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A Case of Ovarian Microinvasive Mucinous Carcinoma and Co-existent Angiosarcoma

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Primary ovarian angiosarcoma is very rare with only 27 cases reported so far in the medical literature. We report here on a rare case of ovarian microinvasive mucinous carcinoma that was coexistent with angiosarcoma in a 54-year-old woman. The tumor was a 26×19×10 cm-sized multilocular cystic mass with a 4×3 cm-sized solid hematoma-like nodule in the center. Microscopically, it was composed mostly of mucinous tumor of various grades from borderline to microinvasive carcinoma. The hematoma-like area turned out to be an angiosarcoma, composed of pleomorphic cells that formed slit-like spaces, spindle cells that formed short fascicles and anastomosing vascular channels with atypical endothelial cells. All these cells were positive for CD31, CD34 and factor VIII-related antigen. The patient developed peritoneal and pleural metastases, which were angiosarcoma and mucinous carcinoma, respectively. We believe this case is only the fourth example of an ovarian collision tumor of angiosarcoma and surface epithelial tumor.

Key Words: Hemangiosarcoma; Cystadenocarcinoma, mucinous; Ovary

Sarcoma is a rare malignancy of the female genital tract and it accounts for less than 1% of all ovarian malignancies.[1] Angiosarcoma of the ovary is even rare with only 27 cases having been reported in the English medical literature. Angiosarcoma of the ovary can be associated with surface epithelial tumors,[2] but only two cases of the combination of the mucinous tumor and angiosarcoma have been reported.[3,4] We report here on a case of an unusual form of ovarian malignancy: angiosarcoma that was coexistent with microinvasive mucinous carcinoma.

CASE REPORT

A 54-year-old woman was admitted to the CHA Gangnam Medical Center to evaluate a huge pelvic mass. A large pelvic mass with ascites was palpated in the left adnexal region. Ultrasonography and pelvic magnetic resonance imaging confirmed the left adnexal mass, which was a 26×19×10 cm-sized, multilocular, thick-walled cystic mass with some solid areas and blood flow (Fig. 1A). The uterus and the right adnexa were normal with no visible lymph node enlargement. The preoperative serum levels of cancer antigen (CA)-125 (423.4 U/mL) and CA 19-9 (508.2 U/mL) were markedly elevated. Total abdominal hysterectomy with bilateral salpingo-oophorectomy and peritoneal biopsy were performed without complications. The gross examination revealed a 26×19×7 cm-sized, cystic mass in the left ovary. The external surface was smooth, nodular and grossly intact. On sectioning, the cut surface of the whole mass was multicystic and it revealed a fungating hematoma-like mass that measured 4×3 cm in the center of the tumor (Fig. 1B). Upon microscopic examination, the multilocular cystic region was a mucinous cystic tumor of borderline malignancy with multifocal intraepithelial carcinoma (Fig. 2A). There was a focus of microinvasion that measured about 0.3×0.2 cm (Fig. 2C). The solid hematoma-like area turned out to be an angiosarcoma (Fig. 2B). It was composed of pleomorphic cells that

