Diagnostic laparoscopy identifies a peritoneal adenomatoid-like mesothelioma masquerading as ovarian cancer: a case report

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Summary

The authors report a rare case of peritoneal adenomatoid mesothelioma in a woman with no history of asbestos exposure. A 61-year-old woman was originally suspected of having a bilateral ovarian tumor based on chest radiography and magnetic resonance imaging (MRI). Upon referral to our hospital, the presence of two solid masses was confirmed by enhanced MRI and ^{18}F-fluorodeoxyglucose positron-emission tomography/computed tomography (18F-FDG-PET/CT). Physical examination was normal, as were serum concentrations of the tumor markers CA 19-9, CA 125, and CEA. Laparoscopic surgery showed a right ovarian tumor and laparoscopic right salpingo-oophorectomy and adhesiotomy were performed. Two months later, the patient underwent laparoscopic segmental resection of the sigmoid colon, with histological analysis identifying an adenomatoid-like tumor. The final diagnosis was peritoneal adenomatoid-like mesothelioma with invasion of the right ovary. This case report demonstrates that imaging techniques must be coupled with laparoscopic surgery for an accurate diagnosis of peritoneal mesothelioma.

Key words: Laparoscopic surgery; Methothelioma; Adenomatoid-like tumor.

Instroduction

Mesotheliomas are aggressive tumors arising from serous surfaces, including the pleura (65%–70%), peritoneum (30%), tunica vaginalis testis, and pericardium (1%–2%) [1]. The main cause of malignant mesothelioma is exposure to asbestos. Its current incidence in the United States is 2,500 patients per year, with an expected worldwide peak in 2020, reflecting the increased use of asbestos in the second half of the 20th century [2].

Mesothelioma is generally diagnosed by imaging methods, including computed tomography (CT), magnetic resonance imaging (MRI), and ^{18}F-fluorodeoxyglucose positron-emission tomography/computed tomography (18F-FDG-PET/CT). A definitive diagnosis requires laparoscopy or open surgery with biopsy, to obtain tissue for histological and immunocytochemical analyses. Consequently, the diagnosis can be easily overlooked, especially in patients with no previous exposure to asbestos.

The authors describe a woman with no previous exposure to asbestos, who was preoperatively diagnosed with bilateral ovarian tumor, but, after laparoscopic surgery, was found to have a rare peritoneal adenomatoid mesothelioma.

Case Report

A 61-year-old woman visited a hospital for treatment of left coxarthrosis. MRI suggested a bilateral ovarian tumor, and she was referred to the Department of Obstetrics and Gynecology at Fukuchiyama City Hospital for detailed examination and treatment.

MRI showed a four-cm left ovarian tumor and a one-cm right ovarian tumor, but no ascites. To verify this diagnosis, the authors performed enhanced MRI 18F-FDG-PET/CT. The size and position of the masses were confirmed by both techniques, but were significantly more visible on MRI than on 18F-FDG-PET/CT (Figures 1A-B). On the basis of this information, there was no reason to doubt the diagnosis of bilateral ovarian cancer. Nonetheless, they conducted additional tests to determine the spread of the cancer to other tissues. Because malignant bowel obstruction is a common complication of ovarian cancer, the patient was examined by gastroscopy and fibroscopy, but these tests showed no evidence of any gastrointestinal tumor. Furthermore, serum concentrations of the tumor antigens CA 19-9, CA 125, and CEA were within normal limits, which did not support a diagnosis of cervical carcinoma. Based on these results and her clinical course, this patient could not be diagnosed with malignant ovarian tumors.

Because non-invasive approaches could not clarify the diagnosis of this patient, the authors performed laparoscopic surgery to remove the tumors and identify the type of cancer. First, a laparoscopic right salpingo-oophorectomy (RSO) was performed, with histopathological analysis identifying an adenomatoid tumor (Figures 2A, B). The left ovary was found to adhere to the sigmoid colon. An adhesiotomy was performed, and the left ovary was found to be atrophic. Moreover, a sigmoid colon

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tumor, preoperatively diagnosed as a left ovarian tumor, was found to be present (Figures 2C, D). The patient was discharged from the hospital four days after the operation. Two months later, she underwent a laparoscopic sigmoid colon segmental resection. After discharge, she received no additional therapy.

