

A young man with chronic dry cough

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In primary care, chest X-rays are commonly performed to assess patients presenting with a prolonged cough. However, the extent to which the films are accurately interpreted depends on the skill of the doctors. Doctors with insufficient experience may miss an exact diagnosis when evaluating a film, especially in patients with nonspecific symptoms, such as in the case discussed in this paper. This case involved a persistent dry cough with an underlying diagnosis that would have been missed if the findings of the chest X-ray had not been properly analyzed.

Case History

A 31-year-old male security guard presented with recurrent dry cough, which he'd had for the past year. There was no sputum production, sore throat, fever, atopic or constitutional symptoms, hemoptysis, shortness of breath, orthopnoea, or chest pain. He had no history of active or passive smoking, regular medication intake, or exposure to hazardous pollutants. His family history was negative for smoking, bronchial asthma, and malignancies.

Clinically, he was afebrile. His vital signs were stable, with a blood pressure of 130/84 mmHg, heart rate of 88 beats per minute (bpm), and respiratory rate of 20 breaths per minute. There were no features of respiratory distress (e.g. usage of accessory muscles), cachexia, or cervical lymphadenopathy. The oropharyngeal examination results were unremarkable. Examination of the respiratory system revealed equal bilateral chest movements. The lungs were resonant on percussion. However, slightly reduced breath sounds over the upper lobe of the patient's left lung were noted during auscultation. No further sounds were heard, such as crepitations or ronchi. There was no cervical lymphadenopathy.

Below is the chest X-ray of this patient, taken in erect position and posteroanterior view.



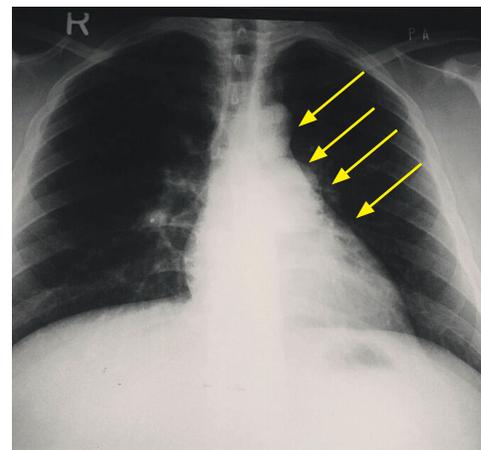
Figure 1. Erect chest X-ray of the patient in posteroanterior view.

Questions

1. Describe the chest X-ray finding(s).
2. What is the most likely diagnosis?
3. What investigation is needed to confirm this diagnosis?
4. What is the management?

Answer:

1. There is a large, loculated mass just medial to the left hilar region and upper left heart border, with obscuration of the adjacent thoracic aorta. No other lung lesion or suspicious bony erosion can be seen. (Based on the radiologist's chest X-ray report).
2. Mass in the superior segment of the left lung, most likely lung carcinoma.
3. Initial investigation includes assessment for pulmonary tuberculosis. However, for any case of suspected lung carcinoma, a CT scan of the thorax is necessary to identify the possible lung mass and highlight further characteristics of the mass. Definitive investigation would include biopsy and histopathological examination of the lung mass.



4. Surgical resection offers the best opportunity for long-term survival and remission in patients with resectable non-small-cell lung carcinoma, with adjuvant chemotherapy according to cancer stage.

Discussion

Lung carcinoma typically presents with hemoptysis and constitutional symptoms as well as a history of chronic cigarette smoking.¹ Due to the lesions' radio-opacity and nodular appearance, a chest X-ray can pick them up in more than 90% of cases.² However, those features can be mistakenly interpreted as normal if they are obscured by the heart shadow, thereby leading to delays in diagnosis and commencement of treatment.³

