

## Pulmonary Epithelioid Hemangioendothelioma: A Tumor Presented as a Single Cavitory Mass

Pulmonary epithelioid hemangioendothelioma (PEH) is a rare tumor that occurs among young women and typically presents as bilateral multiple nodules. In the present report, we describe an uncommon case of PEH presented as a single cavitory nodule in a 33-yr-old asymptomatic man. This is the first case of PEH presented as a single cavitory nodule in the English literature. Three years of the follow-up without treatment was performed. Overall histologic findings were accord with conventional PEH, but some atypical features such as, increased mitotic activity (mean; two per ten high power fields), necrosis, spindling, and pleural and vascular invasion were recognized. Immunohistochemically, the tumor cells were positive for CD34. This report may contribute to the data on clinical findings and natural history of this rare tumor.

**Key Words :** Lung; Hemangioendothelioma, Epithelioid

Kyu Yun Jang, Gong Yong Jin\*,  
Yong Chul Lee<sup>1</sup>, Hung Bum Lee<sup>2</sup>,  
Myoung Jae Kang<sup>3</sup>, Ho Yeul Choi<sup>4</sup>,  
Myoung Ja Chung<sup>5</sup>

5th Criminal Division, Daegu District Public Prosecutor's Office, Daegu; Department of Radiology<sup>1</sup>, Internal Medicine<sup>2</sup>, and Pathology<sup>3</sup>, Chonbuk National University Medical School, Institute for Medical Sciences<sup>4</sup>, Jeonju, Korea

Received : 29 July 2002  
Accepted : 26 September 2002

### Address for correspondence

Myoung Ja Chung, M.D.  
Department of Pathology, Chonbuk National University Medical School, San 2-20 Keumam-dong, Dukjin-gu, Jeonju 560-182, Korea  
Tel : +82.63-270-3071, Fax : +82.63-270-3135  
E-mail : mjchung@moak.chonbuk.ac.kr

### INTRODUCTION

Pulmonary epithelioid hemangioendothelioma (PEH) is the currently preferred term for the neoplastic process, originally described in the lung as intravascular bronchioloalveolar tumor (1-3). The term "epithelioid hemangioendothelioma (EH)" was first applied by Weiss and Enzinger to a soft tissue vascular tumor of borderline malignancy (2). PEH typically occurs as bilateral multiple nodules among young women. Only rare PEH develops as a solitary lung nodule (3-7). Moreover cavitory nodule is exceptional. We describe an unusual case of PEH presented as a single cavitory nodule.

### CASE REPORT

A 33-yr-old asymptomatic man presented for a routine chest radiograph in May 1998. A plain chest radiograph and computerized tomograph revealed a 2 cm sized, well-defined cavitory mass in the apical segment of right upper lobe (Fig. 1). The physical examination and laboratory findings were not significant. Percutaneous transthoracic needle biopsy was performed with unremarkable results. Only a small amount of inflamed lung tissue was seen. Open lung biopsy was recommended to confirm the diagnosis. However, the patient declined. Thereafter he was irregularly followed up with plain

chest radiograph.

In January 2001, the patient began to complain of chest discomfort. Follow-up films showed slight growth of tumor. Bronchoscopic examination revealed narrowing of the lumen with protruded intraluminal mass. With microscopic examination of the bronchoscopic biopsy specimen, the diagnosis of PEH was rendered. Thoracotomy was recommended, but was declined by the patient. Four months later, the patient complained more developed chest discomfort. A simple chest radiograph showed marked increased size and atelectatic change in the right upper lobe (Fig. 2).

In August 2001, the patient underwent a lobectomy of the right upper lobe. Grossly, the cut surface showed a 5.5 × 3.3 cm sized and ill-defined grayish white mass expanding to visceral pleura. The mass protruded into the lumen of the bronchus. Histologically, the tumor showed typical PEH appearance. At the periphery of the tumor, tumor cells extended to adjacent alveoli, in a contiguous, micropolyoid fashion (Fig. 3A). The tumor cells were either round or oval. Mitotic activity averaging 2 mitoses per 10 high-power fields was identified (Fig. 3B). Cytoplasmic vacuoles were seen and sometimes, erythrocytes or fibrin were identified within these intracytoplasmic lumina (Fig. 3C). Foci of spindle-shaped tumor cells were occasionally seen (Fig. 4A). The tumor showed vascular and lymphatic invasion, pleural invasion, and endobronchial spread (Fig. 4B-D). Immunohistochemically, the tumor cells were

