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Case report

Malignant peritoneal mesothelioma, clear cell variant, in a female and its differentiation from clear cell carcinoma

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ABSTRACT

Epithelial type malignant mesothelioma with a clear cell morphology is rare, and no case arising in the peritoneum of a female patient has been reported. Here we report a case of clear cell mesothelioma that developed in the peritoneum of a 61-year-old female. The patient died from massive ascites and respiratory failure 11 days after her hospital admission. The autopsy demonstrated marked thickening of the omentum and a yellowish-whitish tumor diffusely covering the abdominal organs. The predominantly solid tumor was characterized microscopically by the growth of atypical cells with an abundant clear cytoplasm. The immunohistochemical study suggested mesothelioma rather than carcinoma. Electron microscopy showed the long and slender villi of the tumor cells, confirming the diagnosis. Primary clear cell carcinoma of the peritoneum, like clear cell mesothelioma, is rare and was also a diagnostic consideration in this patient. The differentiation between these two tumors is discussed herein.

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1. Introduction

Primary malignant peritoneal mesothelioma is relatively rare compared with pleural mesothelioma. However, its incidence in Japan is expected to increase as the use of asbestos in Japan peaked 30–40 years ago and the symptoms of malignant mesothelioma appear ~30–50 years after asbestos exposure [1]. Histopathologically, mesothelioma is difficult to distinguish from adenocarcinoma. The clear cell variant of malignant epithelial mesothelioma is even more rare, and the involvement of the female peritoneum has yet to be reported [2–5]. Here we describe a case of primary malignant epithelial mesothelioma, clear cell variant, that developed in the peritoneum of a female patient. Although the differential diagnosis of primary malignant epithelial mesothelioma from clear cell carcinoma may be extremely difficult, the diagnosis in this case was finally confirmed by electron microscopy of the tumor cells.

1.1. Clinical summary

A 61-year-old woman hospitalized in a nearby clinic with abdominal distension and pain underwent abdominal computed tomography, which revealed a slight pleural and peritoneal effusion. Over the next 2 months, her pleural and peritoneal effusion gradually increased, accompanied by prominent thickening of her peritoneum and omentum (Fig. 1). She was transferred to our hospital. On physical examination, her abdomen was distended, tense, and showed signs of tenderness. Pitting edema was observed in the patient's arms and legs. Her oxygen saturation level was 94% with room air; decreased breath sounds were detected in both lower lung fields. Her laboratory results on admission showed a high white blood cell (16,300/μl) and platelet (44.9×10^4/μl) counts and high levels of fibrinogen (1092 mg/dl), fibrin/fibrinogen degradation products (8.2 μg/ml), D-dimer (1.7 μg/ml), lactate dehydrogenase (284 IU/L), alkaline phosphatase (1391 mg/dl), C-reactive protein (18.27 mg/dl), tissue polypeptide antigen (1100 U/l), soluble mesothelin-related peptides (2.3 nmol/l), and cancer antigen 15-3 (143 U/ml). Her serum sodium level was low (120 mEq/dl). Analysis of a cytology specimen from the ascites revealed non-cohesive large vacuolar cells intermingled with inflammatory cells (Fig. 2a). There were a few small clusters of cells. Nuclear atypia with large nucleoli was prominent. Multinucleated cells were also seen. Microscopy of cell block specimens showed proliferating, atypical polygonal cells with a clear cytoplasm (Fig. 2b). On immunohistochemistry, the tumor cells were weakly positive for WT1 (Fig. 2c), focally positive for CK5/6, and negative for MOC-31. Malignant mesothelioma was therefore suspected. Although the patient was administered albumin and diuretics, the peritoneal effusion continued to accumulate.

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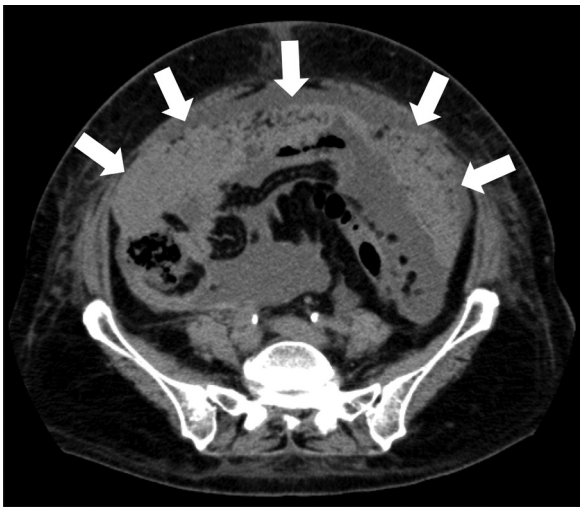

Fig. 1. Computed tomography scan of the abdomen shows a diffusely and prominently thickened omentum (arrows), referred to as "omental cake.".

Pulmonary oxygenation deteriorated and carbon dioxide narcosis developed. On the 11th day of hospitalization, she died. An autopsy was performed. She had no history of asbestos exposure, as determined in detailed interviews.

