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Malignant peritoneal mesothelioma

ABSTRACT

Primary tumors arising from mesothelium of the peritoneum are extremely rare. The accurate diagnosis of diffuse malignant mesothelioma is important because it has almost invariable fatal outcome. The diagnosis can pose several problems to the surgical pathologist. We report the case of a 20-year-old man who was admitted to the Clinical Centre of Serbia, complaining of abdominal pain, loss of weight and tumor-like lesion on the navel. The frosen section biopsy of peritoneal nodules revealed malignant tumor. The lesion was prepared for pathohistology, immunohistochemistry markers and electron microscopy. A morphological pattern of malignant mesothelioma consisted of a variable mixture of epithelial and spindle cell elements.

Key words: *Malignant mesothelioma; Immunohistochemistry markers; Ultrastructural investigation*

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INTRODUCTION

Malignant mesothelioma is neoplasm arising from the serosal lining of the pleural, peritoneal and pericardial cavities. Primary tumors arising from mesothelium of the peritoneum are extremely rare (1).

The diagnosis of malignant mesothelioma can pose several problems to the surgical pathologist. First, the morphological appearances of the tumor are known to de diverse with mimicry of a range of both reactive and neoplastic conditions. Second, due to the relative inaccsessibility of the serosa, biopsy material is often scanty and fragmentary, producing a plethora of interpretative ambiguities (2).

The accurate diagnosis of diffuse malignant mesothelioma is important because it has almost invariable fatal outcome, which contrasts the other mesothelial neoplasms such as the benign adenomatoid tumor and borderline malignant tumours, namely the well-differentiated papillary mesothelioma and multicystic mesothelioma.

Primary tumors arising from mesothelium of the peritoneum are extremely rare, and represent less than one percent of cancers. In many cases, malignant mesothelioma is not diagnosed until after surgery or autopsy. In general, by the time this condition is diagnosed clinically, the lesion has already spread widely in the peritoneum (3).

Similar to the supradiaphragmatic tumors, peritoneal mesotheliomas are often associated with asbestos exposure - in at least 80% of cases. How inhaled asbestos induces a peritoneal neoplasm remains a mystery.

These tumors, arising from the mesothelial lining of the coelomic cavities, consist of a variable mixture of epithelioid and spindle cell elements. When the cells form tubules or solid cords of epitheloid cells, the tumor resembles transcoelomic metastases of carcinoma. When the tumors are composed of spindle cells in a fibrillary matrix they resemble fibromas or fibrosarcoma. Mitotic figures are rare.

Mesotheliomas may be solitary or multiple; the multiple form is called the "diffuse form" because the mutiple nodules are present over wide areas of parietal and visceral surfaces and tend to become confluent. Such extensive lesions are accompanied by ascites or hydrothorax.

The histologic distinction between epithelial peritoneal mesothelioma and papillary serous carcinoma diffusely involving the peritoneum may be difficult.

The distinction of malignant mesothelioma from tumors metastatic to the serosal membranes can often be made based on the results of histochemical studies. However, in some cases, these techniques are inadequate to make firm diagnosis. In these instances, electron microscopic studies with the observation of a constellation of characteristic ultrastructural findings may permit an unequivocal diagnosis of mesothelioma (4).

The prognosis is severe, and treatment is usually disapponting. Survival of patients with mesothelioma is usually short.

CASE REPORT

We report the case of a 20-year-old man who was admitted to the Clinical Centre of Serbia, complaining of abdominal pain, loss of weight and tumor-like lesion on the navel.

After complete clinical investigation, total medial laparotomy was performed. Small whitish nodular lesions were noted on the visceral and parietal surfaces of the peritoneum from the diaphragm to the small pelvis giving a form of peritoneal carcinomatosis. Lesions have spread retroperitonealy, along both curvatures of the stomach, on the omental and serosal surfaces of the small and large bowel, segmentally narrowing their lumina. The largest lesion (5 cm) was localized retroperitoneally beneath the spleen. These tumors were accompanied by about 1000 ml sanguish ascites.

The frosen section biopsy of peritoneal nodules revealed malignant tumor. The lesion was prepared for pathohistology, immunohistochemistry markers for light-microscopy analysis and for electron microscopy investigation.