The tissue specimens collected during the two surgical procedures were analyzed to identify the type(s) of cancer. Microscopic examination revealed that the right ovarian tumor and the colon tumor were both solid yellowing masses (Figures 3A, B). Specimens from each tumor were fixed in formalin, stained with hematoxylin and eosin, and examined by light microscopy. Histologically, both tumors had characteristics of adenomatoid tumors, with a typical microcystic pattern accompanied by a papillary structure and microcystic pattern (Figures 3C, D). The tumors were therefore diagnosed as adenomatoid tumors. Immunohistochemical assays showed that the tumors were weakly positive for epithelial membrane antigen (EMA), a marker for mesothelioma. The tumors were also positive for the mesothelioma marker calretinin (Figure 3E), which is also good maker of the mesothelioma and weakly positive for Ki-67, a marker of cell proliferation (Figure 3F) [3, 4].

Based on these findings, the authors diagnosed this patient as having a peritoneal adenomatoid-like mesothelioma, which was surprising, since this patient had no history of asbestos exposure. The right ovarian tumor was diagnosed as a metastatic lesion.

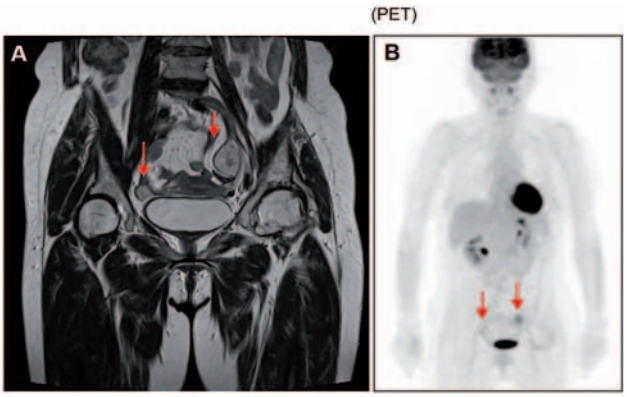

Figure 1 – Solid tumor detected by coronal T2-enhanced MRI (A) and PET (B). A solid mass, approximately 35 mm in diameter (*arrow*), was detected in the left abdomen, with a second mass, approximately 15 mm in diameter (*arrow*), detected in the right abdomen.

Discussion

Mesothelioma can be macroscopically divided into localized and diffuse types. The localized type is usually benign, whereas the diffuse type is malignant. However,

