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PSAMMOMA BODIES IN PULMONARY ADENOCARCINOMA

JIRO ABE, KEIICHI NEMOTO, YOSHIHISA OHNISHI

Department of Pathology, Niigata University School of Medicine, Niigata
Address for reprints: Dr J. Abe, Department of Pathology,
Niigata University School of Medicine,
Asahimachidori-1, Niigata 951. Japan

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ABSTRACT

A rare case of pulmonary carcinoma with many psammoma bodies in a 60-year-old man is reported. Autopsy revealed a whitish subpleural tumor, with solid in consistency and 4 cm in diameter, of left S_{10} of lung and a lymphangitis carcinomatosa of both pulmonary surfaces. There were some solid matastases, up to 2 cm in diameter, in both lungs, the liver, the lt. adrenal, the lt. kindny, the submucosa of the urinary bladder, and the lumbar vertebral bone.

Histologically the tumors revealed a poorly differentiated adenocarcinoma. Especially in the primary site of lt. S_{10}, many psammoma bodies were observed in the lumina of lymph-vessels invaded by tumor cells. That is, psammoma bodies were restricted to the invaded lymph-vessels. There were no psammoma bodies in any other lesions except the lymph-vessels of the primary site. The authors prefer in the present case to relate the mineralization of psammoma bodies to lymph-vessel invasion and degenaration of tumor cells.

Key Word: Psammoma bodies, Pulmonary adenocarcinoma, Lymph vessel,

INTRODUCTION

Calcified "psammoma bodies" are frequently seen in primary or metastatic malignant carcinoma. These have been especially observed in papillary adenocarcinoma of the thyroid, breast and ovary.[2,5,8] In these tumors, psammoma bodis are also one kind of evidence for diagnosis of malignancy. Recently a case of pulmonary small cell

carcinoma diagnosed by psammoma bodies in pleural fluid cytology was reported.[1] However, as far as we know, psammoma bodies in primary pulmonary carcinoma is uncommon, for there have been only eight reported cases of primary pulmonary carcinoma with psammoma bodies.[1,3,6,9] We report a case of pulmonary adenocarcinoma with many psammoma bodies restricted to the lymph-vessels invaded by tumor cells, and we prefer to relate the mineralization of psammoma bodies in the present case to lymph-vessel invasion and degeneration of tumor cells.

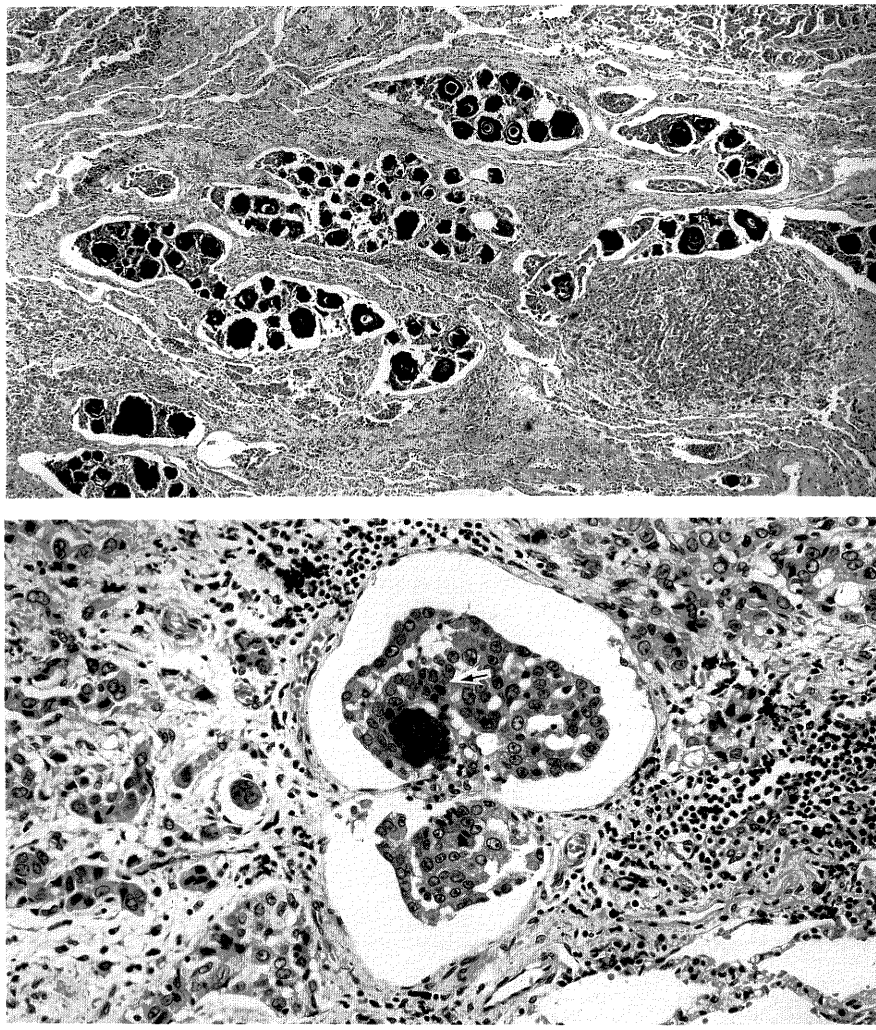

Fig. a : Many psammoma bodies restricted in lymph-vessels infiltrated by tumor cells (H. E. ×10).
b : A psammoma body surrounded by degenerative tumor cells (arrow) showing laminated structure (H. E. ×50).

