

# Computed Tomography Findings of Alveolar Adenoma of the Lung with Histopathologic Comparison: A Case Report<sup>1</sup>

폐포 선종의 전산화단층촬영 소견과 조직학적 소견의 비교: 증례 보고<sup>1</sup>

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Alveolar adenoma is a rare pulmonary neoplasm with a female predominance, and it was considered to be a histologic variant of sclerosing hemangioma in the past. A chest X-ray usually shows a well-defined, peripheral, solitary nodule similar to that of sclerosing hemangioma. Chest CT shows a solitary, well-defined, peripheral nodule with homogeneous density and no contrast enhancement, which is contrary to marked contrast enhancement of sclerosing hemangioma. We report the first case of alveolar adenoma with spotty enhancement of the nodule similar to that of sclerosing hemangioma on contrast enhanced CT, based on the presence of stromal vessels in the interstitium of the compact alveolar area on histopathologic comparison.

## Index terms

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## INTRODUCTION

Alveolar adenoma is an extremely rare pulmonary neoplasm with a female predominance, and it was considered to be a histologic variant of sclerosing hemangioma in the past (1, 2). Thirty such cases have been reported in the English medical literature (1-6). Radiographically, alveolar adenoma usually presents as a well-circumscribed, peripheral, solitary nodule similar to that of sclerosing hemangioma. Computed tomography (CT) shows homogeneous low density without enhancement (3, 4).

We report the first case of alveolar adenoma with spotty enhancement of the nodule similar to that of sclerosing hemangioma on contrast enhanced CT, based on the presence of stromal vessels in the interstitium of the compact alveolar area on histopathologic comparison.

## CASE REPORT

A 57-year-old, non-smoking woman showed a pulmonary nodule on a chest radiograph during a regular medical examination. Regarding her past medical history, the woman had undergone right thyroidectomy for a benign thyroid nodule.

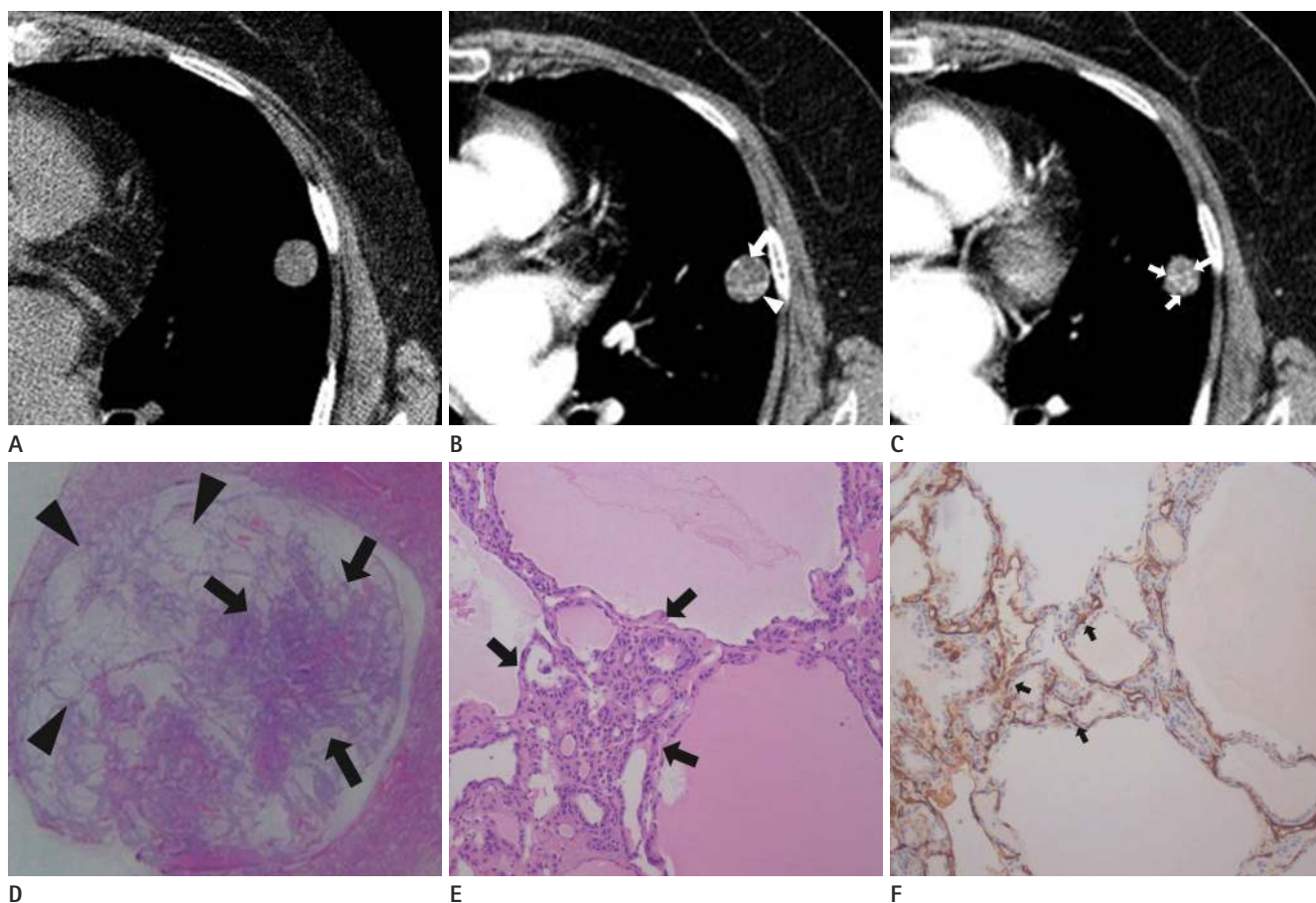
A chest CT showed two nodules. The largest nodule was located in the left lingular segment of the upper lobe, and it measured 1.5 cm in diameter (Fig. 1A). The other nodule was located in the anterior segment of the right upper lobe, and it measured 7 mm in diameter. Both the nodules had well-defined, smooth margins. On unenhanced CT, the nodule in the left upper lobe was homogeneous and had low attenuation (15 Hounsfield units, HU) compared with that of the chest wall muscle (25 HU) (Fig. 1A). Enhanced chest CT images, which were obtained at 55 seconds after administration of 100 mL of

