

Case Report

Minimal Lung Cancer with Extensive Chest Wall Invasion: Report of Two Cases

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ABSTRACT

We describe rare 2 cases of minimal lung cancer with marked progression to the chest wall. The radiological findings revealed a chest wall tumor. Both cases underwent lobectomy concomitant with chest wall resection. Pathological study showed that well-differentiated carcinoma was minimal inside the visceral pleural and poorly differentiated tumor cells broke down the pleura and extended into the chest wall. Both cases died of recurrent cancer within 1 year after surgery.

(Key words : chest wall tumor, lung cancer, surgery)

CASE REPORT

Case 1

A 75-year-old male presented for examination of a left chest wall tumor with a complaint of back pain. Histological examination of needle biopsy specimen showed adenocarcinoma. He had been a stone-worker for 40 years. His smoking history was 40 years with 70 packs / year. The patient had no exposure to asbestos products.

Chest radiography and computed tomography (CT) scans showed a disk-shaped chest wall tumor, 9 cm in the longest diameter, with an irregular margin and no calcification. The tumor located the left posterior chest wall including the 8th rib and 9th rib (Figure 1A). Positron emission tomography (PET) with ^{18}F -fluorodeoxyglucose (FDG) showed ^{18}F -FDG uptake by the tumor. The maximum standardized uptake value was 15. There were no uptake lesions other than the equivocal uptake area. Lung cancer with chest wall invasion was diagnosed as a clinical stage of T3 N0 M0, according to the UICC TNM classification. Posterolateral thoracotomy was performed due to discontinuation of cisplatin and docetaxel chemotherapy. The tumor extended the chest wall with minimal adhesion to the left lower lobe. The left lower lobectomy with concomitant chest wall resection from the 7th rib to the 10th rib was performed.

Macroscopically, the tumor was predominantly located in the chest wall, and measured 9 cm in the longest diameter. The tumor showed minimal invasion to the lung (Figure 1B). Pathologic study with Elastica van Gieson (EVG) staining showed that the visceral pleural external elastic membrane was broken down at the border between the lung and the tumor (Figure 2). Hematoxylin and eosin (HE) staining

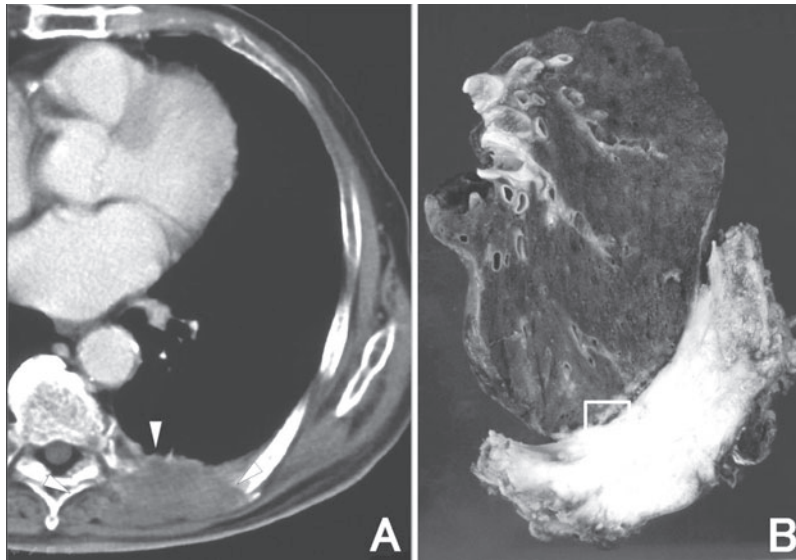


Figure 1 Chest CT scan & Macroscopic finding (Case 1)

(A) A disk-shaped mass, 9 cm across the longest diameter, with an irregular margin and no calcification, invaded the left 8th rib and 9th rib (arrowhead). (B) The chest wall tumor, 9 cm in the longest diameter, minimally invaded the left lower lobe. The microscopical finding of the area indicated by white box was shown in Figure 2.

