

Three Cases of Primary Lung Cancer Undetected by an Annual Checkup

Akira MIYAIRI^{1, 2)}, Tetsuri KONDO^{1, 2)}, Hiromoto INOUE^{1, 2)}, Miho KUMAGAI^{1, 2)},
Keiichi OHHORI¹⁾, Yasuo ONOUE³⁾
and Hiroshi MATSUHASHI⁴⁾

1) *Kyoundo Hiratsuka Hospital*

2) *Tokai University Hospital*

3) *Onoue Clinic*

4) *Matsuhashi Clinic*

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An annual check by chest roentgenogram is very important for the early detection of lung cancer. We present three cases of primary lung cancer which were not detected by the double check system or previous examination. The three patients visited our hospital for evaluation of an ill-defined opacity in the upper lobe of the lung. In the three cases, no abnormality had been reported in the previous year's annual chest X-ray, and we concurred in the decisions. The correct diagnoses of the three cases were well or poorly differentiated adenocarcinoma, and were still amenable for surgical therapy. A poorly defined tumor in this region is very difficult to detect because of superimposed opacities of other anatomical structures. When a questionable shadow in this region is found but without the typical radiological features of lung cancer, it is important to search for indirect indications of adenocarcinoma. These may include fibrotic changes and absence of inflammation. In our cases, the increased number of normal-size bronchi penetrating the ill-defined tumor, seem to have diagnostic significance.

(Key words: computed tomography, bronchiectasis, solitary nodule)

Introduction

Lung cancer is the second most common cause of death in Japan (1) and is the leading cause of cancer mortality in most countries (2). Since early diagnosis and surgery are crucial for the management of lung cancer, the annual checkup by chest roentgenogram is very important. By the law of senior welfare (3) and recent study (4), physicians are encouraged to check chest roentgenograms by a double-read method. In this method, X-ray films are read independently by two physicians. Further, the law of senior welfare (3) advises that X-rays of two consecutive years be compared. These procedures may reduce the incidence of overlooked lung cancers. However, in some cases, the early detection of lung cancer can be very difficult if the size of the tumor is stable or its shape is not typical (4, 5). In this

paper we present three cases of lung cancer which localized at the apical region of the lung and escaped detection by the double-check system and a detailed examination.

Case reports

T. H.; A 65 y. o. male visited our hospital because of an abnormal shadow in the left upper lobe of the lung. He had been well and had not been presented any abnormality on his annual chest X-rays in the last two years. On chest X-ray and CT (Fig 1), an ill-defined nodule, 4 × 3 cm in size, was found in the left upper lobe (S¹⁺²). There were a few bronchi penetrating the lesion. These bronchi were gathered but without any features of bronchiectasis. A trans-bronchial lung biopsy (TBLB) specimen obtained from the left S¹⁺² revealed a poorly differentiated adenocarcinoma. The stage of lung cancer was considered as stage I of

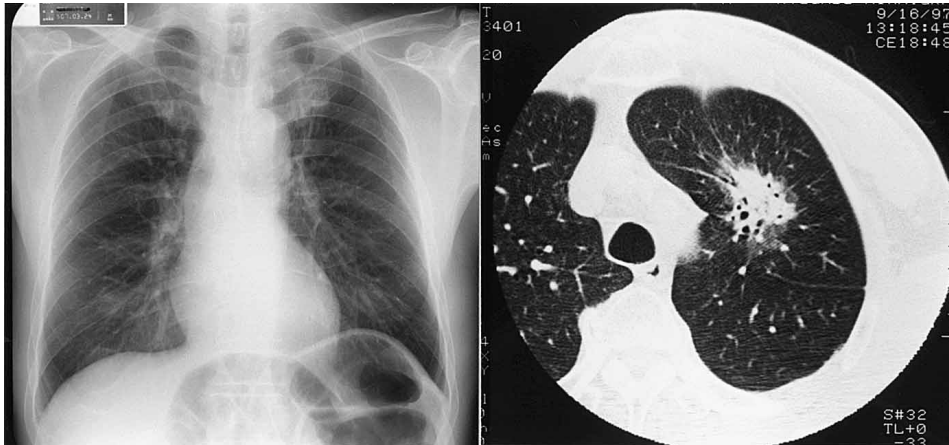


Fig. 1. Chest X-ray (left) and CT (right) of case 1. An ill-defined nodule (arrow) is seen in the left upper lobe (S^{1+2}).