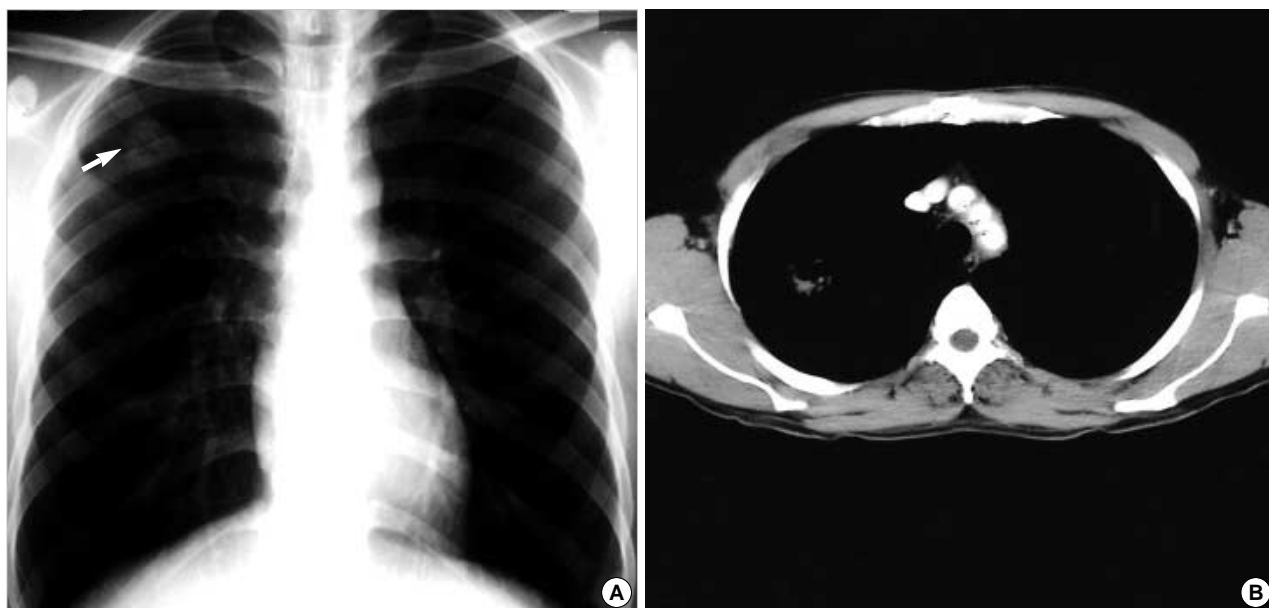


Fig. 1. On first admission, simple chest radiography shows about 2 cm sized, well-defined cavitory mass with thickened wall in the right upper lobe (A). Contrast-enhanced CT shows mild heterogeneous enhancement on the thickened wall of the cavitory nodule (B).



Fig. 2. On the 32-month follow-up, the cavitory nodule in the right upper lobe marks increased size and extension to right hilum. Also, atelectasis in the right upper lobe occurred.

positive for CD34 (Fig. 5) and epithelial membrane antigen, while cytokeratins and S-100 protein were negative. The patient was not followed up after operation.

## DISCUSSION

PEH is a rare pulmonary tumor and it shows distinctive cli-

nical features. PEH occurs among young women and typically presents multiple, bilateral nodules up to 2 cm in diameter (1-6). However, PEH rarely develops as a solitary lung nodule (3, 5-7). The frequency of this presentation lies between 10% and 19% of PEH cases (3, 5-7). Our case revealed a single cavitory nodule. Although a few cases of solitary nodules with extensive necrosis were reported, there was no case that presented as a cavitory lesion (3, 5-7). This unusual radiographic finding and inadequate biopsy specimen, due to the patient's refusal of further evaluation, obstructed correct diagnosis at first admission. Additionally, the high incidence of tuberculosis in Korea brought difficulty in diagnosis.

Usually, PEH shows a slowly progressive clinical course. However, the biologic behavior can be influenced by its origin, clinical extend, and histologic features (3-5). The reported mortality associated with EH is 13% in soft tissue, 35% in liver, and 65% in lung after a minimum of 4 yrs of follow-up (8). Metastatic disease occurs in approximately 20% of the patients with soft tissue disease, 15% of those with lung disease, and 25% of those with liver disease (8). Respiratory symptoms at presentation, pleural effusion on chest radiography, peripheral lymphadenopathy, pleural invasion, extensive intravascular and endobronchial tumor spread, hepatic metastasis, and spindle tumor cells at histology were reported as unfavorable prognostic factors (3, 5). Our case showed poor prognostic factors, such as spindling of tumor cells, pleural invasion, lymphatic and vascular invasion, and endobronchial spread. Therefore, it was predicted that the prognosis of our patient would be poor. It is not certain that the patient with solitary nodule has a more favorable clinical course than the patient with multiple nodules. Weiss and Enzinger used the term malignant epithelioid