1.2. Pathologic findings

Autopsy revealed a prominently thickened tumor-like omentum, referred to radiologically as "omental cake" (Fig. 3a). The yellowish-white tumor had diffusely spread throughout the abdominal cavity, enclosing all of the abdominal organs, including those of the female reproductive system (Fig. 3b). Microscopically, diffusely proliferating clear tumor cells formed sheets (Fig. 3c). Multinucleated giant cells were present sporadically (Fig. 3c). The tumor cells had an abundant clear cytoplasm and frank nuclear atypia (Fig. 3d). In some of the tumor cells, a faint eosinophilic cytoplasm was seen. In addition to the involvement of both ovaries by tumor cells, the tumor had partially infiltrated the ovarian cortex (Fig. 3e). Macroscopically, tumors were not discernible in either of the kidneys, but microscopically, metastases in the lymph ducts of the right kidney were detected. The tumor cells stained positively for periodic acid-Schiff (PAS) stain, which was removed by diastase, and for colloidal iron, which was digested by hyaluronidase. On immunohistochemistry, the tumor cells were positive for AE1/AE3, only weakly positive for calretinin (Fig. 4a), diffusely positive for D2-40 (Fig. 4b), EMA (plasma membrane), and HBME-1, focally positive for Ber-EP4 (Fig. 4c), CK7, and CK5/6, and negative for CEA, CD15 (leuM1) (Fig. 4d), estrogen receptor, progesterone receptor, and CK20. Only a few tumor cells were p53-positive.

Electron microscopy analysis of the specimens showed long villi on the surface of the tumor cells (Fig. 5). This feature confirmed the diagnosis of malignant mesothelioma. The tumor also extended to the pleural cavity bilaterally. Metastases to multiple organs, including the lungs, liver, pancreas, and both adrenal glands, were evident. The cause of death was therefore malignant mesothelioma.

2. Discussion

Malignant epithelial mesothelioma extensively composed of clear cells is a rare subtype, with fewer than 30 cases reported in the English medical literature. In other cases of mesothelioma, focal clear cell change is sometimes encountered [2–5]. Among females, the clear cell subtype of malignant epithelial mesothelioma has been reported in the pleura but ours is the first reported case in which the peritoneum in a female was involved. The difficulty in achieving a diagnosis was due to the fact that, because of

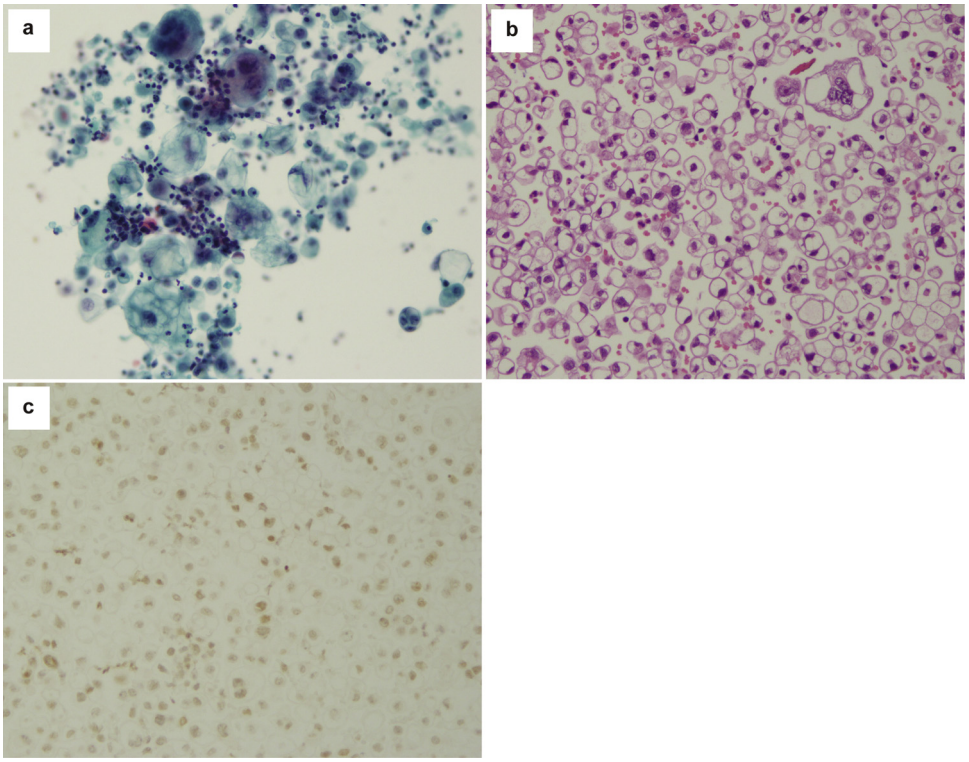

Fig. 2. Microscopic features and immunohistochemistry of the cytology (a) and cell block (b, c) specimens from the ascites. (a) Large atypical cells with an abundant vacuolar cytoplasm non-cohesively intermingle with inflammatory cells. (b) Clear tumor cells proliferate diffusely. Multinucleated giant cells are also discernible. (c) The tumor cells are weakly positive for WT1.

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