

A woman with a solitary pulmonary nodule: is it a lung cancer?

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Abstract. – BACKGROUND: Solitary pulmonary nodules present a real challenge for physicians. Due to the clinical implications and prognosis of a certain diagnosis, it should be pursued with any cost; a clear definition is not always simple and further investigations are often necessary to exclude the possibility of a malignancy.

A diagnostic path must be followed and the clinical hypothesis should be reconsidered on the basis of the new information provided by the tests, always keeping in mind their limits! Sometimes only the surgical resection permits a definitive diagnosis.

A 68 year-old non-smoker female with a pulmonary solitary nodule highly suspicious to be malignant at the chest CT, performed a FBS with BAL, negative for neoplastic cells and for infective agents, and a CT guided pulmonary biopsy that was inconclusive.

The patient underwent then a video-thoroscopic atypical lung resection that demonstrated the reactive nature of the lesion, definitely excluding the presence of a malignancy.

Key Words:

Solitary pulmonary nodule, Gastric lymphoma, Fiberoptic bronchoscopy, Video-assisted thoracoscopic surgery.

Case Report

A 68-year-old non-smoker female was referred to the outpatients' section of our Respiratory Disease Unit, due to dry cough and alterations found in a High Resolution Computed Tomography (HRCT) she had undergone as a control exam. Past medical history included arterial hypertension, hypercholesterolemia, and a gastric lymphoma diagnosed 8 years before, treated with 12 cycles of combined chemotherapy (cyclophosphamide, doxorubicin, vincristine and prednisolone).

Her family physician prescribed her a HRCT because of a dry cough developed during the last 2 months: the exam showed the presence of emphysematous bullae in the lower lobes. No interstitial disease was detected nor ground glass opacities of pulmonary fibrosis. However the HRCT showed the presence of a round opacity with irregular margins (max. diameter 17 mm). No pleural effusion nor lymph nodal enlargement were detected.

The patient denied weight loss or fever or breath shortness during the last 6 months. She appeared in relatively good conditions. Her vital signs were normal.

Thoracic physical examination revealed inspiratory crackles during cough efforts and wheezing after forced expiration. The rest was negative.

Electrocardiography, two-dimensional echocardiography, Pulmonary Function Tests, and blood analysis were normal. Quantiferon-TB Gold (QFT) test was negative.

The patient underwent a Total Body CT scan with contrast material (iodine dye), that showed the presence of a nodular solid formation with irregular margins, characterized by contrast enhancement, with max dimensions of 17 mm × 16 mm, localized in the anterior segment of the left upper lobe, suggestive for an heteroplastic alteration (Figures 1 and 2), and enlarged lymph nodes in ilo-mediastinal positions with max dimensions of 17 mm. She performed then a fiberoptic bronchoscopy (FBS) that was normal. A bronchoalveolar lavage (BAL) specimen was negative for neoplastic cells, and for infective agents. A CT guided pulmonary biopsy was inconclusive.

The patient underwent then a video-assisted thoracoscopic surgery (VATS) for atypical lung resection.

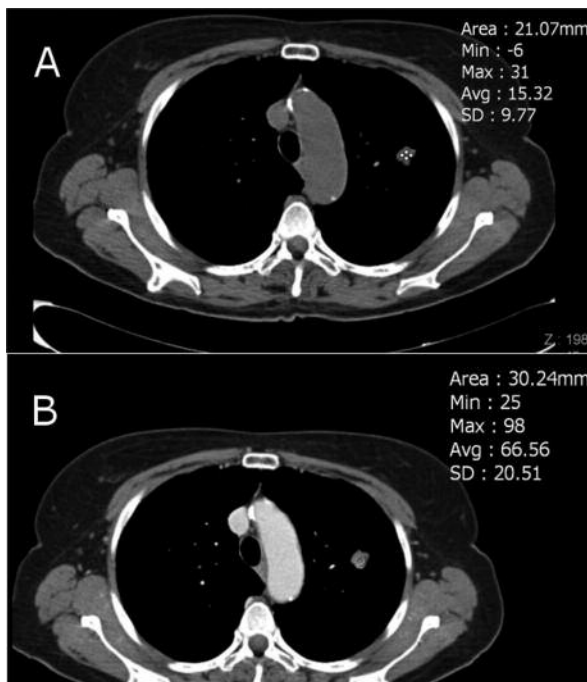


Figure 1. Chest CT, showing in the anterior segment of the left upper lobe a nodular solid formation with irregular margins, characterized by contrast enhancement, with max dimensions of 17 mm x 16 mm. A, Pre-contrast scan; B, Post-contrast scan.

The neoformation showed the histological characteristics of the lung parenchyma partially replaced by hyaline fibrous tissue, associated to peripheral aspects of ‘organizing pneumonia’ and to a reactive multifocal lympho-mononuclear infiltrate organized in lymphatic follicles, with germinal centers (with small B lymphocytes, CD20+, CD79a+, and centrofollicular cells, CD23+) and in paracortical areas (with T lymphocytes, CD3+, CD5+). The proliferative index was significant only in the germinal centers (Figure 3).