iodinated contrast agent at a rate of 2 mL/min, showed a nodule with spotty enhancement (70 HU) (Fig. 1B, C). Lung nodule in the anterior segment of right upper lobe, which had a similar appearance to that of left lung nodule, was not measured by CT due to its small size. We diagnosed these nodules as multiple sclerosing hemangiomas since they were multiple nodules with smooth margins and spotty enhancement.

A percutaneous CT-guided fine needle aspiration biopsy was performed on the nodule in left upper lobe. The biopsy yielded a few atypical cells. Therefore, to rule out lung cancer, wedge re-

section of the large nodule in the left upper lobe was performed through video-assisted thoracoscopic surgery after CT-guided lesion marking.

On gross pathological examination, the tumor was well demarcated and it shelled out easily from the surrounding lung parenchyma. Photomicrograph (H&E stain; magnification:  $\times 1$ ) showed a round nodule consisting of cystic and solid areas (Fig. 1D). The compact alveolar area (solid area) had a higher density of stromal vessels than the cystic area (Fig. 1E, F). The final pathological diagnosis was alveolar adenoma.



**Fig. 1.** A 57-year-old woman with alveolar adenoma.  
**A.** HRCT with mediastinal setting shows lung nodule with homogenous and low-attenuation (15 Hounsfield unit, HU) compared with that of chest wall muscle (25 HU). The lung nodule with smooth margin is located in the subpleural portion of the lingular segment of the left upper lobe, measuring 1.5 cm in size.  
**B.** Contrast enhanced CT shows heterogenous attenuation with mainly low attenuation (25 HU) in the center portion (arrow) and focal enhancement (67 HU) in the left lower lateral portion (arrowhead) of the nodule.  
**C.** Contrast enhanced CT shows spotty enhancement (70 HU) in the lower portion of the nodule (arrows).  
**D.** Photomicrograph (H&E stain; magnification:  $\times 1$ ) shows a round nodule consisting of stromal vessels of the solid area (arrows) in left half of nodule and cystic component (arrowheads) in right half of nodule.  
**E.** Dilated cystic alveolar area alternating with compacted small alveolar area (arrows). The compact small alveolar area has higher density of stromal vessels than that of cystic area (H&E,  $\times 100$ ). The final pathologic report was alveolar adenoma.  
**F.** CD34 immunohistochemical stain ( $\times 100$ ) highlighting the difference of stromal vessel density between dilated cystic alveolar area and compact small alveolar area. Stromal vessel is stained as dark brown channel or line (arrows).

