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Non-Invasive Thymoma with Widespread Blood-Borne Metastasis

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Summary. A 49 year-old woman with multiple coin lesions in both lungs died three months after admission to hospital for progressive neurologic manifestations due to increasing intracranial pressure. At autopsy, neoplastic lesions were found in the anterior mediastinum, lungs, spleen, cerebrum, liver, right kidney and right ovary. Microscopically, the tumor was composed predominantly of epithelial cells which were arranged in an hemangiopericytoma-like pattern. Rosette formation was also prominent. This case was diagnosed as a thymoma with widespread blood-borne metastasis. Previous reports of metastasizing thymomas are very uncommon.

Key words: Thymoma – Blood-borne metastasis – Histologic findings.

Introduction

Thymomas are usually benign in nature and do not metastasize, although one-third to one-fourth of them are incompletely encapsulated and reportedly show occasional local invasion directly into the adjacent mediastinal structures (Bernatz et al. 1961; Wilkins et al. 1966). There are a limited number of reports of metastasizing thymomas in the literature, but they seem to be extremely rare. This paper reports a case of a thymoma showing extensive blood-borne metastases, but lacking local invasive growth.

Report of a Case

The patient was a 49-year-old woman who had no complaints. Multiple coin lesions were found incidentally in both lung fields by routine chest X-ray examination. Three months later she was admitted to Matsuyama Red Cross Hospital for further examination. The chest roentogenogram taken on admission showed no increase in size or in number of the coin lesions compared with

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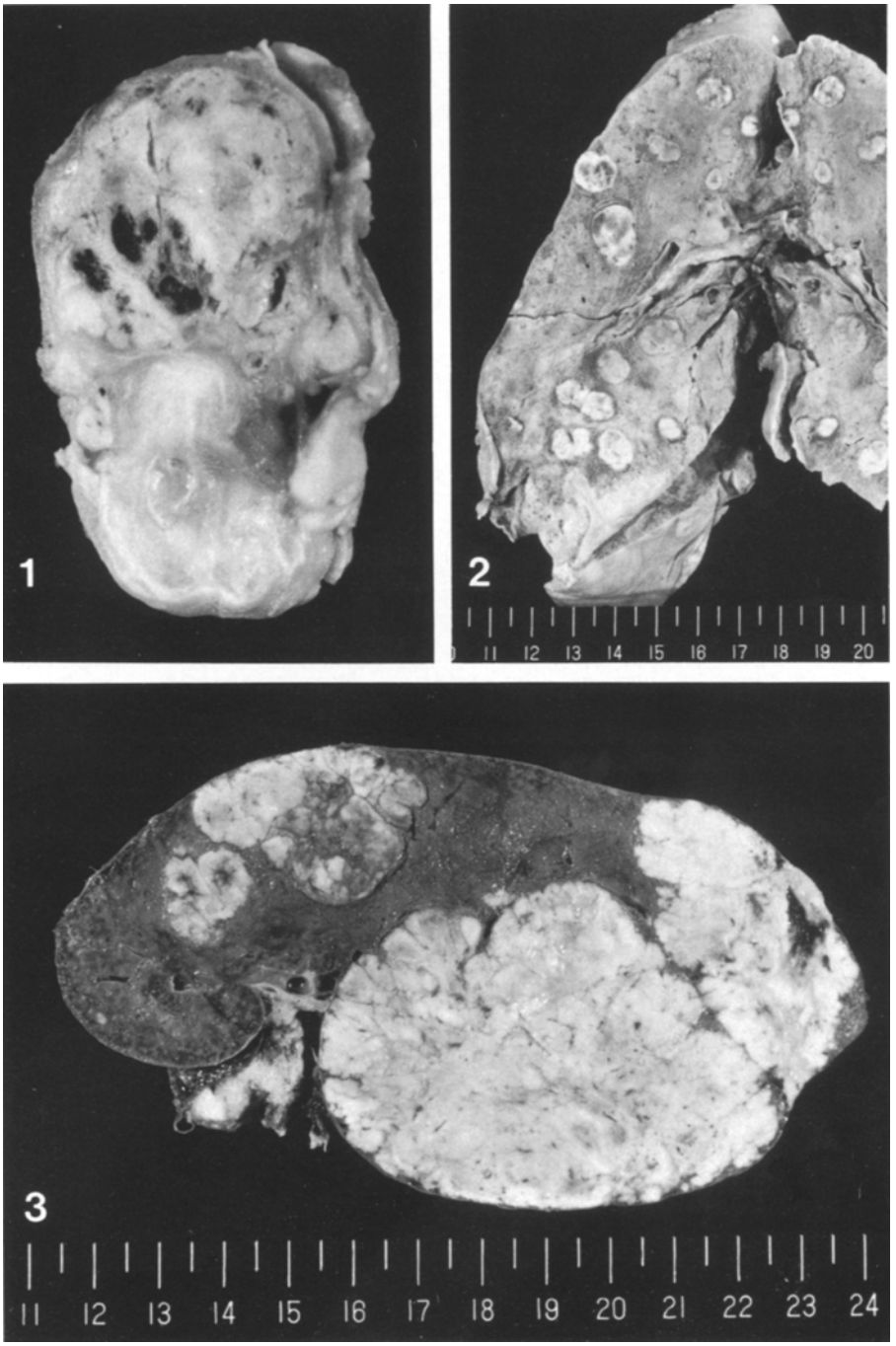