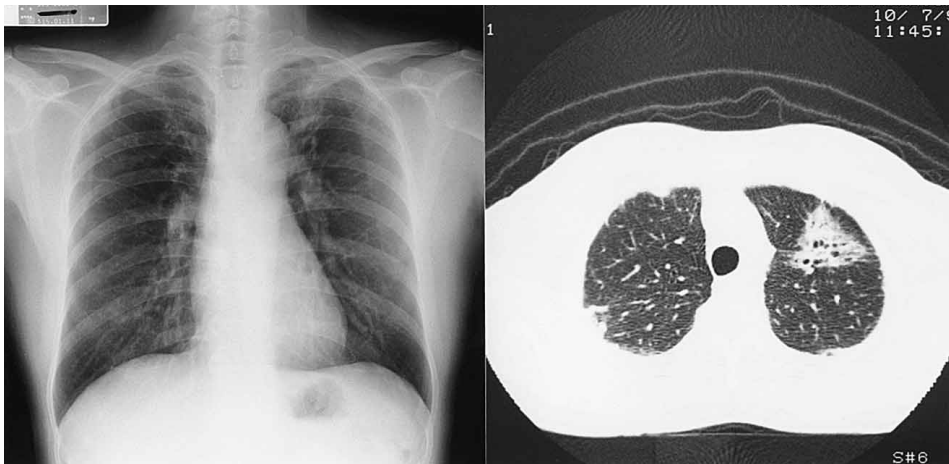


Fig. 2. Chest X-ray and CT of case 2. An ill-defined nodule is seen in the left upper lobe.

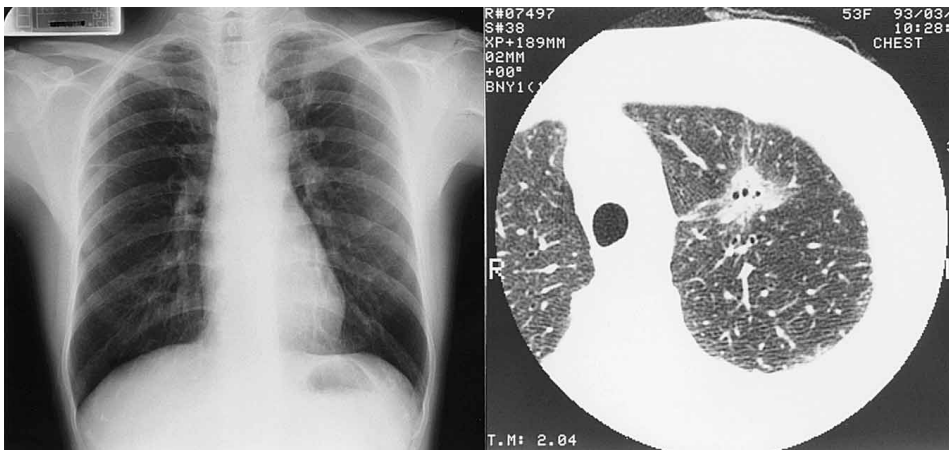


Fig. 3. Thoracic CT of case 2 obtained four years ago. Tumor size is unchanged but the number of penetrating bronchi is less.

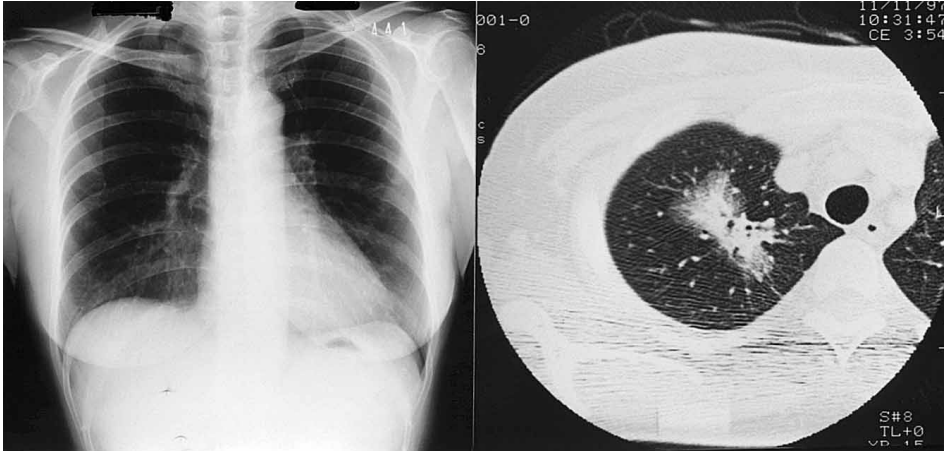


Fig. 4. Chest X-ray and CT of case 3. An ill-defined nodule is seen in the right upper lobe (S¹).