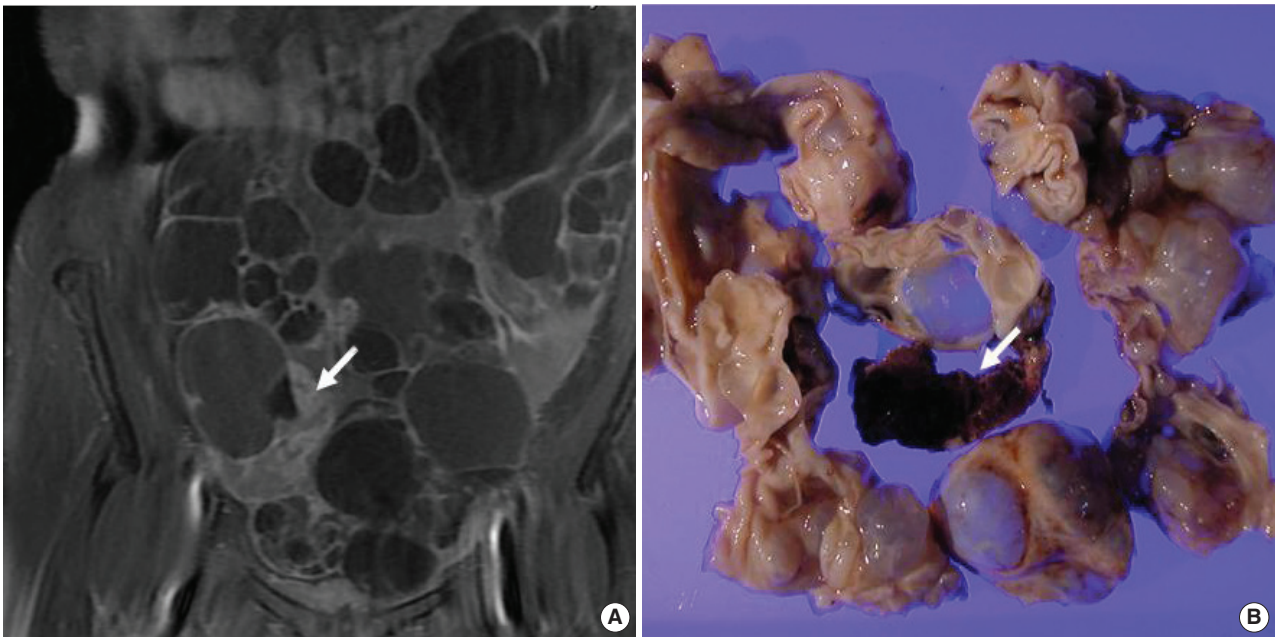

Fig. 1. (A) The magnetic resonance image of the abdomen shows the presence of a 26×19×10 cm sized, multilocular, thick walled cystic mass with some solid areas and contrast enhancement (arrow). (B) Grossly, the tumor is a multilocular, cystic mass that is filled with mucinous fluid and there are multifocal solid and hematoma-like areas (arrow).

formed slit-like spaces filled with red blood cells, spindle cells that formed short fascicles, and anastomosing vascular channels lined by atypical endothelial cells. The tumor cells were strongly positive for CD31, CD34 and factor VIII-related antigen. They were negative for cytokeratin (Fig. 3). The biopsied peritoneum was also involved by angiosarcoma (Fig. 4A). The uterus was free of tumor and adenomyosis was noted in the myometrium. The patient underwent 7 cycles of adjuvant chemotherapy with a combination of ifosfamide, paclitaxel and cisplatin. The patient developed a pleural effusion at six months postoperatively (one month after chemotherapy). She was admitted to the CHA Bundang Medical Center and underwent chest tube drainage and pleural biopsy. The pleural biopsy confirmed the metastasis of mucinous carcinoma (Fig. 4B). At present, she is still alive for 10 months after surgery.

DISCUSSION

Angiosarcoma is an uncommon vascular malignancy that accounts for less than 1-2% of all soft tissue sarcomas. It is characterized by rapidly proliferating, extensively infiltrating anaplastic cells that are derived from blood vessels and irregular anastomosing vascular channels. Angiosarcomas may occur in any region of the body, but they have a predilection for skin and the superficial soft tissue of the head and neck. Primary angiosarcoma of the ovary is extremely rare, with only 27 cases having been reported in the English medical literature since the first case was reported by Ongkasuwan in 1982.[1-18] There is another interesting case in the Korean literature that was reported to be an angiosarcoma-like undifferentiated sarcoma associated with mucinous borderline tumor.[19] Bradford *et al.*[12] reviewed 26 cases of the ovarian angiosarcoma and they recently reported another case. According to their report, the majority of the cases presented only in later stages of the disease, and the patients had nonspecific symptoms such as abdominal pain. Most cases were pure angiosarcomas. Angiosarcomas associated with other tumor types are extremely rare with only 7 such cases reported so far, i.e., four cases associated with mature cystic teratomas,[8,11,15] one with mucinous cystadenocarcinoma,[3] another with mucinous cystadenoma[4] and one with borderline serous papillary cystadenoma.[14] When associated with other types of tumors, sarcomas of the ovary are thought to arise as a component of various complex backgrounds. Angiosarcomas of the ovary are regarded as a component of malignant mixed müllerian tumors or adenosarcomas. They have also been described to arise from an ovarian teratoma, or as a collision tumor with other surface epithelial tumors.[2] In the present case, the main tumor was composed mostly of mucinous tumors of various grades. The majority was borderline tumors, but there were also multiple foci of