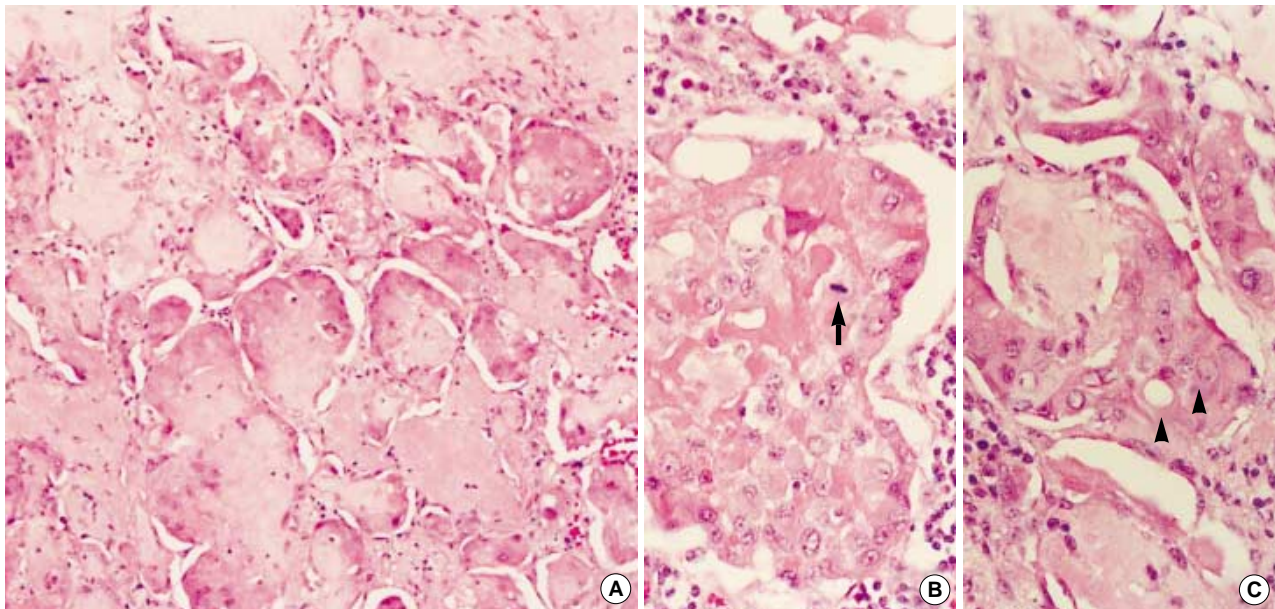


Fig. 3. Tumor cells show micropolyoid growth (A), occasional mitosis (arrow) (B), and frequent cytoplasmic vacuolization (arrowheads) (C) (H&E,  $\times 100$  and  $\times 200$ ).

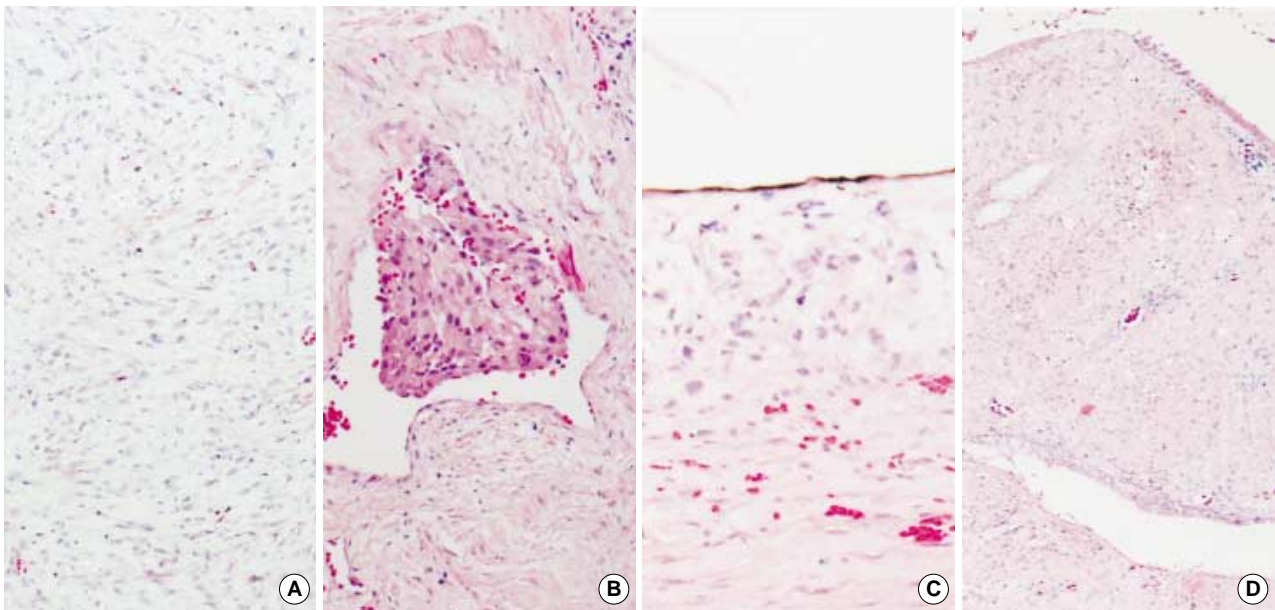


Fig. 4. Spindling (A), vascular invasion (B), pleural invasion (C), and endobronchial spread of tumor cells (D) are noted (H&E,  $\times 100$ ).

