MULTIPLE PERITONEAL MESOTHELIOMA—A CASE REPORT

AKIRA TANIMURA, HIDEO YAMAMOTO, TATSUO YAMAGUCHI AND TERUYUKI NAKASHIMA

Second Department of Pathology, Kurume University School of Medicine, Kurume, Japan

(Received for publication October 8, 1973)

A case of the peritoneal mesothelioma with multiple foci of 62 years male was reported. The patient showed 2 months clinical course and died by ileus.

The tumor masses were scattered over the peritoneal surface and intestinal serosa and the primary focus was not clear.

The tumor showed histologically epithelial type.

Electron microscopically, the tumor cells in our case were classified into 3 types: clear cell, dark cell, and intermediate cell types. The clear cells had morphologically epithelial characters and dark cells fibroblastic.

It is suggested that from these findings, mesothelial cell has the capacity of multipotential differentiation.

Mesotheliomas arising from the peritoneum, pleura, and pericardium are relatively uncommon. Pleural mesothelioma draws recently attention to the relationship with asbestos, but in the peritoneal mesothelioma, such relationship is not clear. According to the review by Foster and Ackerman (1960)\(^4\), three histologic varieties can be observed: epithelial, fibrous, and mixed. Mixed type seems to be seen most frequently in previous papers.

We experienced an autopsy case of peritoneal mesothelioma which showed epithelial pattern and was examined also ultramicroscopically. We would like to present this case in this paper.

CASE REPORT

62 year old male was admitted with abdominal pain in the lower abdomen. About 2 months before admission he had constipation, distension and mild abdominal pain. Weight loss was rapid.

Symptoms of anorexia, distension and abdominal pain steadily increased. Constipation progressed rapidly. On admission, physical examination revealed ill man with four hard, no tender, movable tumor masses in right lumbar regions. Bowel sounds were diminished. Abdomen was distended. Liver and spleen were not palpable. On rectal examination, hard hen-egg sized extrarectal mass was palpable. Generalized lymphnodes were not palpable.

On 3rd hospital day, exploratory laparotomy was performed under the diagnosis of subileus due to malignant tumor.

Temperature was 37.2°C, pulse 90. Blood pressure was 144 systolic, 92 diastolic. Hemoglobin was 80%; white cell count was 41,600, red cell count was 500×10⁴. Liver function and other che-
Detailed medical examinations were normal.

The postoperative reports described many, variable sized, hard nodular tumors had been scattered over the peritoneal surface.

Some nodular tumors measuring 3 to 4 cm in diameter on the serosal surface of each descending and ascending colon, were present and compressed the colon. For the improvement of obliterative symptoms, artificial ileostomy was made at the ileocaecal region. The abdominal cavity contained few ml of turbid ascitic fluid. Culture from it revealed many gram negative cocci. Lymphadenopathy of mesentery and other intra-abdominal region were not found. A section taken from the tumor located in radix mesenterii was prepared for the pathologic study.

The specimen from radix mesenterii was consisted of encapsulated, whitish gray, solid spongy tumor measuring 6 ×4 ×3 cm in diameter. Cut surface revealed whitish gray tumor tissue mixed with hemorrhage beneath the capsular region and scattered small necrotic foci.

Microscopic diagnosis was mesothelioma.

After operation, he had several attacks of ileus.

About 4 months later, he died of peritonitis and ileus.

AUTOPSY FINDINGS

The body is that of poor nourished, emaciated 62 year old male.

Skin was dry and pale. Abdomen was markedly distended and had 3 operation scars at right ileocaecal, midline and left hypochondral regions.

Opening the abdominal cavity, it was contained a small amount of yellowish purulent fluid and intestine had severe fibrous adhesion. Multiple nodes measuring from 0.2 -1.0 cm in diameter were present on the peritoneum, mesenterium and serosa of the intestine but some were whitish-gray patches in appearance.

Sigmoidal serosal surface was covered by thick, whitish gray tumor mass and its lumen showed marked degree of the stenosis but mucous membrane of the intestine was edematous associated with the marked distension of intestinal lumen.

Regional lymphodes were not enlarged. Liver (W; 850 g) and heart (W; 180 g) showed the atrophy. Spleen (W; 240 g) was enlarged. On cut surface it showed distinct, enlarged lymph follicles due to infection. Kidney (W; 150 g both) showed cloudy swelling and corticomedullary junction was somewhat distinct without focal lesion. Lung (W; 260 g, left, 280 g, right). Both lungs were voluminous and dark red in color.

Cut surface showed congestion and edema.

MICROSCOPIC EXAMINATIONS

Microscopically, resected specimen showed cellular tumor tissue which contained of small clefts and small necrotic foci, but no true tubular formation was seen. Arrangements of tumor cells were variable in places; some areas formed the whorl-like arrangement as if it was fibrosarcoma, but in most areas, round, oval mesothelial cells were arranged in solid pattern (Fig. 1).

The tumor cells were spindle or round and nuclei were solitary, round, variably stained and often vesicular. Nucleoli were not prominent. Eosinophilic cytoplasm was vesicular and contained occasional large vacuoles, especially in cells lining the clefts.

Mitotic figures were not common. The tumor cells showing whorl-like arrangement were spindle shaped cells but their cytoplasmic and nuclear figures
were entirely similar to oval round cells. The transition between the epithelial and spindle cells could be seen clearly.

The mesothelial cells lining the clefts were round, oval and projected into the cleft which often contained colloid materials.

Round cells desquamated from the surface of the cleft contained mucin-like materials and showed signet ring appearance (Fig. 2, 3).

