LETTER / Thoracic imaging

Squamous cell carcinoma ‘‘mimicking’’ passive atelectasis from thoracic aortic aneurysm compression

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Ventilatory defects are commensurate with a decrease (atelectasis or collapse) or increase (hyperaeration, air trapping) in pulmonary volume. Lung cancer is the main cause of obstructive atelectasis. In a patient who is a middle-aged smoker, the very fact of an incorrect diagnostic hypothesis of atelectasis should suggest lung cancer until proven otherwise.

Case study

A 71-year-old male patient had a CT scan to assess a left hilar opacity. His history consisted mainly of: carcinoma of the laryngeal surface of the epiglottis treated by radiotherapy and chemotherapy and a second location in the vocal cords treated by total laryngectomy; those two cancers have been in complete remission for more than 10 years. The patient is also treated for hyperthyroidism and hypertension. His main risk factors are: a former smoking habit estimated at 30 pack-years, significant prior occupational exposure to asbestos. A chest X-ray 3 months earlier showed a retrocardiac opacity (Fig. 1); the workup was rounded out by a volume CT scan without and after injection of contrast product. It showed an aneurysm of the descending aorta, atheromatous lesions, and a fusiform area of tissue density attenuation in the pulmonary parenchyma in contact with the aneurysmal dilatation (Fig. 2). This was an image hugging the aorta and displacing the left lower lobe bronchus and left inferior lobar artery slightly forward. The spontaneous density was 32 HU, and it was homogeneous with no air or fluid bronchogram. The margins of the lesion

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Figure 1. AP and lateral chest X-ray: tortuous aorta and opacity with blurred margins in front of the descending aorta.

Figure 2. CT scan of chest with contrast: area of tissue density attenuation hugging the aneurysmal aorta: a: Cross-section in pulmonary window; b: Cross-section in mediastinal window; c: Oblique sagittal reconstruction parallel to the arch; d: Oblique frontal reconstruction orthogonal to the arch.

were clear; after injection, there was significant enhancement with a density of +31 HU. The abnormality was located in contact with and in front of a fusiform aneurysm of the descending aorta measuring 4.8 cm in greatest transverse diameter by a height of 7.6 cm. The first diagnosis suggested was compression atelectasis due to a mass effect of the aortic aneurysm. The patient was then referred to pulmonology. The fiber optic bronchoscopy that was done
showed only a passive collapse of the left lower lobe, and the endobronchial biopsies were negative. In view of the undetermined nature of the lesion and the high risk factors for cancer (smoking and asbestos), an exploratory PET/CT scan was also performed. It showed significant uptake by the para-aortic lesion, suggesting a tumor process (Fig. 3). The histology was finally obtained with a CT-guided transparietal biopsy (Fig. 4). During that procedure, 2 months after the original scan, a significant increase in the volume of the lesion was noted. The biopsy made it possible to diagnose squamous cell carcinoma proliferation. This was therefore a case of squamous cell cancer of the left lower lobe, whose comprehensive staging — T2 N0 M0 — led to a surgical procedure: lobectomy.

**Figure 3.** PET/CT scan: significant uptake by the lesion whose standardized uptake value (SUV) is equal to 7.

**Figure 4.** CT-guided biopsy (increase in lesion volume since initial diagnosis) and microscopic appearance of the carcinomatous proliferation at high magnification.
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Discussion

There are different atelectasis mechanisms: obstructive, passive, adhesive, or cicatricial. Passive or compressive atelectasis is most often associated with the presence of fluid or gaseous pleural effusion. An elastic collapse of the lung then occurs due to lack of negative intrapleural pressure. It may also occur in contact with a large intrathoracic mass, or at the bases when there is an increase in abdominal pressure (ascites, pregnancy, occlusion, obesity) [1]. It is common to see minor ventilatory defects due to compression by a tortuous or aneurysmal thoracic aorta (Fig. 5). Such abnormalities are also seen along the spine in cases of scoliosis or exuberant osteophytes. The loss of pulmonary volume is commensurate with the space occupied by the effusion or the mass effect. A mismatch between the volumes is an argument in favor of pursuing the explorations, specifically by fiber optic bronchoscopy. When the lesion is analyzed after the fact on the original CT scan, it is more voluminous than the usual ventilatory defect due to compression. The mass effect on the left lower lobe bronchus with a decrease in the diameter of the bronchus could also have drawn attention at the outset. The cartilaginous proximal bronchial structures normally resist passive collapse associated with a complete pneumothorax, for example [2]. A small ventilatory defect should not deform a proximal bronchus. However, density enhancement after injection is not discriminative, since it is usual in cases of atelectasis. An atelectasis enhances earlier and more intensely, but there was no dynamic acquisition. The interpretation of the CT scan could also have taken the significant risk factors for cancer into account (combination of smoking and asbestos exposure) [3,4]. The fiber optic bronchoscopy failed to provide a diagnosis of type by showing only extrinsic compression. The intense uptake on the PET/CT supports the tumor hypothesis, even though the atelectasis causes a false positive; this study seemed justified here to decide whether or not to pursue invasive investigations in order to obtain the histology [5,6]. After a multidisciplinary discussion on the risk/benefit of the procedure, ultimately, it was the CT-guided biopsy that confirmed the tumor hypothesis. During the CT-guidance procedure, an increase in the volume of the lesion was already noted (Fig. 4).

Conclusion

The volume of a compression atelectasis should be commensurate with the cause of that compression. Even though that incorrect diagnosis was made in this patient, in principle, the possibility of a tumor should have been considered in a patient with significant risk factors for cancer. Additional investigations and a CT-guided biopsy confirmed the carcinomatous proliferation.

Disclosure of interest

The authors have not supplied their declaration of conflict of interest.

References