hemangioendothelioma of soft tissue for the tumor showing cellular atypia, mitotic activity ( $>1$  mitosis per 10 high power field), necrosis, or extensive spindling (4). Histologically, our case showed atypical features, such as increased mitotic activity (mean; 2 per 10 high power fields), spindling of tumor cells and necrosis, but there was no definition for malignant PEH and necrosis was not a prognostic factor for PEH.

Histologically, our case should be distinguished from epithelioid angiosarcoma and carcinoma. However, angiosarcoma

and carcinomas display far more nuclear atypia and mitotic activity than EH (2, 4, 5). Immunohistochemical and ultrastructural studies may provide the clues that the proliferating cells of PEH are endothelial cells (2, 4, 5).

In the present report, we described an uncommon case of PEH presented as a single cavitory nodule. This report may contribute to the data on clinical findings and natural history of this rare tumor.

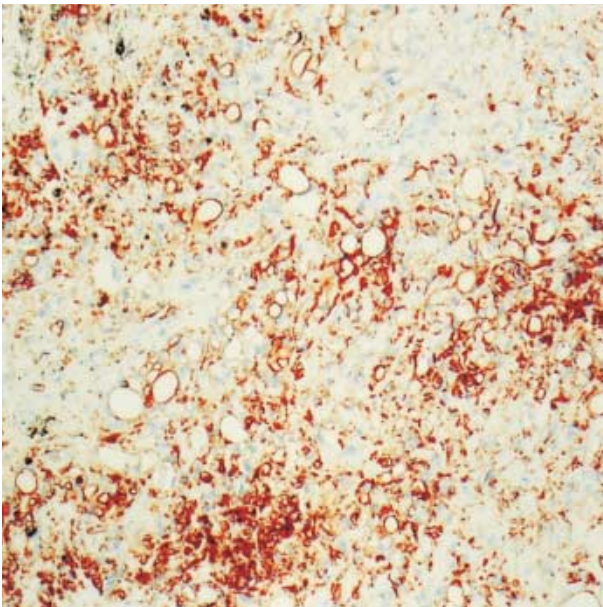


Fig. 5. Intracytoplasmic vacuoles are characteristically accentuated by the CD34 immunostaining ( $\times 200$ ).

## REFERENCES

1. Dail DH, Liebow AA. *Intravascular bronchioloalveolar tumor (Abstr)*. *Am J Pathol* 1975; 78: 6a.
2. Weiss SW, Enzinger FM. *Epithelioid hemangioendothelioma: a vascular tumor often mistaken for a carcinoma*. *Cancer* 1982; 50: 970-81.
3. Kitaichi M, Nagai S, Nishimura K, Itoh H, Asamoto H, Izumi T, Dail DH. *Pulmonary epithelioid hemangioendothelioma in 21 patients, including three with partial spontaneous regression*. *Eur Respir J* 1988; 12: 89-96.
4. Weiss SW, Goldblum JR. *Hemangioendothelioma: vascular tumors of intermediate malignancy*. In: Strauss M, editor, *Soft tissue tumors*. 4th ed., St. Louis: Mosby Yearbook, 2001; 891-915.
5. Dail DH, Liebow AA, Gmelich JT, Friedman PJ, Miyai K, Myer W, Patterson SD. *Intravascular, bronchiolar, and alveolar tumor of the lung (IVBAT): an analysis of twenty cases of a peculiar sclerosing endothelial tumor*. *Cancer* 1983; 51: 452-64.
6. Yousem SA, Hochholzer L. *Unusual thoracic manifestation of epithelioid hemangioendothelioma*. *Arch Pathol Lab Med* 1987; 111: 459-63.
7. Buchenroth M, Beus J, Bittinger F, Kelbel C, Kersjes W, Mayer E, Ferlinz R. *Solitary epithelioid hemangioendothelioma, a rare vascular tumor of the lung*. *Pneumologie* 1995; 49: 239-42.
8. Weiss SW, Ishak KG, Dail DH, Sweet DE, Enzinger FM. *Epithelioid hemangioendothelioma and related lesions*. *Semin Diagn Pathol* 1986; 3: 259-87.