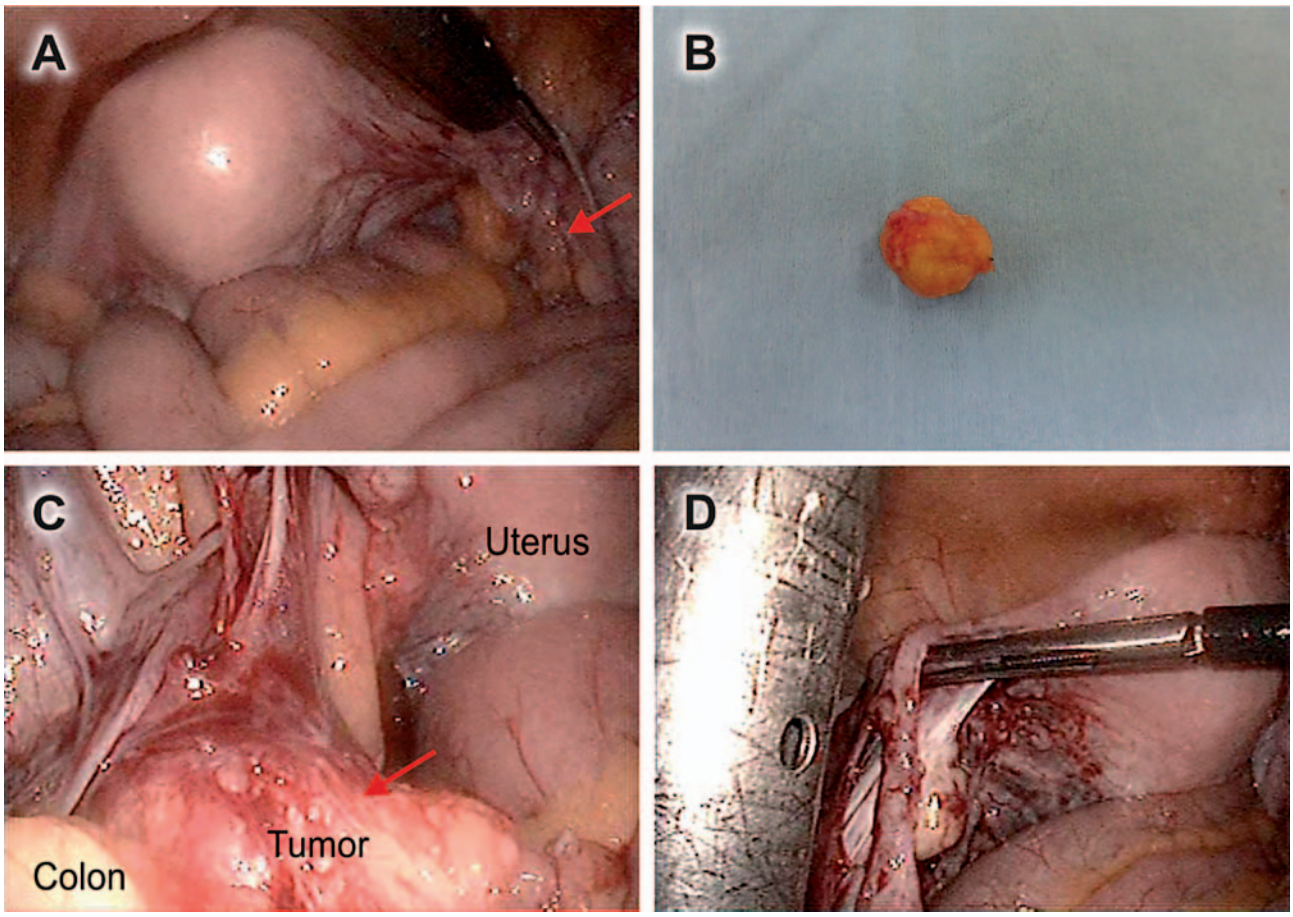

Figure 2 – Laparoscopic findings in the presented patient. (A) Removal of the right ovarian tumor by laparoscopic right salpingo-oophorectomy. (B) Photograph of the resected specimen. (C) Laparoscopic operation showing the left colon tumor. (D) Adhesiotomy showing that the left ovary was normal.

