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Stage IA Ovarian Cancer With an Anaplastic Carcinomatous Mural Nodule in a Mucinous Cystadenoma: A Case Report

Takuya Noda [1], Takeshi Fukuda [2], Takuma Wada [2], Reiko Tasaka [2], Toshiyuki Sumi [2]

1. Department of Obstetrics and Gynecology, Osaka City General Hospital, Osaka, JPN 2. Department of Obstetrics and Gynecology, Graduate School of Medicine, Osaka Metropolitan University, Osaka, JPN

Corresponding author: Takeshi Fukuda, tfukuda@omu.ac.jp

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Abstract

Anaplastic carcinomatous mural nodules in ovarian mucinous tumors are rare and can be difficult to distinguish from sarcoma-like or sarcomatous nodules. We report a 66-year-old woman who presented with abdominal distension and a mass extending to just below the xiphoid process. Magnetic resonance imaging revealed a 304 × 260 × 126 mm cystic abdominopelvic tumor with a solid component showing diffusion restriction. Serum cancer antigen 125 was elevated to 173 U/mL. Laparotomy was performed, and the tumor was removed after aspiration of its cystic contents without intraperitoneal spillage. Total hysterectomy, bilateral salpingo-oophorectomy, pelvic and para-aortic lymphadenectomy, and partial omentectomy were performed, with no residual tumor. Histopathological examination revealed a benign mucinous cystadenoma with an anaplastic carcinomatous mural nodule composed of spindle cells and giant cells. Immunohistochemistry showed focal AE1/AE3 positivity and positive Ki-67 and p53 staining. Peritoneal washing cytology was negative, and no lymph node metastases were identified. The tumor was classified as International Federation of Gynecology and Obstetrics stage IA (pT1aN0M0). Postoperative surveillance without adjuvant chemotherapy was selected after discussion with the patient, considering the complete resection and uncertain benefit of adjuvant chemotherapy in this setting. The patient remained alive without evidence of disease 54 months after surgery. This case provides additional long-term clinical follow-up for anaplastic carcinoma associated with a benign mucinous epithelial component.

Categories: Obstetrics/Gynecology, Oncology
Keywords: anaplastic carcinoma, immunohistochemistry, mucinous cystadenoma, mural nodule, ovarian mucinous tumor

Introduction

Ovarian mucinous tumors occasionally contain discrete mural nodules with appearances ranging from sarcoma-like proliferations to anaplastic carcinoma and true sarcoma. These lesions can be diagnostically challenging because sarcoma-like mural nodules and anaplastic carcinomatous nodules may show overlapping morphologic features [1,2]. Mural nodules in ovarian mucinous tumors are uncommon. An estimate of approximately two to five cases per million has been cited in published case reports, although robust population-based incidence data and a clear denominator for this estimate are lacking [3]. The true incidence of anaplastic carcinomatous mural nodules specifically remains uncertain. Anaplastic carcinomatous mural nodules have been reported in ovarian mucinous tumors in which the mucinous epithelial component shows benign, borderline, or malignant histologic features [4,5]. An anaplastic carcinomatous nodule has been reported in a mucinous cystadenoma, illustrating that benign epithelial morphology does not exclude malignancy elsewhere in the same tumor [4]. Morphologic assessment supplemented by immunohistochemistry helps characterize the nature of mural nodules [5].

Despite the malignant histology of anaplastic carcinomatous mural nodules, favorable outcomes have been reported in patients with unruptured stage IA mucinous ovarian tumors [1]. We describe a patient with a left ovarian mucinous cystadenoma containing an anaplastic carcinomatous mural nodule, classified as stage IA, who remained disease-free for 54 months after surgery without additional therapy.

Case Presentation

A 66-year-old woman, gravida two and para two, presented to a local physician with abdominal distension. Abdominal ultrasonography revealed an abdominopelvic mass, prompting referral to our department for further evaluation. On examination, the mass occupied much of the abdominal cavity and extended to just below the xiphoid process. Her medical and family histories were unremarkable. She had a history of two vaginal deliveries. Abdominal examination revealed a large mass occupying the abdominal cavity and extending to just below the xiphoid process.

