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Unusual presentation of lung cancer in young patient: case report

Tamer Awad El Sayed[1*] and Taha Taha Abd El Gawad[1]

Abstract

This case report describes the diagnostic journey of a 35-year-old patient presenting with interstitial lung disease (ILD). The patient underwent a bronchoscopy, which revealed the presence of cancer. This case highlights the importance of considering malignancy as a potential cause of ILD, even in younger patients, and emphasizes the role of bronchoscopy in the diagnostic process.

Keywords Interstitial lung disease, Transbronchial lung biopsy, Adenocarcinoma

Introduction

Lung cancer is the leading cause of global cancer incidence and mortality, accounting for an estimated 2 million diagnoses and 1.8 million deaths. Neoplasms of the lungs are the second most common cancer diagnosis in men and women (after prostate and breast cancer, respectively). With increasing access to tobacco and industrialization in developing nations, lung cancer incidence is rising globally [1].

Lung cancer (LC) is more frequently diagnosed among people aged 65–74 with only 1.6% of all cases occurring in patients younger than 45 years [2]. Adenosquamous carcinoma (ASC) of the lung is a rare pathological subtype of non-small-cell lung carcinoma (NSCLC), accounting to 0.4–4% of all primary lung cancers [3].

Interstitial lung diseases (ILDs) form one of the most fascinating fields in pulmonary medicine. They also pose one of the greatest challenges for accurate diagnosis and proper treatment [4].

The association between lung cancer (LC) and interstitial lung disease (ILD) can be explained by shared risk factors like smoking and the physiopathology of fibrogenesis and cancerogenesis. The relative LC risk is shown to be 3.5 to 7.3 times higher in ILD, with LC occurrence estimated at 10–20% in ILD, with > 15% of ILD patients likely to die from lung cancer [5].

Transbronchial lung biopsy was first reported by Anderson et al. in 1965. He described this technique using a rigid bronchoscope in a small series of 13 patients [6].

Subsequently, in 1972, Anderson published a larger case series of 450 patients undergoing transbronchial lung biopsy (TBLB) for DPLD. Shortly thereafter, TBLB was successfully performed through a flexible bronchoscope leading to its widespread use until this day [4].

Non-small cell lung cancer (NSCLC) in young adults is uncommon. Although there is limited data about clinical presentation and outcomes, it does seem that this population has some distinct clinicopathological characteristics, and given the significant socio-economic implications, NSCLC in young adults is increasingly important [7].

This case report aims to describe an unusual presentation of lung cancer in a young patient, emphasizing the need to consider this diagnosis even in the absence of traditional risk factors.

Case report

We present the case of a 35-year-old male transport vehicle driver with a history of bird breeding. He is married and has three children. The patient is a current smoker

*Correspondence:
Tamer Awad El Sayed
tawad73@yahoo.com
[1] Chest Department, Mansoura University, Mansoura, Egypt

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with a smoking index of 20 pack-years. There is no significant past medical history and no family history of a similar condition or consanguinity.

The patient complained of progressive dyspnea, dry cough, and fatigue over the past 3 months. He sought medical advice and underwent a computed tomography (CT) scan, which revealed bilateral lung infiltration. Further investigations were conducted, including tests for antinuclear antibodies (ANA), anti-double-stranded DNA (anti-dsDNA), anti-neutrophil cytoplasmic antibodies (ANCA-C), and anti-neutrophil cytoplasmic antibodies (ANCA-P), which were all negative. The diagnosis was made based on the clinical presentation, exposure history, and imaging studies which suggestive of hypersensitivity pneumonitis.

The patient was started on medication, including a steroid (20 mg), azathioprine (50 mg twice daily), and pirfenidone (267 mg three times daily) for 2 months, without response. He was referred to our institute for further evaluation. He was present with severe dyspnea (grade 3) and a dry cough. On examination, the patient had tachypnea (32 breaths per minute) and oxygen saturation of 85% on ambient air. Local chest examination revealed bilateral inspiratory crackles on auscultation.

Pulmonary function tests were performed, revealing a forced expiratory volume in 1 s (FEV1) of 1.8 l which is 60% of the predicted value, forced vital capacity (FVC) of 2.4 l which is 63% of the predicted value, FEV1/FVC ratio of 75%, and a diffusion capacity for carbon monoxide (DLCO) of 35% predicted. These results indicated a restrictive pattern with decrease diffusion capacity.

A CT scan of the chest (Fig. 1) was performed to gather additional information.

