cases, Bronchoalveolar carcinoma presents as a peripheral pulmonary nodule; however, it can also manifest as segmental or lobar consolidation, and may exhibit a multifocal or diffuse distribution pattern. [2,3]

Case Presentation

A 31-year-old male nonsmoker presented with a five-year history

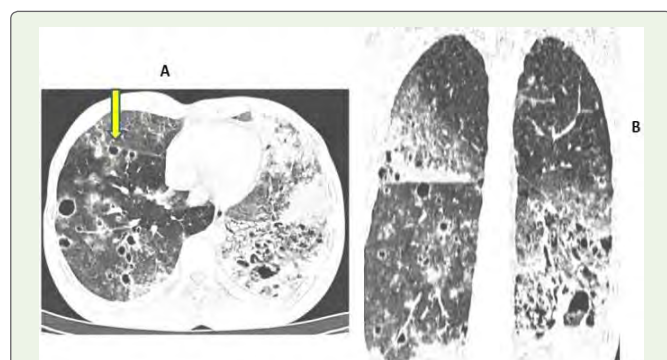


Figure 1: Multi-focal patchy confluent non resolving consolidations involving bilateral lung fields, with the characteristic 'cheerio's' cereal sign; pulmonary nodules with a central lucent cavity supplied by a patent bronchus (arrow).



Figure 2: Mediastinal window images demonstrate extensive multifocal consolidative changes involving multiple lobes of both lungs with predominant left lower lobe involvement, and underlying air bronchograms. Following a comprehensive multidisciplinary discussion, a subsequent open lung biopsy was performed for tissue characterization and specimen procurement, as the diffuse and coalescent morphology of the pathology conferred technical challenges for executing computed tomography/image guided biopsy.

(2021–2025) of recurrent lower respiratory tract infections requiring multiple hospital admissions, one of which led to a Cartridge-based Nucleic Acid Amplification Test (CBNAAT) positive diagnosis of pulmonary tuberculosis. He completed a year of Antitubercular Therapy (ATT) with temporary clinical improvement, but continued to experience recurrent symptoms. In his most recent admission in 2025, respiratory complaints persisted despite a trial of broad-spectrum antibiotics.

Imaging Findings and Histopathological Evaluation

Sequential computed tomography imaging demonstrated progressive ground-glass opacities involving both lung parenchyma that initially spared the lingula of left upper lobe and right middle lobe, later diffusely involving these segments.

Subsequent scans revealed multiple cavitating nodules with the striking "cheerios sign", heightening suspicion for an underlying malignancy in the setting of non-resolving pneumonia. Histopathological evaluation of a lung biopsy confirmed invasive mucinous adenocarcinoma with a predominant lepidic growth pattern.

Discussion

In this entity, growth occurs along the alveolar septa and without evidence of stromal, vascular or pleural invasion. Although only 4% of lung cancers meet this definition, up to 20% of lung cancers comprise a heterogeneous group of tumors with Bronchoalveolar carcinoma histology mixed with a varying population of invasive cells, ranging from predominant Bronchoalveolar carcinoma histology with a small focus of invasion, to invasive adenocarcinoma with an isolated group of cells with Bronchoalveolar carcinoma features at periphery [4]

Typically, three different radiological patterns are seen in Bronchoalveolar carcinoma: a solitary nodule or a mass of varying density, focal consolidation, or multifocal (diffuse) disease [5]

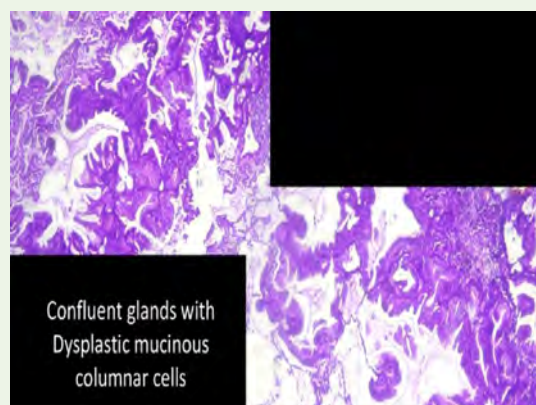


Figure 3: Confluent glands with Dysplastic mucinous Columnar cells.

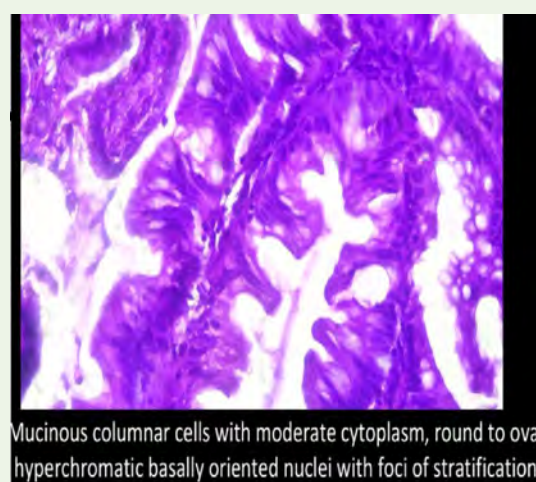


Figure 4: Mucinous columnar cells with moderate cytoplasm, round to oval hyperchromatic basally oriented nuclei with foci of stratification.

Additionally, we have the Cheerios sign, described for the first time by Reed and O'Neil in 1993, a rare computed tomography finding characterized by a nodule with central radiolucency, resembling the ring-shaped Cheerios breakfast cereal. It appears as a small, ring-like, uniform shadow within otherwise normal lung tissue and results from peribronchiolar proliferation of malignant cells, as seen in this case [6]

Learning Point for Clinicians

Clinicians are advised to maintain a heightened clinical vigilance for bronchoalveolar carcinoma in patients presenting with persistent or repetitive pulmonary consolidations refractory to antimicrobial or anti-tubercular therapy, especially when imaging exhibits atypical patterns such as multifocal opacities or the hallmark Cheerios sign, to aid timely diagnosis and optimal therapeutic intervention.

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