Fig. 1. Cut surface of the mediastinal mass (4.0 × 2.5 × 1.0 cm in size). Small hemorrhagic foci and cysts are seen. The mass is completely encapsulated

Fig. 2. Left lung with multiple coin lesions

Fig. 3. Cut surface of the enlarged spleen. The splenic tissue is largely replaced by well circumscribed tumor masses

films taken three months previously. Widening of the upper mediastinum was not noted. The lung field was resonant and no abnormal sounds were heard. An abdominal mass was palpated in the upper quadrant. Laboratory examination showed no abnormal values. The patient underwent a series of upper gastrointestinal examinations which showed compression and shift of the stomach to the right by the abdominal mass. Class I cytology was revealed by Papanicoloau staining of the sputun. Radioactive scintigram of the spleen revealed enlargement of the organ and cold areas, in which hypervascularity was also shown by celiac arteriography. Neurologic manifestations, such as visual loss, headache, nausea and vomiting developed and biopsy could not be performed. By computed tomography scanning of the brain, a mass, 3 cm in diameter, was found in the occipital lobe of the cerebrum. Although the primary site remained unknown, chemotherapy (VEMP) was given. However, the subsequent two months were marked by increasing neurologic manifestations and a gradually deteriorating general condition. The patient died three months after admission. Throughout the clinical course no symptoms associated with thymomas were evident.

Autopsy Findings

In the anterior superior mediastinum, there was a $4.0 \times 2.5 \times 1.0$ cm flattened mass with a smooth external surface (Fig. 1). This tumor had a dense capsule. Direct invasion into surrounding structures was not noted. The cut surface was yellowish-white in color and was separated into lobules by thin septa. A few small foci of hemorrhage, as well as cyst formation, were encountered.

In both lungs the pleural surfaces were intact. Multiple well circumscribed nodules, which were relatively uniform in size (less than 2 cm in diameter) were found (Fig. 2). The spleen was markedly enlarged (540 g in weight). On the cut surface, the splenic tissue was largely replaced by a solid tumor mass (Fig. 3). A well circumscribed mass, 3 cm in diameter, was found in the right occipital lobe of the cerebrum. In addition, cingulate herniation, which seemed to be the direct cause of death, was found. Small nodules (less than 0.5 cm in diameter), were also found in the liver, right kidney and right ovary. No lymph node enlargement was encountered.

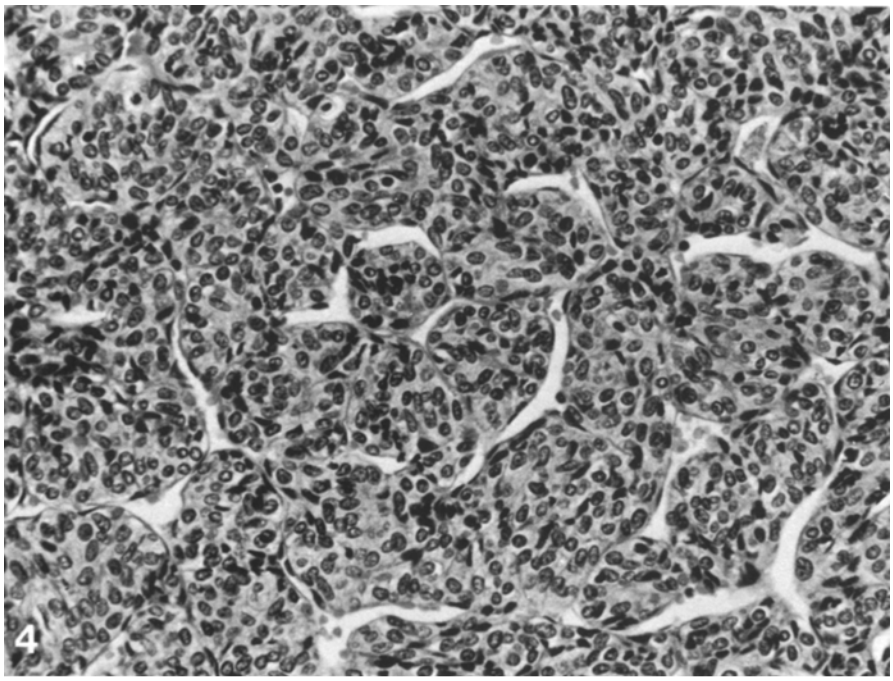
Microscopic Findings

The histologic features of all the various tumor masses are essentially identical. The tumors are composed predominantly of epithelial cells with round or oval vesicular nuclei and scanty eosinophilic cytoplasm. Pleomorphism is slight, and cell boundares are indistinct. For the most part, the epithelial cells grow with prominent vascular spaces showing an hemangiopericytoma-like appearance (Fig. 4). In some areas, elongated epithelial cells form rosettes (Fig. 5). Silver impregnation stain fails to show reticulin fibers around individual tumor cells in most areas. Lymphocytes are rarely seen. The mediastinal mass is completely encapsulated with dense collagenous fibrous tissue. Outside the capsule, atrophic thymic tissue, which contains a few Hassall's corpuscles, is present. Based on these histologic features, a final diagnosis of thymoma was made.