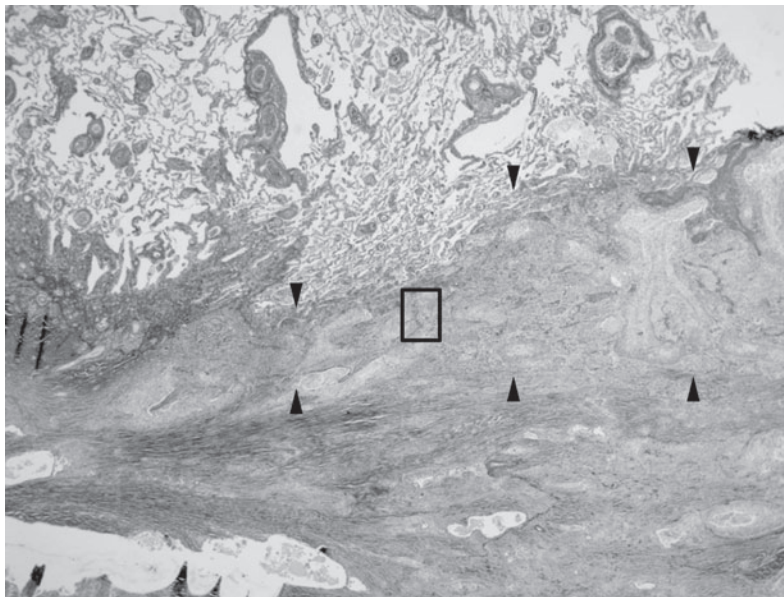


Figure 2 Low-magnification microscopic finding (Case 1)

Elastica van Gieson staining showed that the visceral pleural elastic membrane was partially broken down at the border between the lung and the tumor (arrowhead). High-magnification microscopic findings of the area indicated by the black box was shown in Figure 3.

showed that the tumor tissue located inside the broken elastic membrane comprised alveolar structures with keratinization and glandular structures. Well-differentiated tumor cells were identified inside the elastic membrane, while poorly differentiated tumor cells spread to the chest wall. Immunohistochemical studies revealed positivity for thyroid transcription factor-1 (TTF-1) and napsin A (Figure 3). These findings suggested a diagnosis of primary lung cancer categorized by adenosquamous carcinoma. The patient had paraplesia caused by anterior spinal ischemia on the 1st postoperative day and died of local recurrence 1 year after surgery.

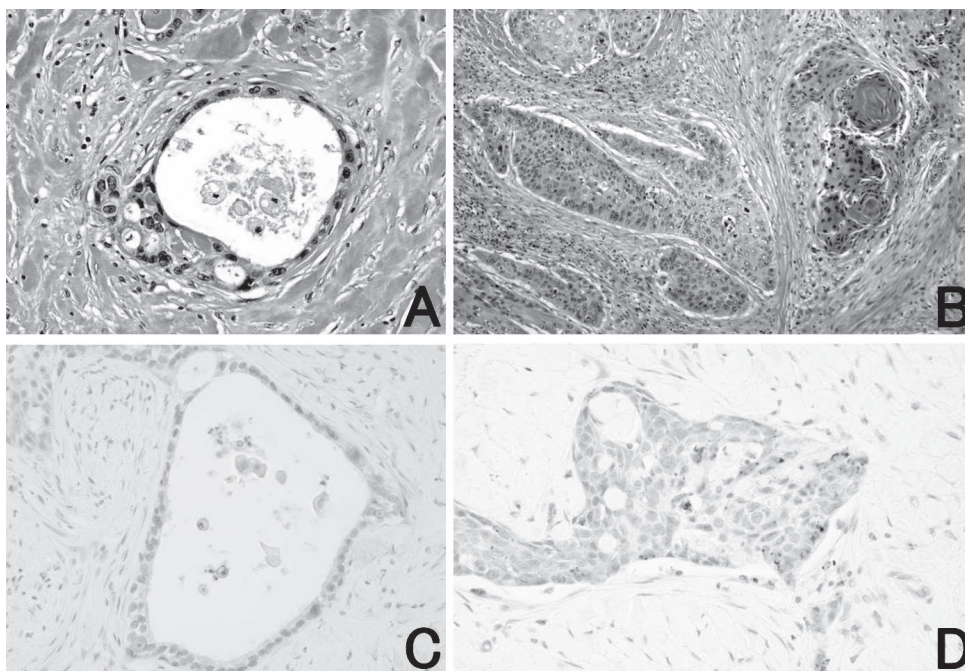


Figure 3 High-magnification microscopic findings (Case 1)

(A), (B) Hematoxylin and eosin staining showed high magnification of the adenosquamous carcinoma, as indicated by the box in Figure 2. (C) Thyroid transcription factor-1 expression identified in the duct structure. (D) Napsin A expression was identified.

Case 2

A 40-year-old male presented for examination of a right axillary palpable lymph node with right chest pain and arm hypoesthesia. Histological examination of the right axillary lymph node following axillary lymphadenectomy showed carcinoma. His smoking history was 24 years with 50 packs / year. The patient had exposure to asbestos.

