Case Report

Pulmonary Apical Mass, the So-Called Pulmonary Apical Cap, in a 43-Year-Old Woman

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A 43-year-old woman had a pulmonary tumor detected by a computed tomographic (CT) scan during follow-up for breast cancer 15 years previously. The tumor showed a solid mass measuring 42 × 32 × 12 mm in extensive contact with the pleura of the apex of the left upper lobe. The edge of the tumor was relatively well-defined with an irregular shape, and a bubblelike area was seen within it. The longitudinal slice high-resolution CT findings showed a flat and thick mass, and its inferior border was distinct and horizontal. The pathological findings by a thoracoscopic lung biopsy showed a localized pulmonary fibrosis of the apex, a so-called pulmonary apical cap (PAC). With the recent advances in CT scan technology, the detection of PACs is very likely to increase, and they must be differentiated from superior sulcus tumors. (Ann Thorac Cardiovasc Surg 2010; 16: 122–124)

Key words: pulmonary apical cap, superior sulcus tumor, fibrosis, scar, computed tomographic

Introduction

Pulmonary apical caps (PACs) are mostly thin scar lesions noticed in the apices of the lobes. However, some PACs form thick fibrous masses that must be differentiated from pulmonary carcinoma, especially superior sulcus tumors. There have been very few reports evaluating radiological findings in detail that might be useful for differential diagnosis. Here we report on a case in which a PAC formed a thick fibrous mass and include comments on the radiological findings.

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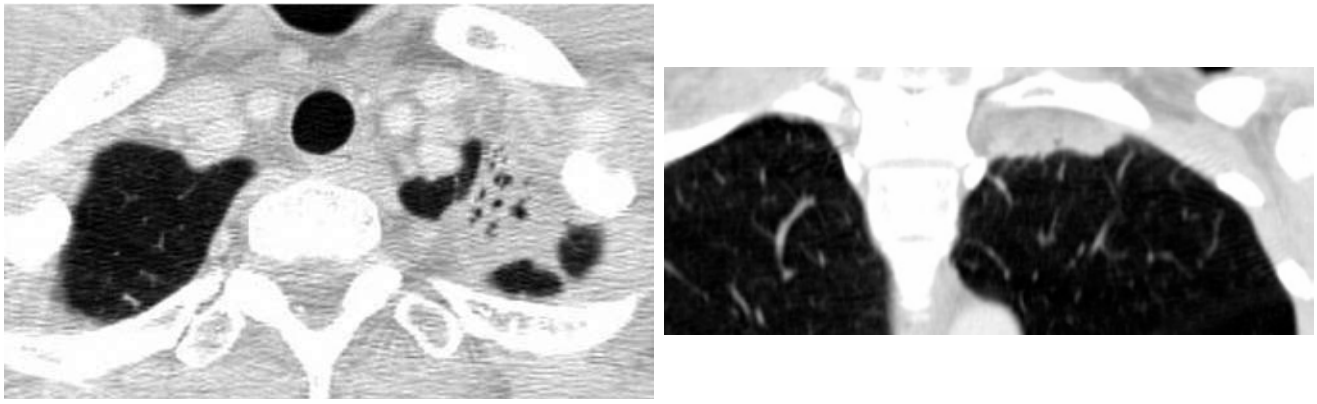
Case Report

A 43-year-old woman, a nonsmoker with no history of asbestos or silicon dust exposure, was referred to our hospital for further examination of a pulmonary tumor detected by a computed tomographic (CT) scan during follow-up for breast cancer 15 years previously. Although a chest X-ray showed no obvious lesions, a high-resolution CT (HRCT) scan showed a solid mass measuring 42 × 32 × 12 mm in extensive contact with the pleura of the apex of the left upper lobe (Fig. 1A). The edge of the tumor was relatively well-defined with an irregular shape, and a bubblelike area was seen within it. The longitudinal slice HRCT findings showed a flat and thick mass, and its inferior border was distinct and horizontal. No signs of vascular convergence, infiltration to the chest wall, or calcification were found (Fig. 1B). There is no emphysematous change or bullae adjacent to the cap, and neither mediastinal nor hilar lymphadenopathy could be detected. The uptake of fluorodeoxyglucose (FDG) in the tumor was absent on positron emission tomography (PET). Although a benign lesion was suspected, based on the radiological findings, the possibility of adenocarcinoma remained as a differential diagnosis, and a thoracoscopic



A | B

Fig. 1. HRCT showing a mass in the apex of the left upper lobe.
A: A bubblelike area is seen in the mass.
B: The mass seen in the longitudinal section is thick, and its inferior border is distinct and horizontal.