## DISCUSSION

Alveolar adenoma is a very rare and unusual pulmonary neoplasm that was first described in 1986 by Yousem and Hochholzer (1). Almost all of the alveolar adenomas are subpleural and solitary lesions, with a predominance among middle-aged women (2:1) similar to that of sclerosing hemangioma (2, 5). The lesion is incidentally found on a chest radiograph. The middle and lower lobes of the lung are the preferred sites, similar to sclerosing hemangioma (4).

An alveolar adenoma usually presents as a well-circumscribed coin lesion with occasional predominant cystic features (Fig. 1D). This benign neoplasm is composed of a network of spaces lined by cuboidal neoplastic cells resembling type II pneumocytes (7). The histological similarities between alveolar adenoma and sclerosing hemangioma were noted during the initial description of this lesion. Semeraro and Gibbs (2) hypothesized that alveolar adenoma was a histological variant of sclerosing hemangioma. Kim et al. (6) reported a case showing alveolar adenoma-like area within the sclerosing hemangioma. The microscopic features of sclerosing hemangioma are variable and include solid, papillary, angiomatoid, and sclerotic areas, and one of these areas occasionally predominate (6). The alveolar adenoma, however, is characterized microscopically by cystic spaces lined by presumed alveolar pneumocytes and a spindle cell intervening matrix, closely resembling the angiomatoid areas in sclerosing hemangioma (2). We presumed that stromal vessels in the interstitium of the compact alveolar area might show spotty enhancement, and the cystic space of alveolar adenoma might show low density on contrast enhanced CT.

Alveolar adenomas show several morphologic characteristics on unenhanced CT images that are suggestive of benign tumors: a round or ovoid shape, a smooth margin, and homogeneous attenuation. However, cystic mass and cavitory mass with a smooth margin on CT have been reported (8, 9). The unusual giant cystic space formation in the nodule of a predominant microcystic lesion may lead to the formation of a cavitory or cystic tumor nodule on CT (9). Fluid in the cystic space of the nodule may show homogeneous attenuation on CT. Air in the cystic space of the nodule may appear as a bulla-like nodule. Compact microcystic spaces lined by presumed alveolar pneumocytes and a spindle cell intervening matrix with stromal vessels, which close-

ly resemble the angiomatoid areas in sclerosing hemangioma, might show spotty enhancement and the fluid in the macrocystic space of alveolar adenoma might show low density on contrast enhanced CT. Chung et al. (10) reported that sclerosing hemangioma has strong and rapid enhancement attributed histopathologically to the presence of hemangiomatous or papillary components in the tumor.

Solitary benign tumors that resemble alveolar adenoma in terms of morphologic features and enhancement characteristics include sclerosing hemangioma, papillary adenoma, hamartoma, and leiomyoma. However, differentiation between these tumors is clinically insignificant because of the common prognostic implications.

In conclusion, we report the first case of alveolar adenoma with spotty enhancement of the nodule similar to that of sclerosing hemangioma on contrast enhanced CT, based on the presence of stromal vessels in the interstitium of the compact alveolar area on histopathologic comparison.

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## 폐포 선종의 전산화단층촬영 소견과 조직학적 소견의 비교: 증례 보고<sup>1</sup>

김도영<sup>1</sup> · 류대식<sup>1</sup> · 강길현<sup>2</sup> · 박만수<sup>1</sup> · 최수정<sup>1</sup> · 안재홍<sup>1</sup> · 신동락<sup>1</sup> · 유동곤<sup>3</sup>

폐포 선종은 드문 폐의 신생물로 과거 경화 혈관종의 조직학적 변종으로 알려져 있으며 여성에서 주로 발생한다. 흉부 단층 촬영에서 경화 혈관종과 비슷하게 경계가 선명하고, 변연부에 주로 위치하며, 단일결절의 소견을 보인다. 전산화단층 촬영 소견은 단일성이고 경계가 선명한 균일한 음영의 변연부 결절로 보이나 경화 혈관종과 달리 조영증강은 동반되지 않는다. 저자들은 조영증강 전산화단층촬영에서 고형부분의 간질성 혈관성분에 의해 경화 혈관종과 비슷하게 점상의 조영 증강을 동반한 폐포 선종을 경험하여 보고한다.

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