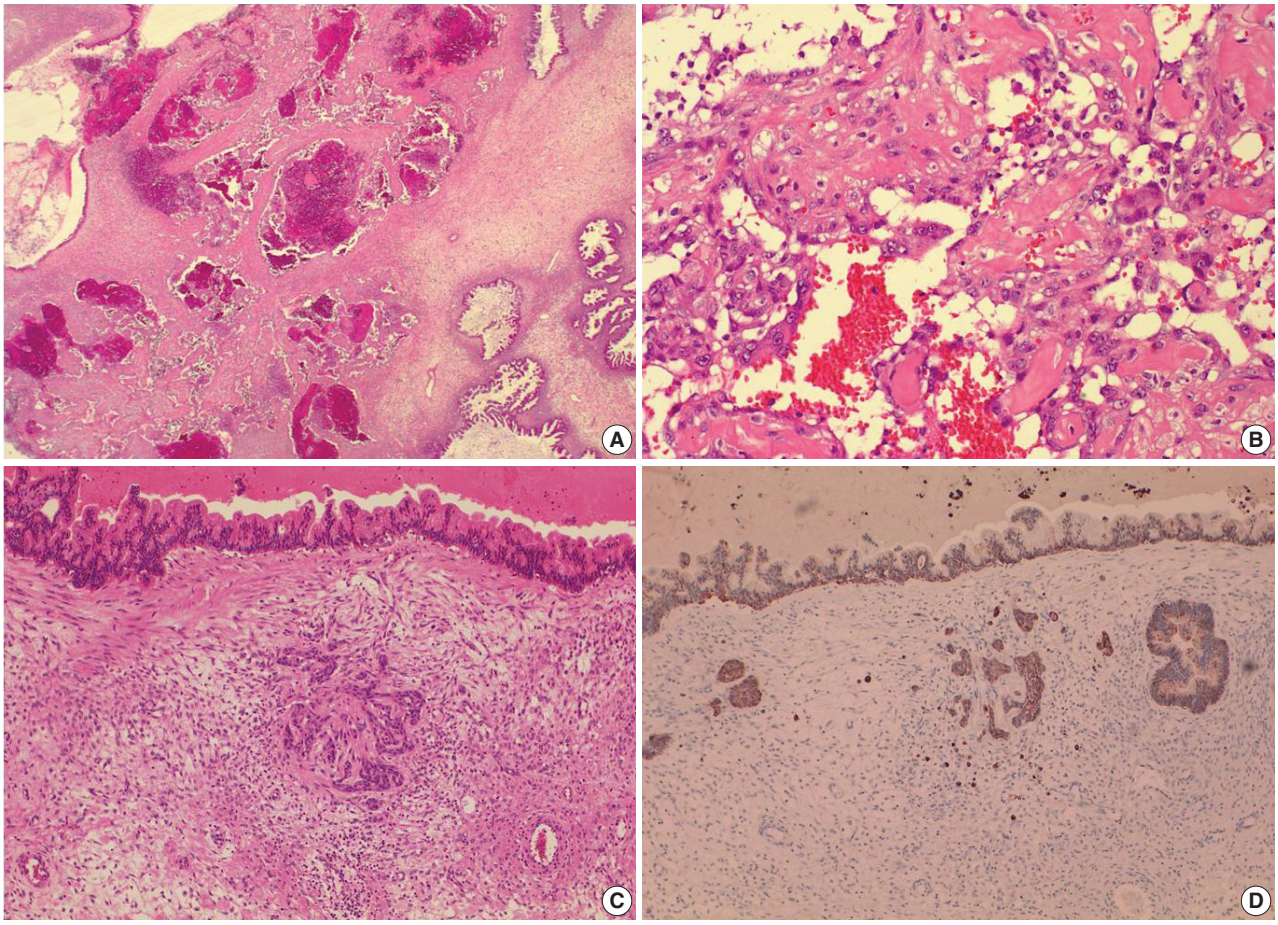

Fig. 2. (A) The central solid hematoma-like area shows findings compatible with angiosarcoma, with the surrounding multilocular cystic region being a mucinous cystic tumor of borderline malignancy together with multifocal intraepithelial carcinoma. (B) The high power view of the angiosarcoma area shows pleomorphic cells forming slit-like spaces filled with red blood cells, and anastomosing vascular channels lined by atypical endothelial cells. (C) A focus of microinvasive mucinous carcinoma is present, which is evident according to the positive reaction for cytokeratin (D).