PET scan is done which show the following:

- Metabolically active interstitial, interlobar, and fissural septal thickening noted in both lungs, associated with numerous bilateral pulmonary nodules largest 14-mm SUV 4.6
- Metabolically active retrosternal superior mediastinal pretracheal, retroclavicular, prevascular, bilateral hilar, aortopulmonary, and precranial lymph node 23 mm
- Metabolically active few right supraclavicular lymph nodes 17-mm SUV 6
- Multiple metabolically active lytic osseous lesions at bilateral humeral few bilateral ribs, dorsolumbar vertebrae, bilateral pelvic bones, and SUV 9

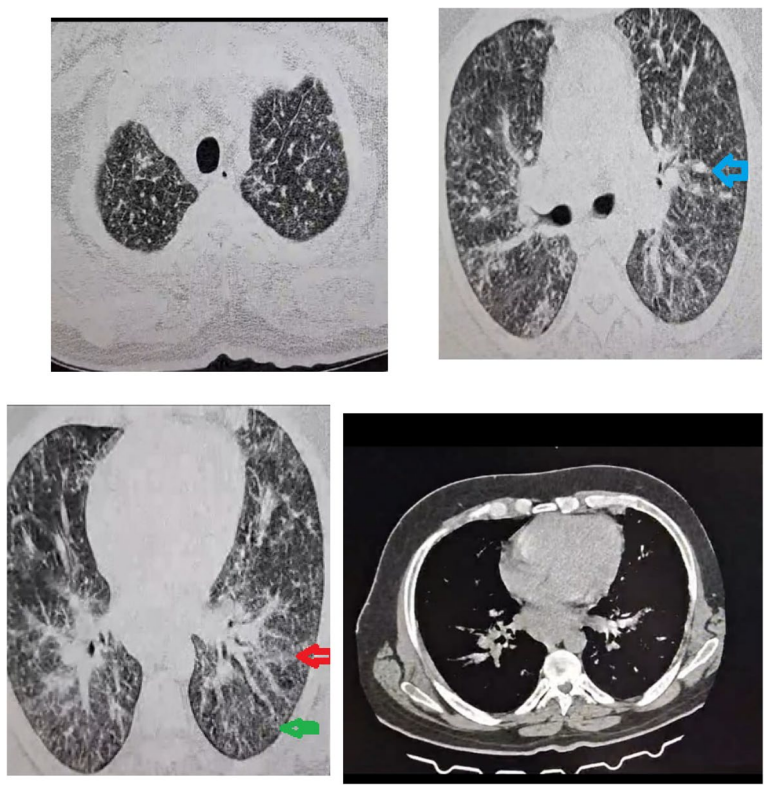

Fig. 1 Computed tomography scan showing bilateral areas of ground-glass opacity (red arrow), subpleural honey comb (green arrow), and random scatter small nodule (blue arrow)

Flexible fiber-optic bronchoscopy was performed for further investigation. Continuous monitoring of oxygen saturation to promptly detect and address hypoxemia uses high flow oxygen during procedure with good monitoring of oxygen level above 92% as oxygen saturation of patient was 88% on room air.

The bronchoscope (PENTAX Europe GmbH, Hamburg, Germany) was introduced through oral route and advanced to the segmental bronchus. The procedure was conducted after local oropharyngeal anesthesia with three to five puffs of lidocaine spray 10% and under sedation with 2–5 mg midazolam with monitoring of oxygen saturation throughout the procedure.

The bronchoscopy revealed excessive secretion from both bronchial trees, but no endobronchial lesions were observed. As part of the procedure, a bronchoalveolar lavage (BAL) was taken using 150 ml of warm saline 0.9% and sent for microbiological examination [Ziehl–Neelsen (ZN)] for acid-fast bacilli and TB culture and bacterial and fungal culture and for cytological examination.

Additionally, transbronchial cryobiopsy was done by introduction of a flexible cryoprobe (78 cm in length/2.4 mm in diameter, ERBE, Medizintechnik GmbH, Tübingen, Germany) which was connected to cryomachine (ERBOKRYO CA, ERBE, Tübingen, Germany) introduced through the working channel of fiber-optic bronchoscopy to the target segment followed by a freezing cycle for 3–4 s. The cryoprobe was retracted together with fiber-optic bronchoscopy (FOB), while the biopsy was attached to its frozen tip.

The biopsies were preserved and fixed in 10% buffered formalin and transferred to pathology laboratory for processing and staining.

As regard complications of the procedure (hypoxemia, bleeding, pneumothorax, cardiovascular events) were recorded, and with no any serious complication recorded, only mild bleeding has occur, which was controlled by maintained suction.

The results of the bacterial and fungal cultures, as well as the Ziehl–Neelsen stain (used for detecting acid-fast bacteria such as *Mycobacterium tuberculosis*), were negative, indicating the absence of bacterial or fungal infections. Also, collagen profile was negative as cause of interstitial pulmonary fibrosis.

However, the histopathological examination of the tissue samples obtained from the cryobiopsy result was fragment of lung tissue with infiltration by small sheets of atypical epithelial cells with focal attempts of glandular-like formations which show large hyperchromatic nuclei and moderate amount of eosinophilic cytoplasm and exhibit moderate atypia and pleomorphism picture suggestive of adenocarcinoma (Fig. 2).