The mucin-like material in cytoplasms gave a faint positive staining by PAS and Alcian-blue stains. PAS and Alcian-blue positive substances were also seen within stromal spaces.

The cytoplasms of some tumor cells had fine granular Sudan IV stained fat. By silver stain, delicate reticulin fibers were seen between the tumor cells, especially in areas beneath the capsule. Capsular invasion and regional lymph-node metastasis were negative, but development of the multiple nodular lesions over the peritoneum indicates its malignancy, but the other evidences of malignancy such as pleomorphism, atypicality, mitotic figures and capsular or vascular invasion were not found.

ELECTRON MICROSCOPIC FINDINGS

In the electron-microscopic examination obtained from surgical specimen, tumor cells consisted of three types of cells; dark cells, clear cells and intermediate cells, and these tumor cells were compactly arranged (Fig. 4, 5).

In general, the tumor cells were nearly round in appearance and have distinct plasma membrane. Some of them were spindle in shape and the spindle cells were mostly dark cells.

The plasma membrane of tumor cells were closely arranged to one another with a few desmosome attachments. In one area interdigititation was shown. The basement membrane surrounding the tumor cells was observed in one area.

The nuclei showed somewhat irregular borders and indentations with narrow rim of chromatin. The nucleoli were not prominent.

Some were multinuclear. Dark cells had abundant endoplasmic reticulum and Golgi apparatus (Fig. 4). A few mitochondrias were present in perinuclear regions. The dark cells had prominent fine fibrils like fibroblasts (Fig. 6).

Small clusters of glycogen granules were scattered in the cytoplasm.

Clear cells, as compared with dark cells had smaller number of cytoplasmic organelle. The cytoplasms contained large, degenerated mitochondrias and moderate number of endoplasmic reticulums (E. R.) especially vacuolated smooth surfaced type.

Cystic dilatation of E. R. system and small round electron-dense materials in the cytoplasms were characteristic for clear cells. Some lipid droplets and fine filaments similar to that of dark cells were also found in clear cells (Fig. 4).

Transitional types between dark cell and clear cell were observed and they had increased cytoplasmic organelles but cystic dilation of E. R. system was not prominent.

These electromicroscopic findings were almost similar to the case of mesothelioma in the report of Kay & Silverberg in 1971.

DISCUSSION

Mesothelioma originating from mesothelial tissue is relatively rare condition. Pleura, peritoneum and pericardium are the sites of predilection of this tumor and involvements of tunica vaginalis propria testis and atrioventricular node were also reported.
According to Kaufman and Stout, mesothelioma occurs mainly in adults, though it may be found at any age. It occurs more often in males than in females. Mesothelioma in adult are commonly benign. Incidence and behavior of mesothelioma in children younger than 16 years of age were studied by Kaufman and Stout (1964). In contrast with that in adult, mesothelioma in children was mostly malignant and rapidly fatal.

Etiologic factors are not clear, but it is well known fact that asbestosis and thorium play important role. L. H. Pistawka in 9th Japan international cancer congress, held in 1966, had reported 70 cases of mesothelioma in South-east Pennsylvania which occurred 2.5% in peritoneal and 7.5% in pleural cavity, and 7.5% of them had relation with asbestosis.

Histologically several types were observed by Foster and Ackerman: epithelial, fibrous and mixed.

Epithelial and mixed type are usually seen in adult and become fibrous in children. Our case was epithelial though it was consisted of 2 cell types, round cells and spindle cells, fibrous element was not apparent. From the electron microscopic observation, these two kinds of cells exhibited the different appearances.

It was not clear whether our case might occur in multicentric or metastatic. The microscopic features, unlike the other malignant tumors, seemed to be benign (no atypicality, no mitosis and no invasion). As shown by Stout and Himadi, solitary fibrous type was curable by surgical resection. However it was well known that recurrence and metastasis are apt to occur.

A number of electron microscopic studies on mesothelioma have been reported by Luse & Spjut (1964), Echevarria & Arean (1968), Marcus & Lynn (1970) and Kay & Silverberg (1971). According to our findings, round and spindle cells which were shown by the light microscopic examination showed some ultrastructurally different findings.

From the electron microscopic finding, 2 kinds of tumor cells were present. Clear cells had epithelial character associated with secretory activity and dark cells had fibroblast-like character. It is considered that the superiority of one of them had the influence upon the classification of mesothelioma.

In the clear cells, numerous organelles, cystic dilatation of E. R. system and existence of electron-dense materials might imply the cellular activity. Electronmicroscopic findings indicated that the round cell in light microscopy corresponds with electronmicroscopic clear cell and spindle cell in light microscopy corresponds with dark cell in electronmicroscopy.

REFERENCES


EXPLANATION OF FIGURES

Fig. 1 Peritoneal mesothelioma showing compactly arranged round and spindle shaped cells. (H & E. 10×40)

Fig. 2 Small Cystic space containing amorphous material in tumor tissue. (H & E. 10×40)

Fig. 3 Signet ring appearance of tumor cells lining on the cleft in the tumor tissue. (H & E. 10×100)

Fig. 4 Electron micrograph of mesothelioma showing 2 cell pattern of clear cell (C) and dark cell (D). Basement membrane can be seen between the tumor cells. Lipid droplets are noted within cytoplasm of clear and dark cells. (×1850)

Fig. 5 Electron micrograph showing the clear cells which have characteristic of cystic dilated smooth surfaced endopasmic reticulum and an intermediate cell (I). (×3300)

Fig. 6 Numerous fibrils and glycogen granules are seen in dark cell. (×11500)
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