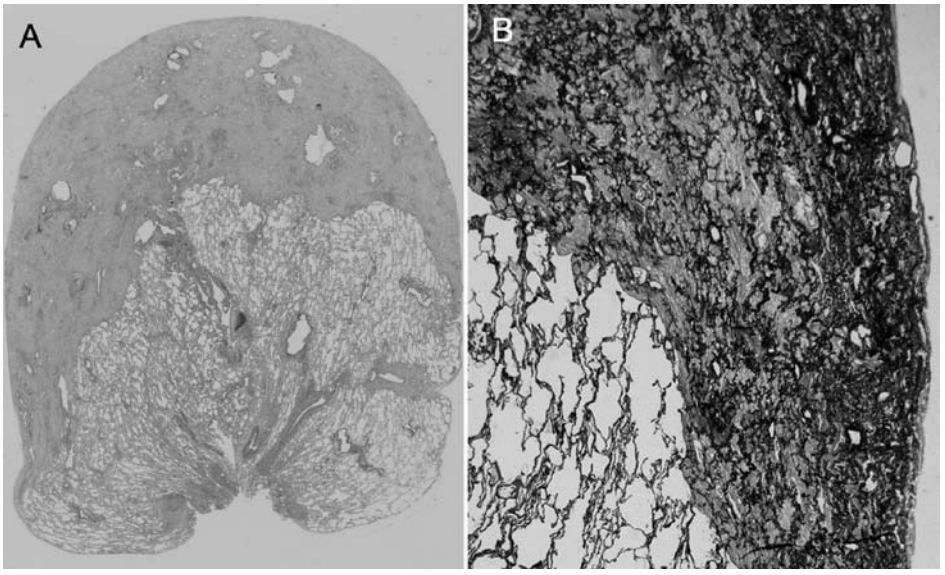


Fig. 2. Histological appearance of PACs.
A: Subpleural localized fibrosis in the apexes of the lobes. The pleural surface is at the top, with normal lung tissue at the bottom. A fibrous plaque of the pleura was not found. (hematoxylin-eosin stain, original magnification: ×4)
B: Elastic fiber stain shows marked alveolar collapse with an increase of elastic tissue in the alveolar septa. (hematoxylin-eosin stain, original magnification: ×10)

lung biopsy was performed. The pleural surface of the apex was opaque and milky white, and the lateral margin of the tumor was sharply defined with slight dimpling. The pathological findings showed a solid mass occupied by a large amount of connective tissue without the normal structure of alveolar and atypical cells (Fig. 2A). The elastic fiber stain defined marked alveolar collapse with an increase of elastic tissue in the alveolar septa (Fig. 2B). There was no fibroblastic stromal reaction. Considering these findings, we diagnosed the lesion as a localized pulmonary fibrosis of the apex, a so-called PAC.

Discussion

The PAC is a well-circumscribed area of fibrosis frequently found in the apex of the lung.[1)] In autopsies, PACs have been reported in 48 (26.2%) of 183 patients,[1)] and in 45 (39.8%) of the left lung of 113.[2)] However, there are only

a few cases in which the clinical manifestation has been reported. Yousem[3] reported 13 cases of PACs resected for a presumed diagnosis of carcinoma. The CT revealed spiculated pleural-based parenchymal masses associated with pleural thickening. Almost all of the lesions were noncalcified.

In our case, HRCT similarly showed a widely pleural-based mass 12 mm thick. The characteristic finding was a bubblelike appearance within the mass, which is sometimes seen in a well-differentiated adenocarcinoma. Compared with the pathological finding, the bubblelike appearance was caused by bronchioles with condensation of the framework of elastic fibers in the alveolar wall. If adenocarcinoma as a differential diagnosis is ruled out, the useful radiological finding is a lack of vascular convergence. This is pathologically explained by the absence of any fibroblastic stromal reaction, which is a characteristic of adenocarcinomas. Furthermore, the widely pleural-based localization of PACs seemed to be useful to distinguish them from adenocarcinomas. There have been no reports on PET findings of PACs. In our case, PET results were negative probably because the lesion lacked many inflammatory cells that collected FDG. However, it should be noted that well-differentiated adenocarcinomas sometimes show false negatives.

As for the pathogenesis of PACs, infarction was suspected as the cause of PACs because there were abnormalities of vessels immediately adjacent to the fibrous area.[3] This hypothesis was supported by the PACs frequently occurring in older individuals.[1,2] However, our case was a 43-year-old patient who was the youngest patient among past reports of PACs surgically resected for a presumed diagnosis of carcinoma, and we could reveal no findings of the causes of fibrous formation, including sclerosis or obliteration of the arteries in the cap.

In summary, we reported a case of a PAC forming a fibrous mass. The radiological findings were a widely pleural-based consolidation of the apex with distinct borders and no vascular convergence. With the recent advances in CT scan technology, the detection of PACs is very likely to increase, and they must be differentiated from superior sulcus tumors.

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