the TNM system (3) and thus he was referred to a surgeon. Four pneumonologists and one radiologist critically reviewed the chest X-rays of the previous years. A questionable opacity was found on both of the films but its features were not sufficient to definitely diagnose lung cancer.

N. N.; A 57 y. o. female visited the Kyoundo Hiratsuka Hospital because of an abnormal shadow in the left upper lobe of the lung. Four years ago the lesion had been intensively examined in the same hospital. The chest CT and TBLB did not permit a definite diagnosis. Every year since, the abnormal shadow was detected in annual chest X-rays, but a detailed examination was not performed. On the chest X-ray and CT obtained during the present visit (Fig 2), an ill-defined nodule was seen in the left upper lobe. There were a few normal-sized bronchi penetrating the lesion. The distances between each of the bronchi were shorter than normal. In the contralateral chest, small fibrous scattered lesions were observed. Comparing the CT with that obtained four years ago (Fig 3), the size of the mass had slightly increased as well as the number of penetrating bronchi, suggesting an increase in the fibrotic process. A TBLB specimen obtained from the left S³c revealed a well differentiated adenocarcinoma. The stage of lung cancer was considered as stage I, and she was referred to a surgeon.

T. M.; A 55 y.o. female visited our hospital because of an abnormal shadow in the right upper lobe of the lung. No abnormality had

been reported on her annual chest X-ray taken last year. The chest X-ray and CT (Fig 4) taken on the present visit revealed an ill-defined nodule located in the right S¹. A few bronchi penetrated the lesion in a crowded fashion. There was no hilar lymphadenopathy. In the last year's X-ray, the opacity was slightly smaller and could be considered as an inflammatory change. The first TBLB proved unsatisfactory but the second TBLB suggested a well differentiated adenocarcinoma. Open lung biopsy confirmed the diagnosis and a curative operation was done.

Discussion

All three cases presented here had escaped detection during the routine checkups, apparently because the tumors were localized in the upper lobe beneath the clavicle. In this region, detection of a small and ill-defined tumor is very difficult because several anatomical structures such as ribs, clavicle and pulmonary vessels are superimposed on the lesion. When the tumor originates at the level of the segmental bronchus, the typical radiological features of adenocarcinoma, i.e., pleural retraction, corona radiata, and convergence of the vessels (5), are not apparent either in the chest X-ray or in the thoracic CT. Furthermore, in Japan, many of the lesions found in this area are the fibrous changes of healed tuberculosis (6).

The most important features for the diagnosis of lung cancer in these cases may be the increased number of the normal-size

bronchi which can be seen penetrating the ill-defined opacity. The poorly defined lesion, are suggestive of the fibrous changes which may occur either in chronic inflammation (7) or adenocarcinoma (4). The chronic inflammatory process is frequently associated with dilation of the bronchus, i.e., bronchiectasis (8), but in adenocarcinoma, association with bronchiectasis is infrequent (9, 10). Although pulmonary adenocarcinomas originating at the segmental bronchus level do not usually develop typical radiological features, the neighboring bronchi may appear closer because of fibrotic changes of the lesion. Therefore, such findings should serve to alert the physicians.

Another point which should be emphasized is that all of the cases were still good candidates for surgical treatment. Although the prognostic significance of the histologic appearance has not been established in non-small cell carcinoma, adenocarcinomas have a tendency toward distant metastasis (11). The present three cases were diagnosed with well- or poorly-differentiated adenocarcinomas, but the clinical and radiological characteristics resembled those of bronchioloalveolar cell carcinoma which has a lower tendency to metastasize. Therefore, if a suspicious opacity is found in a pulmonary apical lesion, lung cancer should be suspected.

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