Lymph nodes are free from metastasic spread. The pleura, pericardium and other mediastinal structures show no evidence of tumor invasion.

Discussion

The tumor in the anterior mediastinum was localized in the thymus because as indicated by the presence of atrophic thymic tissue adjacent to the tumor



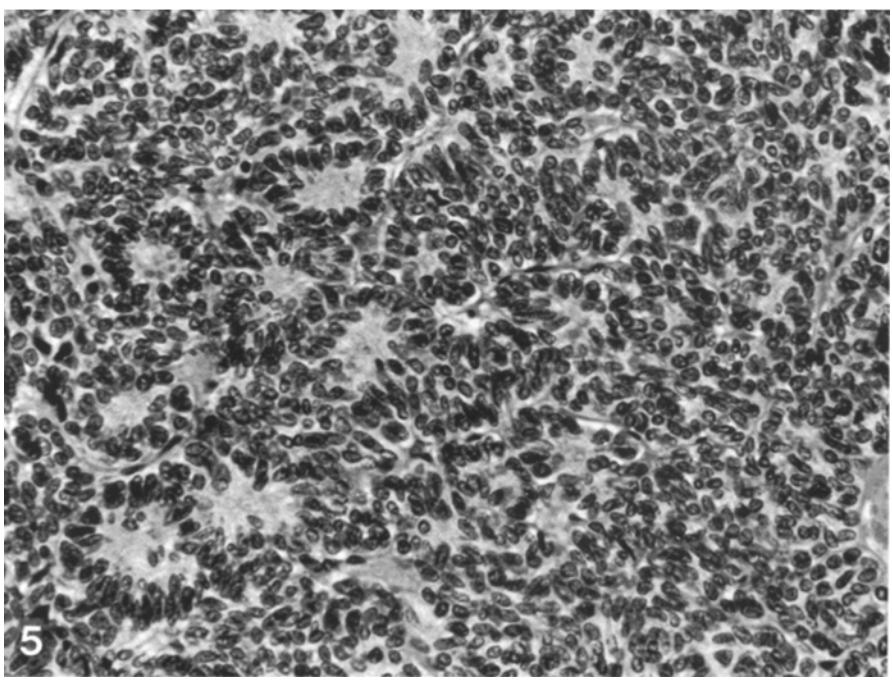


Fig. 4. Hemangiopercytoma-like pattern of the thymoma. Note the prominent vascular spaces and epithelial cells with a round or spindle shape. H–E, ×270

Fig. 5. Tall columnar cells forming numerous rosettes. In this field, the tumor is composed exclusively of epithelial cells, and no lymphoid cells are observed. H–E, ×270

Table 1. Number and incidence of Metastasizing Thymomas (collected from recent reviews)

Year	Author(s)	No. of thymomas examined	No. of cases with metastasis
1962	Lattes, R.L.	52	1 (1.9%)
1965	Legg, M.A. and Brady, W.J.	51	0
1974	Batata, M.A. et al.	54	11 (20.4%)
1976	Salyer, R.S. and Eggleston, J.C.	65	1 (1.5%)
1977	LeGolvan, D.P. and Abell, M.R.	46	0
1979	Gray, G.F. and Gutowski, W.T.	54	0
Total		322	13 (4.0%)

mass. In hematoxylin eosin sections, the tumor was characterized by the presence of both an hemangiopericytoma-like pattern and rosette formation, which have been described occasionally in cases of epithelial thymomas (Rosai and Levine 1976). The thymoma in our case was predominantly epithelial. Epithelial thymomas reportedly tend to metastasise rather more frequently than other histologic types of thymoma. Of 12 metastasizing thymomas which were found in the literature by Guillan et al. (1971), 8 showed a predominance of epithelial cells. 9 out of 11 thymomas reviewed by Batata et al. (1974) were also composed predominantly of epithelial cells.

Table 1 indicates the number and incidence of metastasizing thymomas which have been reported in recent reviews. As can be seen, the incidence is extremely low with the exception of one report by Batata et al. (1974), in which 11 out of 54 thymomas (20.4%) showed extrathoracic metastases. Lymph nodes were reportedly involved more frequently by secondary spread than any other organ. However, in our case, no metastases was found in any lymph node, while blood-borne metastases were found extensively in various organs including the brain and spleen. Thymomas seem hardly ever to metastasize to these organs. We could find only 2 cases in the literature in which a thymoma metastasized to the brain (Mottet 1964; Rachmaninoff and Fentress 1964), and 2 cases of spread to the spleen (Castleman and Kibbee 1962; Rosen et al. 1966).

There have been a few reports in which cytological evidence of malignancy was observed in thymomas (Minkowitz et al. 1967; Jain and Frable 1974). However, in our case, pleomorphism of the tumor cells was minimal, and we could find no cytological feature that distinguished our case from a benign thymoma.

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