Lung carcinoma should be suspected regardless of symptoms if the chest X-ray shows new focal lesions, pleural effusion, pleural nodules, enlarged hilar or paratracheal nodes, or atelectasis.⁴ However, these findings can occasionally be obscured by the cardiac borders. In such cases, it is important to search for a positive silhouette sign to identify indicators of underlying masses or adjacent pathologies.⁵ Normally, adjacent anatomical structures of differing densities and consistencies will form a hard contour, or "silhouette." Accordingly, the loss of specific contours can help narrow down the location of a disease process. This phenomenon is known as the "silhouette sign," denoting the loss of normal soft tissue interfaces caused by pathologies which replace or displace the otherwise air-filled lungs.⁶ This sign is commonly found in the heart, mediastinum, chest wall, and diaphragm in chest X-ray films.³ In our patient's case, the adjacent lesion that disrupted the left heart border arose from the upper lobe of the left lung, therefore suggesting the possibility of a left upper lobe mass.

The delayed diagnosis was also attributable to the atypical presentation and absence of obvious radiological findings. While the patient was a non-smoker and had no alarming or constitutional symptoms, there is an ongoing increase in the occurrence of lung carcinoma in non-smokers, owing to the presence of other risk factors in need of further exploration, such as second-hand smoke.⁷ Additionally, non-small-cell lung carcinomas (NSCLC) can be of insidious onset, producing no symptoms until the disease has reached an advanced stage.⁸ This is one possible explanation for the

isolated cough in our patient. Nevertheless, the manifestation of symptoms depends on the location of the mass. Early recognition of these symptoms is beneficial to patient outcome.

In suspected lung cancers of any radiological appearance, tissue diagnosis via bronchoscopy or image-guided biopsy is necessary.^{4,9} Even in the absence of suspicious findings or in the case of X-ray misinterpretation as normal, a patient who presents to primary care with a chronic cough should be referred to a respiratory physician for further assessment if the cause of the cough cannot be identified through adequate initial evaluations.⁹ Following the diagnosis of a carcinoma, complete staging should be performed using a positron emission tomography (PET) scan, as cancer stage is a major determinant of the mode of treatment.⁴

Following the detection of the silhouette sign and highly suspicious lung masses, our patient benefitted from early referral to a respiratory physician at our tertiary center. Computed tomography (CT) of the thorax and bronchoscopy plus lung mass biopsy were performed, after which the diagnosis of lung adenocarcinoma was made. A whole body PET-CT scan confirmed that the lung cancer was in an early stage, lacking any metastases or involvement of other body parts. The soft tissue mass measured $4.5 \times 3.7 \times 3$ cm³ and was confined to the superior segment of the left lung, with few adjacent small nodules. The patient is currently stable and awaiting the earliest possible surgery date.

Surgery is the treatment of choice for patients with NSCLCs of stages I to IIIA.⁸ However, patients with resected lung cancers have a high risk of relapse and are therefore treated with adjuvant chemotherapy. Meanwhile, patients with NSCLCs of stages IIIB–IV are usually offered chemotherapy with an option of surgery. Radiotherapy is a reasonable mode of treatment in patients who are not candidates for surgery. Adjuvant radiotherapy following resection of the primary tumor may have a role in treatment, but this remains controversial.⁸

As a conclusion, accurate interpretations of chest X-rays and awareness of the silhouette sign in primary care providers, coupled with relevant clinical findings, can save patients from the morbidity and mortality of a delayed cancer diagnosis.

Conflict of Interest

Nil

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How does this paper make a difference to general practice?

Chronic cough is one of the most common complaints in primary care, most of which are benign cases. However, a diagnosis of lung carcinoma should be suspected in non-smokers or even those without constitutional symptoms in view of the frequent late presentation of the cancer, especially in NSCLCs. Accordingly, appropriate and adequate assessments should be performed, including referrals to tertiary centers if indicated or whenever a diagnosis cannot be made. The silhouette sign can play an important role when the lesion is obscured by an intrathoracic structure, especially one located behind the cardiac borders. Strong clinical suspicion, in the presence of adequate clinical assessments, will definitely lead to a timely diagnosis and therefore a good prognosis.

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