Preoperative serum cancer antigen 125 was 173 U/mL (reference range: 0-35 U/mL), and carbohydrate antigen 19-9 was 6 U/mL (reference range: 0-37 U/mL). Carcinoembryonic antigen was <1.7 ng/mL (reference

range: 0-5 ng/mL), and sialyl-Tn antigen was 23.4 U/mL (reference range: 0-45 U/mL). Magnetic resonance imaging demonstrated a 304 × 260 × 126 mm cystic abdominopelvic tumor with a solid component showing diffusion restriction (Figures *1A*-*1C*).

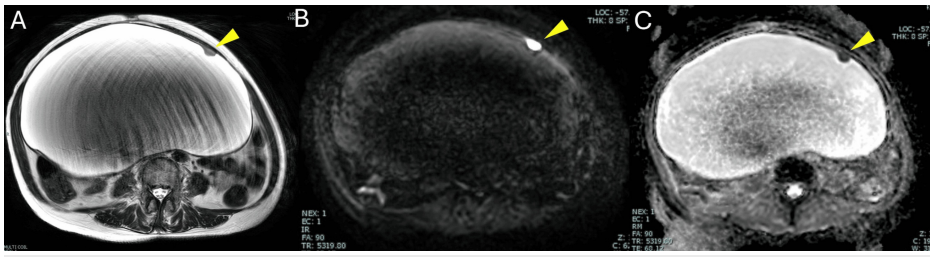


FIGURE 1: Preoperative magnetic resonance imaging.

(A) Axial T2-weighted image showing a large cystic abdominopelvic mass with a solid nodule (arrow). (B) Diffusion-weighted image showing high signal intensity in the solid nodule (arrow). (C) Apparent diffusion coefficient map showing corresponding low signal intensity in the solid nodule (arrow). These findings indicate restricted diffusion in the solid nodule.

At laparotomy, the tumor was found to arise from the left ovary. Its cystic contents were aspirated using an S.A.N.D. balloon catheter (Chikuma, Japan: Hakko Co., Ltd.), and the tumor was subsequently removed without intraperitoneal spillage during aspiration or resection. Intraoperative pathologic assessment indicated malignancy, but the histologic subtype remained uncertain. Total hysterectomy, bilateral salpingo-oophorectomy, pelvic and para-aortic lymphadenectomy, and partial omentectomy were performed. There was no residual tumor at the completion of surgery. The resected tumor was cystic and contained mural nodular tissue (Figure *2*).



FIGURE 2: Gross appearance of the resected ovarian tumor.

The opened specimen shows a cystic tumor with a mural nodule (arrowhead).

Histopathological examination included five tissue sections from the cyst wall and four from the mural nodule. The cystic epithelial component was classified as a benign mucinous cystadenoma, with no borderline or invasive epithelial components identified in the examined sections. The mural nodule contained abundant spindle cells and giant cells (Figures *3A*-*3C*). Immunohistochemistry showed focal AE1/AE3 positivity in the mural nodule, together with positive Ki-67 and p53 staining (Figures *4A*-*4C*).

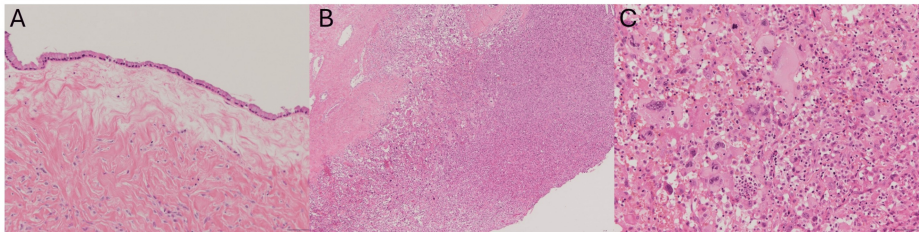


FIGURE 3: Histologic findings of the cyst wall and mural nodule.

(A) Cyst wall with the epithelial component diagnosed as mucinous cystadenoma (hematoxylin and eosin, original magnification ×200). (B) Low-power view of the mural nodule (hematoxylin and eosin, original magnification ×40). (C) Higher-power view showing spindle cells and giant cells in the mural nodule (hematoxylin and eosin, original magnification ×200).

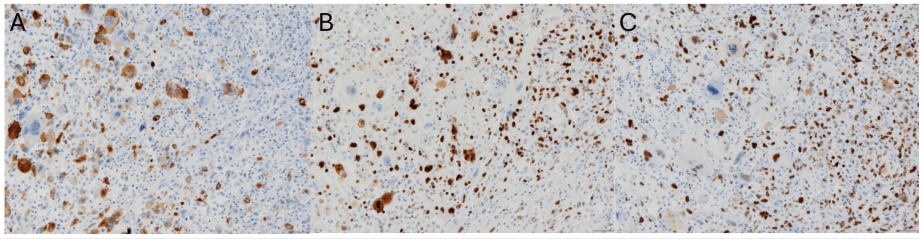


FIGURE 4: Immunohistochemical findings of the mural nodule.