CASE REPORT

A 60-year-old man was admitted to Niigata Rosai Hospital because of lumbago, bloody sputa, and dyspnea. Chest radiographs showed a tumor shadow in the left lower lobe and indicated the possibility of lymphangiosis carcinomatosa. Many adenocarcinoma cells were detected in a smear of sputa, and biopsy specimen of a swelled cervical lymph node showed metastatic adenocarcinoma. Consequently, he was diagnosed as having advanced pulumonary adenocarcinoma. He was treated with combined chemotherapy. Dyspnea became more severe, and the patient died of respiratory insufficiency one month after admission. The serum calcium level was within normal limits through his clinical course.

A subpleural whitish tumor, of 4 cm in diameter and solid in consistency with severe pleural indentations, was detcted in left S_{10} by systemic autopsy. Both pulmonary surfaces showed moderate lymphangiosis carcinomatosa. Some metastatic lesions, up to 2 cm in diameter, were observed in the liver, the lt. adrenal gland, the lt. kindey, the submucosal region of the urinary bladder, the lumbar vertebral bone, and the lymph nodes in general.

Histological examinations of both primary and metastatic lesions showed poorly differentiated adenocracinoma. In the primary site of lt. S_{10}, many psammoma bodies were observed in tumor-cell nests that infiltrated to the lumina of the lymph vessels. That is, the psammoma bodies were restricted to the lymph-vessels invaded by tumor cells. Most of the psammoma bodies were accompanied by one or two layers of degenerative tumor cells (figure). There were no psammoma bodies in any lesions except the infiltrated lymph-vessels at the primary site. No calcification, including that of psammoma bodies, was observed in any other organs.

DISCUSSION

Psammoma bodies are extracellular, laminated concretions that measure 30 μm to 100 μm in diameter. Originally described by Virchow in reference to meningeal tumors,[10] psammoma bodies are most commonly seen in papillary tumors of the thyroid gland, ovary, or endometrium and less commonly in tumors of the kidney, pancreas, and pituitary gland.[1,2,4,5,7,8] The occurrence of psammoma bodies in plumonary adenocarcinoma is rare, and a primary pulmonary carcinoma with psammoma bodies restricted to infiltrated lymph-vessels has not been previously reported.

To our knowledge, hitherto, about eight cases of psammoma bodies in primary pulmonary carcinoma were reported mainly by cytopathologists(table). In four of eight cases psammoma bodies were detected in pleural effusion,[1,3,9] and all of the eight cases had advanced carcinomas with distinct metastases, including lymph nodes. Thus all reported cases of psammoma bodies in pulmonary carcinoma have revealed the lymph-

Table Reported cases of pulmonary carcinoma with psammoma bodies

Patient	Histology	Detection of psammoma bodies	Reference
65 y F	alveolar	surgical lobectomy	3
50 y M	alveolar	sputum cytology	3
64 y M	alveolar	pleural fluid cytology	3
	adeno	autopsy	6
	muco epi	autopsy	6
69 y F	small	pleural fluid cytology	1
48 y M	pap adeno	bronchial biopsy	9
80 y F	pap adeno	lymph node biopsy	9
60 y M	por adeno	autopsy	this report

alveolar: papillary adenocarcinoma, bronchio-alveolar type,
adeno: adenocarcinoma, muco epi: mucoepidermoid carcinoma,
small: small cell carcinoma, pap: papillary,
por: poorly differentiared

vessel invasion by tumor cells.

The mechanism of psammoma body formation is unknown. But the theories of orgin have been pointed out, such as extracellular calcification of inspissated secretory material, intracellular deposition of lime salts around calcified lipids or hemosiderin, and granular degeneration and calcification of papillae.[2,7] It is possible that psammoma bodies in adenocarcinoma that arise in different locations may be formed by different mechanisms. Eight reported cases of pulmonary adenocarcinoma in which psammoma bodies histologically showed various features confirm this conception (table).

Calcification in tissues of carcinoma in various organs has been well observed, and it has been known that two kinds of calcified patterns exist. One is that of psammoma bodies, the other the so-called "dystrophic type."[6] The latter reveals histologically homogenous calcification and no specific structure, and this type is frequently observed in the necrotic regions of carcinoma with stroma in abundance. This dystrophic calcification is considered to be formed secondarily in necrotic tissues. Psammoma bodies are usually recognized in vivid tissues of mucous-producing carcinoma, and these bodies reveal a laminated structure. Consequently, these two patterns of calcification are considered to be based upon different mechanisms.

Calcification in the present case was only of the psammoma type, not the dystrophic type. However, no case of pulmonary carcinoma with calcification entirely of psammoma type had been reported previously. The fact that the psammoma bodies were restricted to only lymph-vessels invaded by tumor cells seemed to indicate that all psammoma bodies in the present case originated not only from mucous-producing tumor cells but lymph fluids as well. In addition, the findings that the psammoma bodies were accompained by degenerative tumor cells suggest the following mechanism in psammoma body formation. That is, gradual degeneartion of individual tumor cells appears at first in the center of a nest of tumor cells that infiltrated the lymph-vessels. Then the calcium

contained in the lymph fluids binds itself to the extra or intracytoplasmic mucous of a degenerative tumor cell. This binding occurs gradually and sequentially in individual tumor cells. Thus, the laminated structure of psammoma bodies is formed.

Generally, for the surgical pathologist it is difficult to assert histologically whether tumor cells infiltrate to lymph vessel or not, in the specimens of surgically resected pulmonary tissues. Psammoma bodies in pulmonary adenocarcinoma is probably the reliable finding in recognizing the presence or absence of lymph-vessel invasion by tumor cells, even though the occurrence of psammoma bodies is rare.

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