Chest radiography and CT scan showed a spherical chest wall tumor, 6 cm in diameter, without calcification. The tumor invaded the mid-portion of the 3rd rib with osteolytic change (Figure 4A). The lung cancer with chest wall invasion, clinical stage of T3 N0 M1 according to the UICC TNM classification was diagnosed. A right upper lobectomy with concomitant chest wall resection from the 2nd rib to the 5th rib was performed via a posterolateral thoracotomy. Adhesion of the chest wall tumor to the right upper lobe

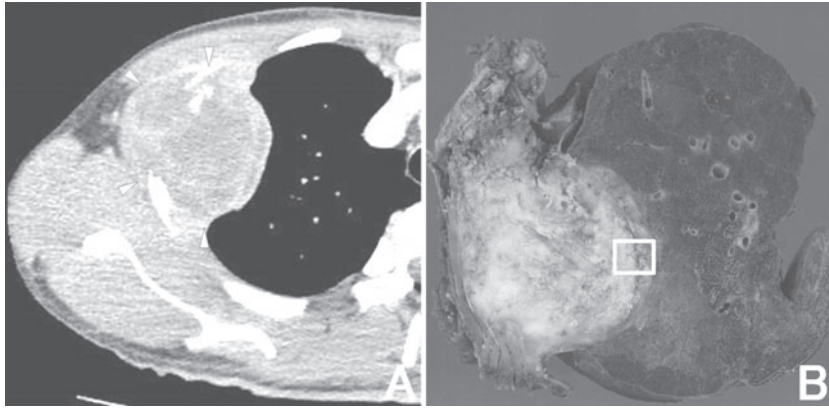


Figure 4 Chest CT scan & Macroscopic finding (Case 2)

(A) Spherical tumor, 6 cm in diameter, without calcification, invaded the chest wall at the mid-portion of the right 3rd rib (arrowhead). (B) The tumor compressed lung parenchyma with minimal invasion. The microscopical finding of the area indicated by white box was shown in Figure 5.

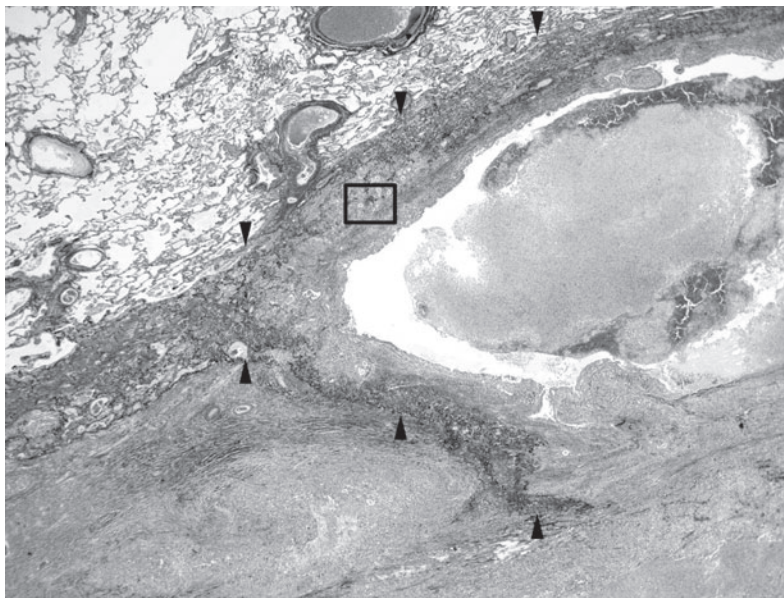


Figure 5 Low-magnification microscopic finding (Case 2)

Elastica van Gieson staining showed that the visceral pleural elastic membrane was partially broken down at the border between the lung and the tumor (arrowhead). High-magnification microscopic findings of the area indicated by the black box was shown in Figure 6 (C), (D).

was minimal.

Macroscopically, the chest wall tumor measured 6 cm in the longest diameter. The tumor compressed the lung parenchyma with minimal invasion (Figure.4B). EVG staining revealed that the visceral pleural external elastic membrane was broken down at the border between the lung and the tumor (Figure 5). A few well-differentiated tumor cells, comprising glandular structures, were identified inside the elastic membrane, and were immunohistochemically positive for TTF-1 and napsin A (Figure 6). The tumor was pathologically diagnosed as a primary lung carcinoma categorized by large cell carcinoma. Postoperative course was uneventful, but the patient died of multiple bone metastases 4 months after surgery.