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Microscopic findings

A morphological tissue of a tumor consisted of a variable mixture of epithelial and spindle cell elements. This pattern consisted of tubulopapillary structures and glandlike acinar spaces lined by uniform cuboidal or flattened epithelial-like cells, eosinophilic cytoplasm, with vesicular nuclei, one or two incospicuos nucleoly.

There is a sheet of large vacuolated cells resembling lipoblasts. The tumor also consists of round or polygonal cells that are disposed in a linear or cordlike pattern and solid nests. The surroundings were well-oriented, spindle-shaped, fibroblast-like cells with nuclear hyperhromatism, rare mitotic figures, and areas of various dense fibrosis with focal hyalinization. A patho-morphological pattern and immunohistochemical characteristics consisted of malignant mesothelioma (Table 1).

Table 1. Histochemical and immunohistochemical characteristics.

Epithelial-like cells were:	Spindle-cells were:
PAS +	Vimentin +
D-PAS reistent	S-100 -
Cytokeratin +	Actin -
CEA +	Actin HHF-35 -
Vimentin -	
S-100 -	
CD 31 -	
Alcian blue +	

Technique for preparation of biopsy for electron microscopy

The specimen was fixed in 4% glutar-aldehyde buffered in 0.1% cacodylate buffer (pH 7.4) and postfixed in 1% osmium-tetroxide in the same buffer. The specimen was dehydrated in a graded series of alcohol and embedded in EPON 812. The semifine and ultra-thin sections were cut on the LKB ultramicrotome III. The semifine sections were rountinely stained by 1% toludine blue in borax. The ultra-thin sections "stained" with uranyl acetate and lead citrate. Ultrastrucutral analysis of sections was performed on Philips electron microscope 208 S.

Ultrastructural investigation

The nuclei of the tumor cells were large and contained one or two nucleoli. The cytoplasm contained moderate quantities of mitochondria. We have noted proliferation of granular endoplasmatic reticulum. The Golgy apparatus of these cells was moderately well developed. There were also numerous cytoplasmic tonofibrils. Microvilli, remarkably uniform in size and shape, were found on the surface of these cells and/or intracitoplasmic lumina. Desmosomes, very often giant and greater than one micron in length, linked the cell with a neighbour. We also detected spindle cells in this specimen. These cells showed morphological characteristics of the intensive synthetic activity. We observed the irregularities of nuclear shape with invagination of the nuclear envelope and pseudoinclusions.

DISCUSSION

Malignant mesothelioma is relatively rare disease, that is found in only 0.01-0.1% of all autopsied cases (5). Malignant peritoneal mesothelioma comprises only 20-30% of all malignant mesothelioma cases (5,6).

Clinical symptoms include the presence of abdominal mass, but no other remarcable symptomatology has ben observed (7). Specific tests to reveal this type of malignancy have not been developed yet. Many of these patients are misdiagnosed. However, many researchers have suggested that open biopsy is necessary for accurate diagnosis (3). Although histochemistry and immunochemistry are of tremendous aid in the differentiation between epithelial mesotheliomas and adenocarcinomas, there are still many cases when a distinction can be clearly elucidated. One of the greatest demands in making a diagnosis of an epithelial mesothelioma is distinguishing it from an adenocarcinoma. There are no specific ultrastructural features that are unique to malignant mesotheliomas. However, one of the most prominent and useful ultrastructural characteristics observed in epithelial mesotheliomas is the presence of numerous, long, slender, smooth, sinous microvilli. In contrast, the microvilli present in adenocarcinoma are generally less abundant, short, straight, and fuzzy secondary to the ample glucocalix on their surface (8). Another potentially useful observation is that the microvilli in mesotheliomas are not only present on luminal surfaces, but can also be seen on the abluminal surface of the cells. Intercellular junctions are present in both adenocarcinomas and mesotheliomas. A study by Burns et al. (9) found that 4 of 12 cases of epithelial mesotheliomas contained giant desmosomes, defined as desmosomes greater than one micron in length. A study by Ghadially et al. (10) substantiated this observation. Giant desmosomes were not present in any of the adenocarcinomas examined.

CONCLUSION

The distinction of malignant mesothelioma from tumors metastatic to serosal membranes can often be made based on the results of histochemical or immunohistochemical studies. However, there are cases in which differentiation of mesothelioma from other tumors is not possible with the histochemical or immunohistochemical techniques. In these instances, electron microscopic analysis may permit an unequivocal diagnosis of mesothelioma.

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