Figure 2. Chest CT, lung window.

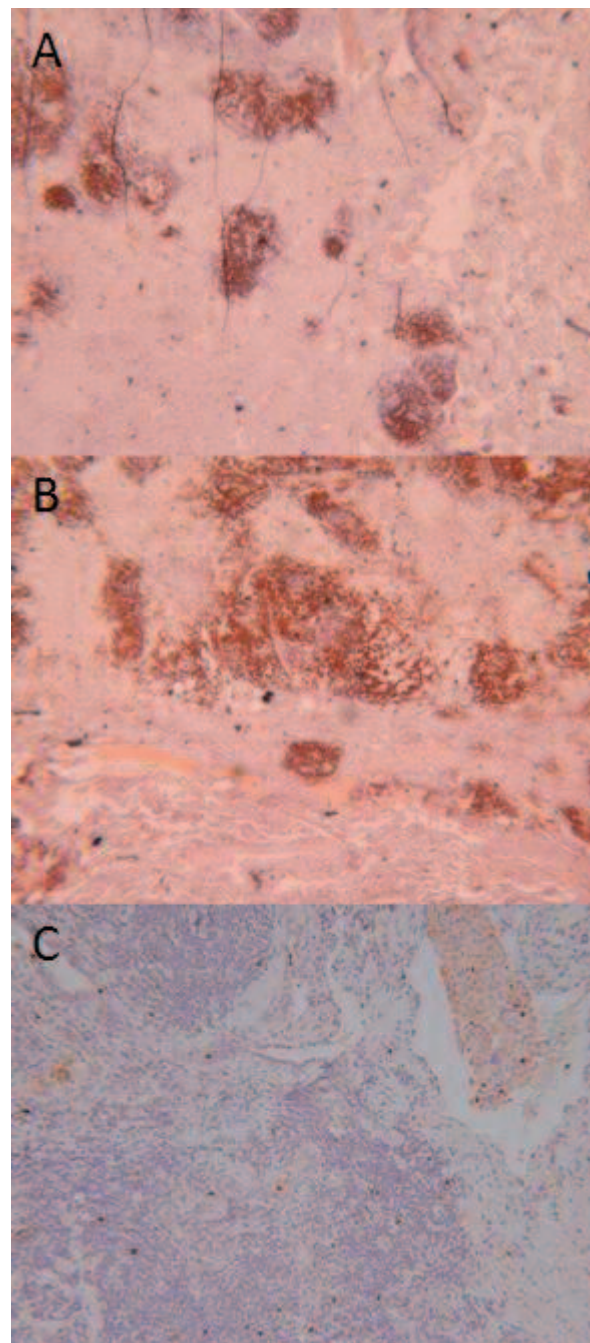


Figure 3. Lung sections obtained from video-assisted thoracoscopic atypical lung resection: immunohistochemistry coloration for the identification of antigens CD20 (A) and CD3 (B) and proliferation index Ki67 (C). Immunohistochemical staining method: ABC (Avidin-Biotin Complex), counterstained with Hematoxylin. Magnification x 125.

Discussion

The principal hypothesis in this case were infections or a neoplastic disease.

Two radiological patterns of the margins of a nodule are relatively specific for cancer: one is the corona radiata sign, consisting of very fine linear strands extending 4 to 5 mm outward from the nodule, and the second is a spiculated appearance¹. A scalloped border is associated with an intermediate probability of cancer, whereas a smooth border is more suggestive of a benign diagnosis¹.

Contrast enhancement of a lesion would be almost diagnostic for a neoplastic process. In a study, in which an increase in attenuation of 20 Hounsfield units was considered the threshold for the detection of a malignant process, the sensitivity and specificity of this technique were 95 to 100 percent and 70 to 93 percent, respectively².

