



Lung cancer masquerading as COVID-19 in a young non-smoking woman: case report

S. Zarrouki, MD^{a,*}, R. Marouf, MD^{a,b}

Introduction and importance: The clinical and radiological similarities between COVID-19 and lung cancer pose diagnostic challenges, particularly in young, non-smoking individuals. Ground glass opacities (GGO) on imaging, often associated with COVID-19, can also indicate lung cancer. Distinguishing between these conditions is crucial but complex, requiring a systematic approach.

Case presentation: The authors present a case of a 31-year-old non-smoking woman initially suspected of COVID-19 due to cough, dyspnea, and GGO on chest CT. Despite negative RT-PCR and inconclusive bronchial aspiration, symptoms persisted, prompting further investigation. A PET scan revealed hypermetabolic consolidation, leading to a biopsy confirming adenocarcinoma.

Clinical discussion: Lung cancer can mimic COVID-19 symptoms, complicating diagnosis, especially in young, non-smoking patients. While smoking remains the primary risk factor, lung cancer in non-smokers, particularly young individuals, is increasingly recognized. GGO, commonly associated with COVID-19, should prompt consideration of malignancy, emphasizing the importance of a comprehensive differential diagnosis.

Conclusion: Early detection of lung cancer in young, non-smoking individuals is vital yet challenging. Clinicians should maintain a high index of suspicion, promptly investigating persistent or worsening symptoms, even in the absence of traditional risk factors. Timely biopsy and intervention are critical for improving outcomes in this population.

Keywords: case report, COVID-19, ground glass opacity, lung cancer, young patient

Introduction

The clinical and imaging features of COVID-19 and lung cancer often overlap, presenting a diagnostic puzzle for healthcare professionals. Both diseases frequently present with cough and dyspnea, symptoms that lack specificity and can be attributed to various underlying conditions^[1,2]. The emergence of ground glass opacity (GGO) as a hallmark imaging finding in COVID-19 further complicates matters, particularly when observed bilaterally, suggesting a probable COVID-19 infection^[3]. However, it's important to note that GGO and consolidations are not exclusive to COVID-19; it can also be indicative of lung cancer.

Distinguishing between Lung cancer and COVID-19 represents critical components of the GGO differential diagnosis, each presenting unique prognostic and diagnostic challenges.

HIGHLIGHTS

- The diagnostic overlap between COVID-19 and lung cancer, especially in young non-smoking individuals, underscores the need for a thorough differential diagnosis.
- Despite negative RT-PCR, ruling out COVID-19 infection can be a challenge.
- The persistence of ground glass opacities, typically associated with COVID-19, should prompt consideration of malignancy, emphasizing the importance of a comprehensive diagnostic approach.
- Early detection and timely biopsy are crucial for improving outcomes in young, non-smoking individuals presenting with respiratory symptoms suggestive of lung cancer.

In this case report, written in line with the SCARE 2023 criteria^[4], our aim is to elucidate the complexities of GGO diagnosis in the COVID-19 era and underscore the importance of a systematic diagnostic approach and thorough consideration of differential diagnoses.

Case presentation

A 31-year-old non-smoking woman with the suspicion of COVID-19 infection, was brought to the ER for shortness of breath, chronic cough lasting more than 3 months, and night sweats. The patient had no history of passive smoking. Her father died of cancer, but there was no history of cancer in her older sibling, uncles or aunts. The Chest CT scan was prescribed to exclude a pulmonary embolism, and showed a right inferior lobar consolidation with diffuse ground glass opacities (crazy paving) consistent with COVID-19 infection (Fig. 1). Blood work

^aDepartement of Thoracic Surgery, Mohammed VI University Hospital Center and Mohammed First University, Faculty of Medicine and Pharmacy, Oujda, Morocco
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*Corresponding author. Address: Mohamed EL Amraoui avenue, Nb 9, 60000, Oujda, Morocco. Tel.: +212 663 473 991. s.zarrouki4@gmail.com (S. Zarrouki).

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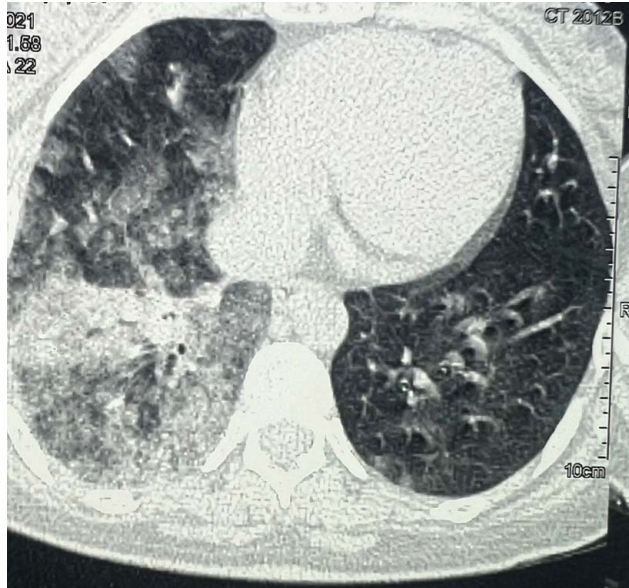


Figure 1. Chest computed tomography scan shows diffuse right ground glass opacities and consolidation, and a few left peripheral ground glass opacities.

revealed a high white blood cell count. At this point, RT-PCR was negative, and bronchial aspiration was negative for tuberculosis, and other germs and no abnormal cells were detected.