Further evaluation and management of the patient's condition would likely involve consultation with an oncologist for immunohistochemistry which result was CK7: diffuse positive reaction in tumor cells, CK20, Napsin A, Ttf1, P63, and glypican: negative reaction.

The patient starts chemotherapy in the form of paclitaxel 300 mg.

Discussion

The first literature reviews on the association between lung cancer (LC) and interstitial lung disease (ILD) primarily focused on epidemiology [8].

There is an established association between lung cancer (LC) and interstitial lung disease (ILD), although the exact nature of this relationship is complex and multifactorial [5].

The patient is a smoker and a bird breeder, which are risk factors for both ILD and lung cancer that agree with King et al. who concluded that smoking and exposure to hazards are common risk factors for LC and ILD especially IPF, and both may account for their concomitant occurrence [9].

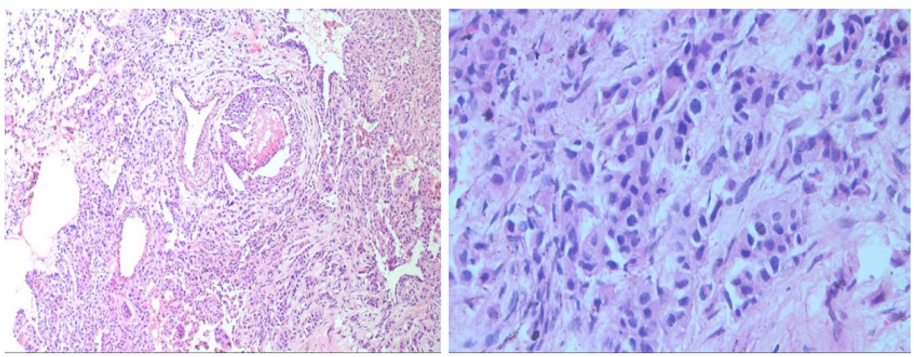

Fig. 2 Histopathology result

Cryptogenic fibrosing alveolitis produces chronic inflammation resulting in the remodeling of the lung, and malignancy may be secondary to these chronic inflammatory and fibrotic processes [10].

Lung adenocarcinoma represents about 50% of all lung cancers and has a high prevalence in smokers. Other risk factors include family history, environmental exposures, and toxic fumes [11].

Bronchoalveolar lavage and transbronchial biopsy can be useful methods in the diagnosis of interstitial lung disease (ILD) [12].

Since 2009, transbronchial cryobiopsy has emerged as a novel diagnostic tool for interstitial lung diseases (ILDs), particularly for idiopathic interstitial pneumonias (IIPs) and transbronchial cryobiopsy, and has the potential to significantly supplant surgical lung biopsy (SLB) as the primary method for obtaining tissue samples to diagnose IIPs [4].

A study by Troy et al. (2020) reported a diagnostic yield of 65% for TBLB in ILD patients, with a complication rate of 4% for pneumothorax and 2% for significant bleeding [13].

While Hariri et al. (2021) found that SLB had a diagnostic yield of 95% in ILD patients but noted a 9% complication rate and a 1% mortality rate, [14] collagen profile was negative as cause of interstitial pulmonary fibrosis, and no family history of lung cancer excludes possible genetic causes.

Conclusion

The significance of this research lies in highlighting the potential for early onset of lung tumors in patients suffering from interstitial pulmonary fibrosis and the necessity for younger patients to undergo lung biopsy.

Despite being rare, lung adenocarcinoma presents as interstitial pattern. But lung adenocarcinoma has diverse clinical and radiological presentation and so should always be on the differential when considering interstitial lung disease (ILD).

Occupational exposures and smoking history are strong risk factors for ILD and lung cancer.

Invasive diagnostic testing such as flexible fiber-optic bronchoscopy with transbronchial and/or surgical biopsy should be done early in the disease course to confirm the diagnosis.

Abbreviations

ANA	Antinuclear antibodies
ANCA-C	Anti-neutrophil cytoplasmic antibodies
ASC	Adenosquamous carcinoma
CT	Computed tomography
DLCO	Diffusion capacity for carbon monoxide
FEV1	Forced expiratory volume in 1 s
FVC	Forced vital capacity
ILD	Interstitial lung disease
LC	Lung cancer
NSCLC	Non-small cell lung cancer
NSCLC	Non-small-cell lung carcinoma
TBLB	Transbronchial lung biopsy

Authors' contributions

TAES wrote the initial draft of manuscript. TTAEG managed the diagnosis and treatment, approved the final version of the manuscript, and agreed to be accountable for all aspects of the work. All authors read and approved the final manuscript.

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Availability of data and materials

Data will be made available on reasonable request.

Declarations

Ethics approval and consent to participate

Written and verbal informed consent was obtained from the patient for publication of this case report.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Competing interests

The authors declare that they have no competing interests.

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