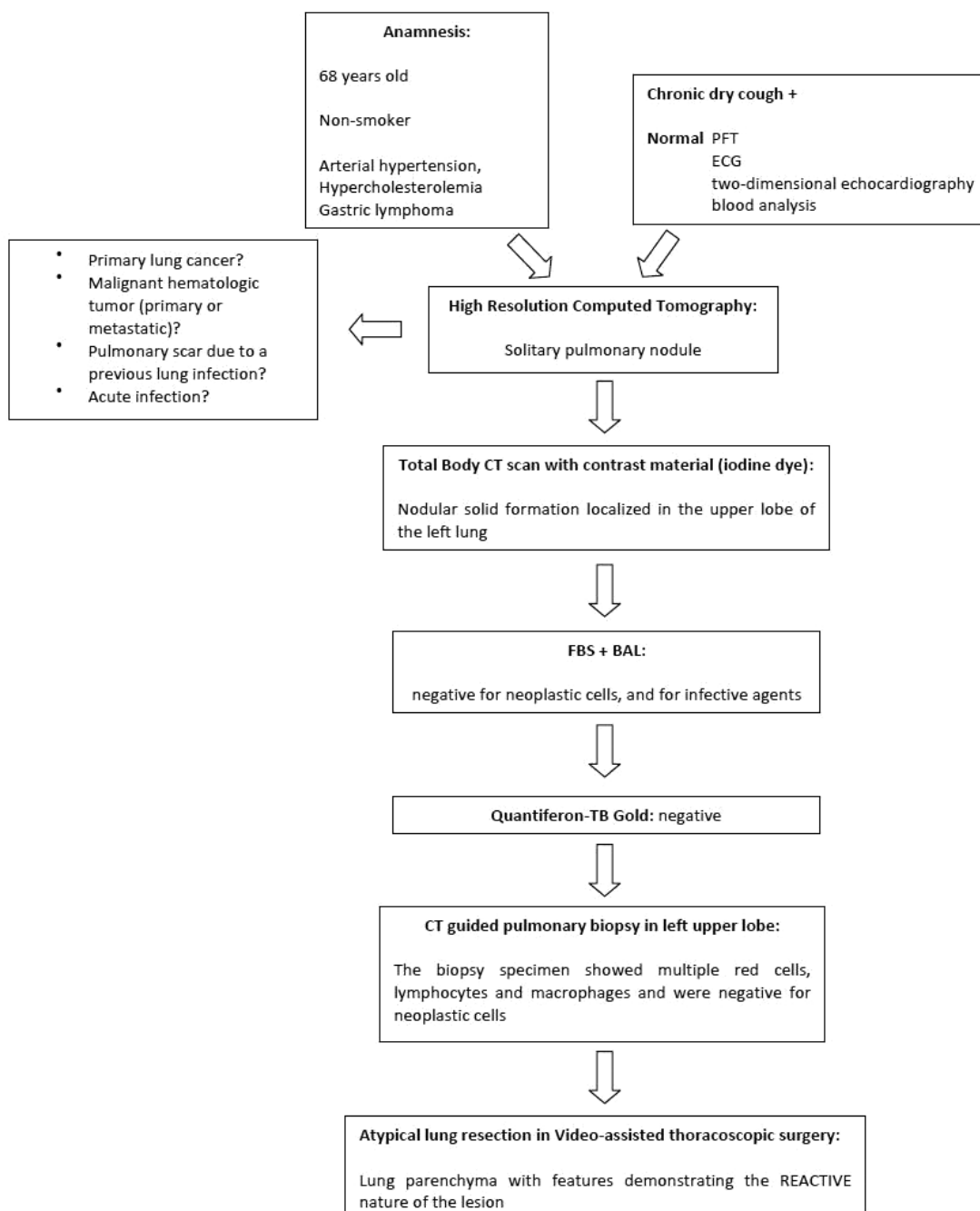


Figure 4. Diagnostic course of case report. PFT: Pulmonary function test; ECG: Electrocardiography; CT: Computed Tomography; FBS: Fiberoptic bronchoscopy; BAL: Bronchoalveolar lavage.

In the case of nodules larger than 8 mm, additional options such as positron emission tomography (PET), percutaneous needle biopsy, and thorascopic resection can be considered³⁻⁶. It is important to clarify that these approaches depend greatly on available expertise and equipment; furthermore PET has limited applicability to nodules in the subcentimeter range.

Sputum specimen would be helpful even though a negative result doesn't exclude an infective or neoplastic process. A peripheral location could make FBS and BAL almost unnecessary⁷.

When these procedures fail to give clear results, but CT scan results show a possible neoplastic nature, more invasive tests may be necessary and in first instance a CT guided trans-thoracic fine-needle biopsy would be helpful to define completely the nature of the lesion. Although fine needle biopsy has a relatively good sensibility, its specificity is not very high. Also, the procedure has a false negative rate of 3 to 29 percent for lesions that are less than 2 cm in diameter⁸.

In our case we had to obtain a larger specimen, to examine a frozen section: VATS offers the potential for lower morbidity and a shorter hospital stay than conventional thoracotomy⁹.

Solitary nodules are a very complicated topic in pulmonary medicine. Since the definitive diagnosis influences the prognosis of the patient, it should be pursued without making the mistake of the early closure of the diagnostic process, taking a hypothesis as an already secure diagnosis. The diagnostic tests, even though have changed our way of evaluation, have their limits, and we should be aware of this. A clear definition is not always simple and further investigations are often necessary to exclude the possibility of a malignancy.

A diagnostic path must be followed and the clinical hypothesis should be reconsidered on the basis of the new information provided by the

tests, always keeping in mind their limits! Sometimes only the surgical resection permits a definitive diagnosis.

Diagnosis

A benign pulmonary nodule with histological features showing its reactive nature, in a woman with a previous gastric lymphoma. The diagnostic course is represented in Figure 4.

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