Table 1. Comparison of the outcomes among the case of pure angiosarcoma, angiosarcoma with MCT, angiosarcoma with epithelial tumor and the present case

	Age (yr)	Stage	Follow-up	Status
Present case (n=1)	54	IV	10 mo	AD (peritoneal extension of angiosarcoma and pleural metastasis of mucinous carcinoma)
Pure angiosarcoma (n=20)	19-67 (mean, 33)	I (n=10) III (n=3) VI (n=4) No record (n=3)	"Died quickly"-9 yr	DOD (n=9) NED (n=9) No record (n=2)
a/w MCT (n=4)	30-40 (mean, 31)	I (n=3) III (n=1)	2-30 mo	DOD (n=3) NED (n=1)
a/w epithelial tumor (n=3)	37-77 (mean, 53)	IV (n=1) No record (n=2)	2 mo	DOD (n=2) (lost to follow-up presumed DOD [n=1]) No record (n=1)

MCT, mature cystic teratoma; AD, alive with disease; DOD, dead of disease; NED, no evidence of disease; a/w, associated with.

intraepithelial carcinoma, and even a focus of microinvasion. In the center of the tumor, a nodule of malignant angiosarcoma colliding with mucinous tumor was found. We believe this case is the fourth case of an ovarian collision tumor of angiosarcoma and surface epithelial tumor. According to the previous reports, the mean age of the patients with primary angiosarcoma associ-