(A) Focal AE1/AE3 immunoreactivity. (B) Ki-67-positive nuclei. (C) p53-positive nuclei.

Estrogen receptor, spalt-like transcription factor 4, human chorionic gonadotropin, human placental lactogen, S100, and CD68 were negative. The combined morphologic and immunohistochemical findings were interpreted as anaplastic carcinoma within the mural nodule. Histopathological examination revealed no metastases in the 31 pelvic lymph nodes (0/31) or four para-aortic lymph nodes (0/4). Peritoneal washing cytology was negative for malignant cells. The final diagnosis was left ovarian mucinous cystadenoma with an anaplastic carcinomatous mural nodule. Based on the surgical and pathological findings, we staged the tumor as International Federation of Gynecology and Obstetrics (FIGO) stage IA (pT1aN0M0).

Given the FIGO stage IA disease, complete surgical resection, and lack of established evidence supporting the benefit of adjuvant chemotherapy for stage IA ovarian anaplastic carcinoma, postoperative surveillance without adjuvant chemotherapy was selected by the treating team after discussion with the patient. The patient continued outpatient surveillance and was alive without evidence of disease at the latest follow-up, 54 months (four years and six months) after surgery.

Discussion

Diagnostic interpretation of the mural nodule

A notable feature of this case is the coexistence of a mucinous cystadenoma and an anaplastic carcinomatous mural nodule. The epithelial lining and mural nodule require separate assessment. A diagnosis based only on the cyst lining could overlook the malignant component, whereas reliance on spindle-cell morphology alone could lead to misclassification of the mural nodule. Hong et al. described an anaplastic carcinomatous mural nodule accompanying a mucinous cystadenoma whose cyst lining showed no malignant features [4]. Careful histopathological examination of both the cyst wall and the mural nodule is essential for accurate diagnosis.

The principal differential diagnoses include sarcoma-like mural nodules and true sarcomatous nodules. Focal cytokeratin expression may also occur in sarcoma-like mural nodules, so AE1/AE3 positivity alone cannot establish the diagnosis of anaplastic carcinoma [2,5,6]. In the present case, focal AE1/AE3 staining was interpreted together with the spindle-cell and giant-cell morphology. The negative staining for SALL4, S100, and CD68 was considered supportive in the differential diagnostic assessment, although these findings alone were not sufficient to exclude other types of mural nodules. The histopathological and immunohistochemical findings were reviewed and discussed with our pathologists. However, focal AE1/AE3 positivity alone cannot definitively distinguish anaplastic carcinoma from sarcoma-like mural nodules; the combined morphological and immunohistochemical findings were considered consistent with anaplastic carcinoma. Based on this integrated assessment, the diagnosis of an anaplastic carcinomatous mural nodule

was considered appropriate.

Clinical outcome and postoperative management

Under the International Federation of Gynecology and Obstetrics (FIGO) staging classification summarized in the 2025 Cancer Report, stage IA ovarian cancer is confined to one ovary with an intact capsule, without tumor on the ovarian surface or malignant cells in ascites or peritoneal washings [7]. We staged the tumor as FIGO stage IA (pT1aN0M0) on the basis of the surgical and pathological findings. Tumor aspiration and removal were performed without intraperitoneal spillage, and peritoneal washing cytology was negative.

In a 34-case series by Provenza et al., 15 cases were stage IA, while follow-up was available for 21 cases overall. A total of 10 patients were alive without disease after a median follow-up of five years, and all 10 had stage IA disease. Another patient with stage IA disease died from an unrelated cause [1]. These observations indicate that an anaplastic carcinomatous mural nodule does not invariably imply an unfavorable outcome in an unruptured stage IA tumor. However, incomplete follow-up and the lack of a controlled treatment comparison preclude conclusions about the benefit of adjuvant chemotherapy.