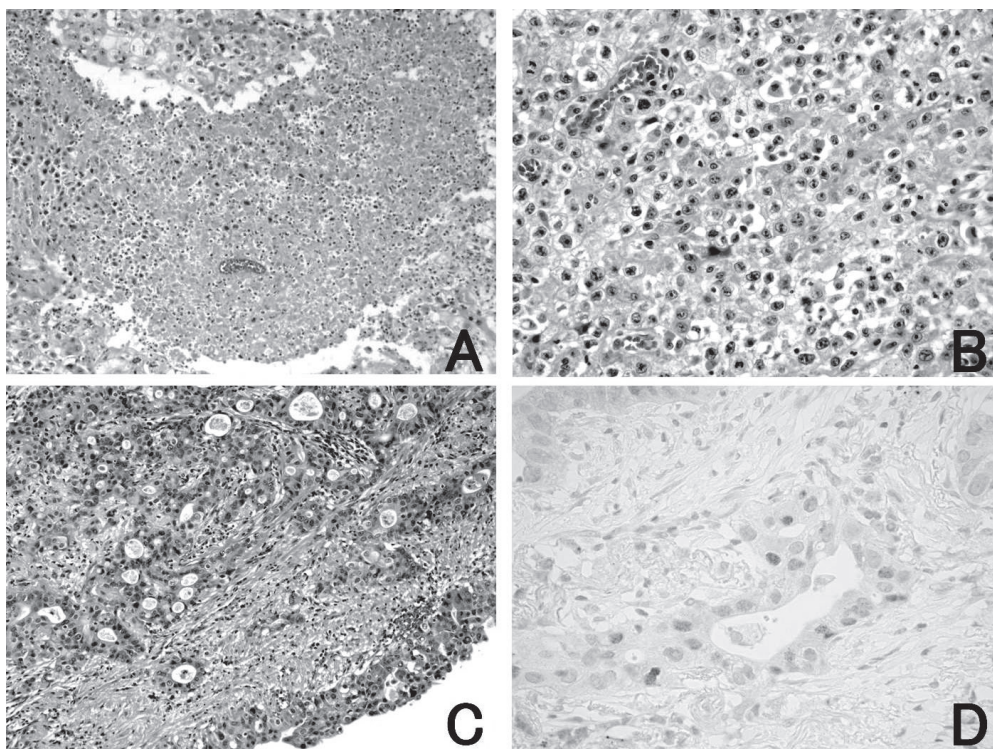


Figure 6 High-magnification microscopic findings (Case 2)

(A), (B) Hematoxylin and eosin staining showed large cell carcinoma. (C) A few well-differentiated tumor cells, comprising glandular structures, were identified inside the elastic membrane. (D) Thyroid transcription factor-1 expression was identified in the glandular structure.

DISCUSSION

There have been few reports describing progression features of minimal lung cancer besides the visceral pleura extending to the chest wall among the English literatures cited by lung cancer, chest wall tumor, and visceral pleura in the Pubmed. In 1976, Harwood et al. reported a lung adenocarcinoma with marked extension into the pleura with no clear border, mimicking malignant pleural mesothelioma on diagnostic imaging, what is so called, "pseudomesotheliomatous carcinoma"¹⁾. Not only adenocarcinoma

but also other types of lung cancer have been reported to extend diffusely along the parietal pleura²⁾. The chest wall tumor originated from a minimal lung cancer as described in this report may be a subtype of pseudomesotheliomatous carcinoma.

It is important for the diagnosis of a malignant chest wall tumor to differentiate among malignant mesothelioma³⁾, lung cancer invading the chest wall, and metastatic chest wall tumor. The tumors in our cases were pathologically diagnosed as primary lung cancer, based on the positivity of cytokeratin 7, TTF-1, and napsin A. Both cases showed a unique progression pattern as follows. Well-differentiated carcinoma was identified inside the visceral pleural elastic membrane. More poorly differentiated tumor cells than those inside the pleural elastic membrane broke down the external elastic membrane and extended into the chest wall.

Complete resection of lung cancer with invasion to the chest wall provide good prognosis, especially in the cases without nodal involvement⁴⁾. Unfortunately, both patients reported here died within 1 year after the operation. They might be related to such an oncologic behavior as extrapleural extension. Chemo – radiation therapy may be a mainstay for better prognosis.

In conclusion, we described two rare cases of minimal lung cancer with extensive chest wall invasion mimicking a chest wall tumor on the radiological image.

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胸壁に広汎な浸潤を認めた微小肺癌の2手術例

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要 約

今回我々は、胸壁に広汎な浸潤を認めた微小原発性肺癌の2手術例を経験した。2症例ともに胸部CTにて肋骨破壊を伴う胸壁腫瘍を認めた。開胸所見では、腫瘍は胸壁に広汎に進展し、肺実質の病巣はごく僅かであった。腫瘍を含む胸壁切除と肺葉切除を施行した。病理所見では、腫瘍は胸壁に発育し、肺実質には腫瘍細胞はごく僅かに存在するのみであった。胸膜直

下では比較的分化度の高い腫瘍細胞がみられ、それと連続して分化度の低い腫瘍細胞が臓側胸膜外弾性板を破壊し、肺外へ進展していた。症例1は腺扁平上皮癌で、症例2は大細胞癌と診断した。術後は、2症例ともに、術後1年未満で癌死した。通常の胸壁浸潤肺癌と異なり、本例のような微小肺癌から胸壁に広汎に浸潤する症例は特殊であり、予後不良と考えられた。