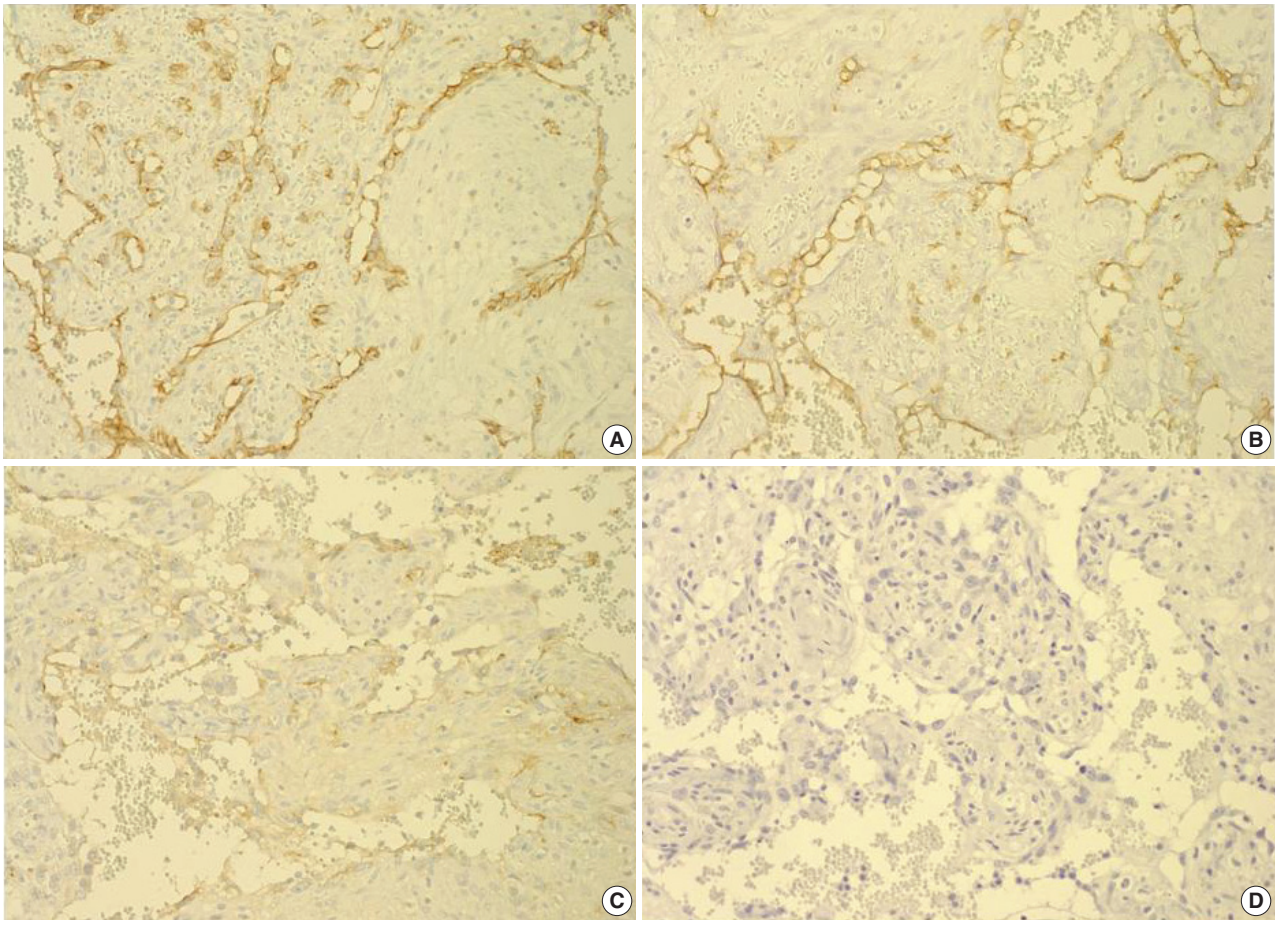

Fig. 3. The tumor cells of the angiosarcoma area are strongly positive for CD31 (A), CD34 (B) and factor VIII-related antigen (C). They are negative for cytokeratin (D).

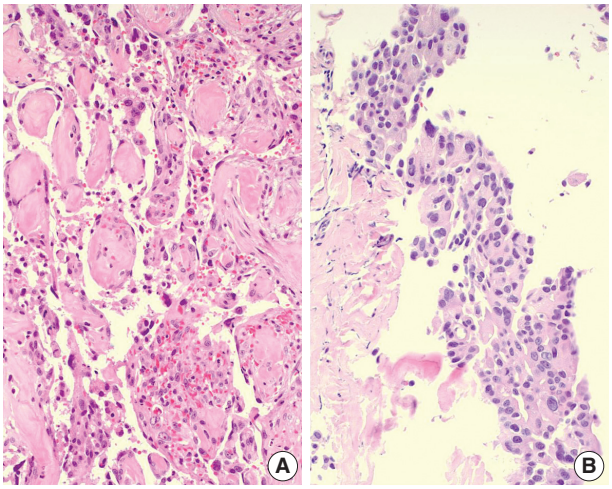

Fig. 4. (A) The peritoneal metastatic focus is composed of infiltrating angiosarcoma while (B) the biopsy of the pleural metastasis confirms the metastasis of the mucinous carcinoma.

ated with surface epithelial tumor is much older than that of the patients with pure angiosarcoma or the patients with angiosarcoma combined with teratoma. Primary ovarian angiosarcomas usually present at an advanced stage with a poor prognosis. There is no significant difference of the outcomes between pure angiosarcomas or angiosarcomas associated with other tumor types. Various chemotherapy regimens have been tried, but the optimal regimen is still unknown. The prognosis was generally poor with more than half of the patients dying of the disease within 30 months, according to the literature (Table 1). Fourteen out of 27 patients died of the disease. Among those 14 cases, 1 was lost to follow up, but the patient was presumed to have died of the disease, and the other 13 died either quite early after the diagnosis or up to 30 months later. The mean survival time was 8.35 months. The prognosis of our present case, which showed peritoneal extension of the angiosarcoma and pleural metastasis of the mucinous carcinoma, appears to be a bit grim.

Our report is the fourth case of an ovarian collision tumor of

angiosarcoma and surface epithelial tumor, and it is a well-documented example although the follow-up period is relatively short. We report here on this rather unique case of mucinous borderline tumor with intraepithelial and microinvasive carcinoma, and the sarcomatous component metastasized to the peritoneum and the carcinomatous component metastasized to the pleura.