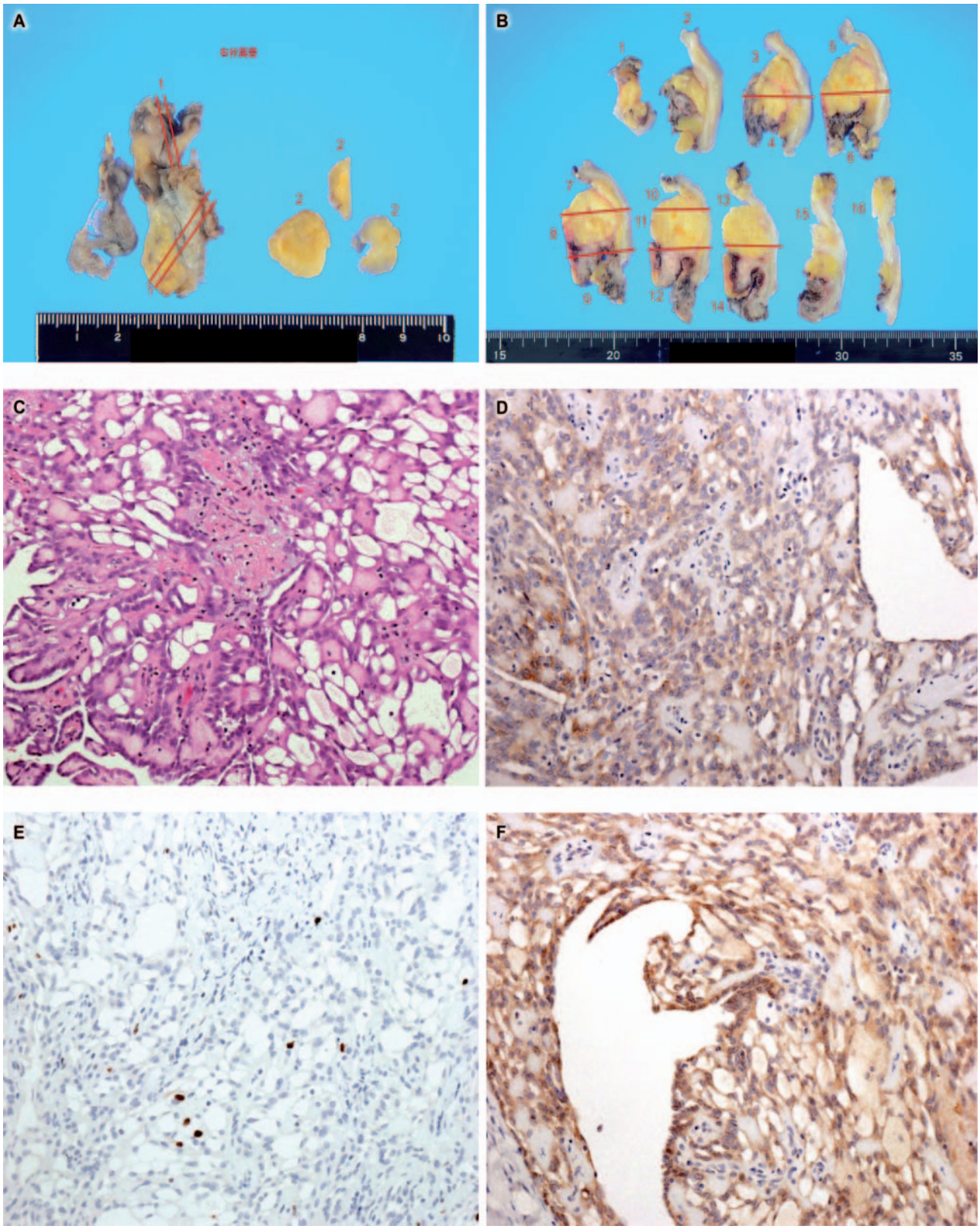

Figure 3 – Microscopic findings. The resected tissues were fixed in 10% formalin. Both the right ovarian (A) and left colon (B) tumors were solid and yellowish in color. Histologically, the right ovarian tumor (C) and colon tumor (D) were similar in that both had microcystic patterns accompanied by a papillary structure. Immunohistochemically, the tumors were weakly positive for EMA and calretinin (E) and positive for Ki-67 (F).

transformation of localized to diffuse mesothelioma has been reported [5-7]. Moreover, localized mesotheliomas have the potential of malignant transformation [8].

Histologically, mesotheliomas are classified as epithelioid, sarcomatoid, and biphasic types. Some variant forms are recognized, including multicystic mesothelioma, adenomatoid tumor, desmoplastic-type mesothelioma, and well-differentiated papillary mesothelioma [9]. Immunohistochemical analysis is required for differential diagnosis.

Adenomatoid mesothelioma is a usual variant of epithelioid malignant mesothelioma that may mimic other tumors histologically, including benign adenomatoid tumors [10]. Adenomatoid tumors are usually located in the genitourinary tract and are often detected incidentally during pelvic surgery [11]. Since adenomatoid mesotheliomas look very similar to other adenomatoid lesions, adenomatoid mesotheliomas have been so designated because of their resemblance to adenomatoid tumors of the genital tract [12]. Diffuse and multicystic adenomatoid lesions are thought to be malignant mesothelioma, whereas local and simple tumors are thought to be adenomatoid tumors.

Accurate diagnosis of diffuse malignant mesothelioma requires a comprehensive diagnostic workup, including assessments of its gross appearance, histology, histochemistry, immunocytochemistry, and electron microscopy [13]. Pathologically, positive immunostaining for calretinin and EMA are considered markers of malignancy when differentiating epithelioid malignant mesothelioma and mesothelioma-in-situ from reactive mesothelial hyperplasia [14]. Ki-67 is strictly associated with cell proliferation [4]. The right ovarian tumor in the present patient was clearly positive for EMA and weakly positive for calretinin and Ki-67. This patient was diagnosed immunocytochemistry as having a tumor of low malignant potential and therefore did not receive adjuvant therapy. The right ovarian tumor may have been a metastatic lesion of the left colon tumor, although both may have appeared simultaneously.

Mesothelioma is difficult to diagnose, although it can be diagnosed by histopathological examination of the sample taken during laparoscopy [15-17]. Laparoscopy is therefore an important tool in the diagnosis of primary mesothelioma. In contrast, other diagnostic modalities, such as ultrasonography, CT, and cytology of the ascites fluid, are less accurate. Since laparoscopy can complicate management by facilitating tumor dissemination, non-invasive imaging should be performed prior to laparoscopic surgery [18].

Conclusion

The authors report a patient with a malignant adenomatoid methothelioma who was diagnosed after laparoscopic surgery by immunocytochemistry. Laparoscopy is an important tool in the diagnosis of mesothelioma.

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