She was put on symptomatic treatment and was scheduled for outpatient consultation three month later. The patient suffered from the persistence of coughing and exertional dyspnea. The second chest CT showed the same findings as the last CT scan, there was no progression noted. There was no secondary lesion on the body scan. TEP scan was prescribed and showed that the consolidation was hypermetabolic with a SUV of 4, the GGO had SUV of 3.3 (Fig. 2).

In light of these findings, and based on the multidisciplinary discussion, a biopsy of the hypermetabolic consolidation was indicated by a wedge resection to obtain sufficient tissue for a definitive diagnosis.

VATS wedge resection of the consolidation was performed, and the histological finding pointed to adenocarcinoma with positive TTF1 and CK7 marking and negative CK20. The patient was referred to the oncology department for chemotherapy for stage 4 lung cancer involving contralateral lung nodules.

Discussion

COVID-19 clinical manifestations are various and often non-specific, respiratory symptoms are frequent^[2]. Interestingly, early lung cancer manifestations can mimic symptoms commonly associated with COVID-19 infection, such as cough, dyspnea, or recurrent pneumonia^[1].

Lung cancer primarily affects older patients with a frequency peak typically observed around the age of 70^[5]. As the most common and deadliest cancer in both sexes^[5], lung cancer's devastating impact is often attributed to its strong association with tobacco use.

Smoking is implicated in ~90% of lung cancer deaths in men, and 80% in women^[6], underscoring the importance of addressing tobacco use as a key preventive measure against lung cancer, particularly in populations at higher risk due to age or other predisposing factors.

Lung cancer in never-smoker population is a rare entity, found in 15% of men and in up to 53% of women^[5]. In fact, non-smoker females were 15% more likely to develop lung cancer than non-smoker males^[7].

On the other, lung cancer in young patients remains rare, with reported incidence ranging between 0.5 and 5.2% of the lung cancer population. The age threshold defining this group varies among authors^[8-11], contributing to a lack of exploration and determination of risk factors.

In the context of COVID-19 infection, imaging is typically reserved for moderate to severe cases or when factors suggest disease progression, rather than being necessary for mild, non-progressive cases^[12]. This decision reflects the current guidelines favouring imaging for cases where disease severity or progression is suspected. For instance, in our case report, the young patient presented with mild symptoms and lacked any prior condition indicating a worsening prognosis, thus chest CT scan was not recommended^[12].

The Fleischner Society defines ground glass opacity (GGO) on chest CT scans by a hazy area of increased lung density, characterized by the preservation of adjacent vascular and bronchial structures^[13]. This opacity typically results from air space filling by fluid or cells, interstitial thickening, or alveolar collapse.

GGO can stem from various benign conditions (including infection, inflammation, or hemorrhage) or from malignancies portraited by lung cancer^[14]. In the COVID-19 milieu, diagnosing GGO requires initially ruling out COVID-19 infection before proceeding with further investigation^[15,16]. Common non-



Figure 2. Pet-scan shows low intake in the right lung, and mild intake in right lower lobe consolidation (SUV = 4).

specific respiratory symptoms such as cough and dyspnea often raise suspicion of COVID-19, while bilateral GGO and consolidations are frequently observed on chest CT scans^[3]. COVID-19 diagnosis relies on a positive RT-PCR result, complemented by radioclinical evidence suggestive of the disease^[17]. However, effectively ruling out COVID-19 poses challenges when RT-PCR results are negative, given the non-negligible percentage of false negatives^[18].

In younger age groups with respiratory symptoms and abnormal radiological findings, such as GGO and consolidations, the primary considerations typically lean towards infectious or inflammatory conditions. As lung cancer diagnoses are uncommon in this demographic, they are frequently relegated to lower priority or overlooked entirely.

Follow-up COVID-19 patients have shown mostly regression of symptoms like dyspnea, and regression of GGO at chest CT scan^[19,20]. However, approximately one-fourth of patients have persistent GGO^[19]. Persistent post-COVID-19 symptoms are not uncommon and can last up to 12 months or more^[21]. The delayed resolution of radiological abnormalities is often responsible of uncertainty regarding late recovery versus other potential diagnoses.

In cases involving a young, non-smoking patient with mild, non-specific respiratory symptoms, the possibility of lung cancer is frequently disregarded, resulting in delays in diagnostic. Despite our patient displaying bilateral GGO and consolidation in the right inferior lobe, indicative of conditions such as pneumonia, COVID-19 infection, or other inflammatory diseases, the histological findings favored adenocarcinoma. These results highlight the importance of including lung cancer in the differential diagnosis for respiratory symptoms and imaging finding, regardless of the patient's age.

Conclusion

Diagnosing lung cancer in young individuals presents a formidable challenge due to its low incidence and the tendency to prioritize other differential diagnoses. Yet, the severity of the disease necessitates early detection. We advocate for a proactive approach, recommending prompt biopsy upon even the slightest suspicion of lung cancer. Furthermore, in cases of disease progression or lack of improvement, timely intervention becomes imperative.

Ethical approval

The ethical committee approval was not required given the article type (case report). However, the written consent to publish the clinical data of the patient was given and is available for review by the Editor-in-chief of this journal on request.

Consent

Written informed consent was obtained from the patient for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-chief of this journal on request.

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None.

Author contribution

Z.S.: study concept, data collection, data analysis, writing the paper. M.R.: supervision and data validation.

Conflicts of interest disclosure

The authors declare no conflicts of interest.

Research registration unique identifying number (UIN)

This is not an original research project involving human participants in an interventional or an observational study but a case report. This registration was not required.

Guarantor

Zarrouki Sara.

Data availability statement

The datasets generated during and/or analyzed during the current study are available upon reasonable request.

Provenance and peer review

This paper is not commissioned, externally peer-reviewed.

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