Other reports describe selected patients managed without chemotherapy. Yamazaki et al. reported a stage IA mucinous borderline tumor with an anaplastic spindle cell carcinomatous mural nodule and no recurrence 15 months after surgery alone [3]. In the 2025 series by Sullivan et al., two patients with stage IA anaplastic ovarian carcinoma received no adjuvant chemotherapy and remained without evidence of disease at 28.1 and 54.3 months, as reported in their patient-level table [8]. However, these reports were not restricted to anaplastic carcinomatous mural nodules associated with benign mucinous cystadenomas; their applicability to this specific histologic combination therefore remains uncertain.

Adverse outcomes have nevertheless occurred after a stage IA diagnosis. Mhawech-Fauceglia et al. described a mucinous borderline tumor with a small focus of anaplastic carcinoma, followed by biopsy-confirmed nodal recurrence approximately three months after surgery and a fatal subsequent course [9]. Wang et al. also reported disease-related death in a patient classified as stage IA despite postoperative paclitaxel and carboplatin [6]. These cases demonstrate heterogeneity in clinical outcomes among patients with stage IA disease. Neither favorable surgery-only reports nor adverse chemotherapy-treated cases can determine treatment effectiveness because they lack comparable treatment groups and are subject to selection and reporting bias.

The optimal postoperative management of anaplastic carcinomatous mural nodules in ovarian mucinous tumors remains uncertain because of their rarity and the absence of comparative clinical trials [1,8]. Although platinum-based chemotherapy, commonly carboplatin plus paclitaxel, is frequently used as adjuvant treatment for epithelial ovarian cancer, no standard adjuvant chemotherapy regimen has been established specifically for ovarian anaplastic carcinoma [6]. Several regimens, including carboplatin plus paclitaxel, fluoropyrimidine/oxaliplatin-based chemotherapy, and ifosfamide plus paclitaxel, have been reported [8]. Adjuvant chemotherapy may potentially eradicate occult microscopic disease but also carries risks of adverse effects, including myelosuppression and peripheral neuropathy, while its benefit in this rare setting remains uncertain [6].

In the present case, the tumor was completely resected and classified as FIGO stage IA, without intraoperative spillage, lymph node metastasis, or malignant cells in peritoneal washings. Considering these findings and the lack of established evidence supporting the benefit of adjuvant chemotherapy for stage IA ovarian anaplastic carcinoma, postoperative surveillance without adjuvant chemotherapy was selected after discussion with the patient.

Clinical implications and limitations

The principal contribution of this report is the documentation of 54 months of disease-free survival after surgery without adjuvant treatment in a patient with stage IA anaplastic carcinoma forming a mural nodule in an ovarian mucinous cystadenoma. This sustained disease-free interval adds to the limited clinical experience with anaplastic carcinoma accompanying a benign mucinous epithelial component. Beyond illustrating the diagnosis, this case provides extended follow-up documenting the clinical course of this specific histologic combination.

The limitations of this report include its single-patient design and limited generalizability. Furthermore, the optimal postoperative treatment strategy for ovarian anaplastic carcinoma remains uncertain, and late recurrence cannot be excluded despite the favorable 54-month follow-up. Therefore, this individual outcome does not establish that adjuvant chemotherapy can safely be omitted in other patients. Additional cases with detailed histopathological findings, treatment information, and long-term follow-up are needed to better understand the clinical course and optimal management of this rare tumor.

Conclusions

This case documents 54 months of disease-free survival after surgery without adjuvant treatment in a

patient with stage IA anaplastic carcinoma forming a mural nodule in an ovarian mucinous cystadenoma. The sustained disease-free interval provides additional long-term follow-up data for anaplastic carcinoma accompanying a benign mucinous epithelial component, a histologic combination for which clinical experience remains limited. Careful assessment of the mural nodule remains essential even when the surrounding mucinous epithelium is benign. Although this individual outcome does not establish the safety of omitting adjuvant therapy, reporting such cases with extended follow-up contributes to a better understanding of their clinical course.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Takeshi Fukuda, Takuya Noda, Takuma Wada, Toshiyuki Sumi, Reiko Tasaka

Acquisition, analysis, or interpretation of data: Takeshi Fukuda, Takuya Noda, Takuma Wada, Toshiyuki Sumi, Reiko Tasaka

Drafting of the manuscript: Takeshi Fukuda, Takuya Noda, Takuma Wada

Critical review of the manuscript for important intellectual content: Takeshi Fukuda, Toshiyuki Sumi, Reiko Tasaka

Supervision: Takeshi Fukuda, Toshiyuki Sumi

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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