REFERENCES

1. Quesenberry CD, Li C, Chen AH, Zweizig SL, Ball HG 3rd. Primary angiosarcoma of the ovary: a case report of Stage I disease. Gynecol Oncol 2005; 99: 218-21.
2. Nucci MR, Krausz T, Lifschitz-Mercer B, Chan JK, Fletcher CD. Angiosarcoma of the ovary: clinicopathologic and immunohistochemical analysis of four cases with a broad morphologic spectrum. Am J Surg Pathol 1998; 22: 620-30.
3. Jylling AM, Jørgensen L, Hølund B. Mucinous cystadenocarcinoma in combination with hemangiosarcoma in the ovary. Pathol Oncol Res 1999; 5: 318-9.
4. Ongkasuwan C, Taylor JE, Tang CK, Prempree T. Angiosarcomas of the uterus and ovary: clinicopathologic report. Cancer 1982; 49: 1469-75.
5. Furihata M, Takeuchi T, Iwata J, *et al.* Primary ovarian angiosarcoma: a case report and literature review. Pathol Int 1998; 48: 967-73.
6. Jha S, Chan KK, Poole CJ, Rollason TP. Pregnancy following recurrent angiosarcoma of the ovary: a case report and review of literature. Gynecol Oncol 2005; 97: 935-7.
7. Cunningham MJ, Brooks JS, Noumoff JS. Treatment of primary ovarian angiosarcoma with ifosfamide and doxorubicin. Gynecol Oncol 1994; 53: 265-8.
8. den Bakker MA, Ansink AC, Ewing-Graham PC. "Cutaneous-type" angiosarcoma arising in a mature cystic teratoma of the ovary. J Clin Pathol 2006; 59: 658-60.
9. Lifschitz-Mercer B, Leider-Trejo L, Messer G, Peyser MR, Czernobilsky B. Primary angiosarcoma of the ovary: a clinicopathologic, immunohistochemical and electronmicroscopic study. Pathol Res Pract 1998; 194: 183-7.
10. Nara M, Sasaki T, Shimura S, *et al.* Diffuse alveolar hemorrhage caused by lung metastasis of ovarian angiosarcoma. Intern Med 1996; 35: 653-6.
11. Nielsen GP, Young RH, Prat J, Scully RE. Primary angiosarcoma of the ovary: a report of seven cases and review of the literature. Int J Gynecol Pathol 1997; 16: 378-82.
12. Bradford L, Swartz K, Rose S. Primary angiosarcoma of the ovary complicated by hemoperitoneum: a case report and review of the literature. Arch Gynecol Obstet 2009 Apr 25 [Epub]. DOI: 10.1007/s00404-009-1092-2.
13. Patel T, Ohri SK, Sundaresan M, *et al.* Metastatic angiosarcoma of the ovary. Eur J Surg Oncol 1991; 17: 295-9.
14. Pillay K, Essa AS, Chetty R. Borderline serous cystadenocarcinoma with coexistent angiosarcoma: an unusual form of ovarian carcinosarcoma. Int J Surg Pathol 2001; 9: 317-21.
15. Platt JS, Rogers SJ, Flynn EA, Taylor RR. Primary angiosarcoma of the ovary: a case report and review of the literature. Gynecol Oncol 1999; 73: 443-6.
16. Twu NF, Juang CM, Yeng MS, Lu CJ, Lai CZ, Chao KC. Treatment of primary pure angiosarcoma of ovary with multiple lung metastases: a case report. Eur J Gynaecol Oncol 1999; 20: 383-5.
17. Davidson B, Abeler VM. Primary ovarian angiosarcoma presenting as malignant cells in ascites: case report and review of the literature. Diagn Cytopathol 2005; 32: 307-9.
18. Vavilis D, Papadopoulos N, Agorastos T, Efstratiou I, Kommoss F, Bontis IN. Primary ovarian angiosarcoma: review of the literature and report of a case with coexisting chylothorax. Eur J Gynaecol Oncol 2007; 28: 287-9.
19. Kim J, Park JB, Kang HJ. A case of mucinous borderline ovarian tumor associated with undifferentiated sarcoma with angiosarcoma-like appearance. Korean J Obstet Gynecol 2007; 50: 1039-43.