Case Reports

Primary peritoneal low-grade serous carcinoma forming a mass in the colon mimicking a colonic primary carcinoma: a case report

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Summary

Primary carcinomas of Müllerian origin involving the colon is not an uncommon phenomenon, with most cases reportedly associated with endometriosis. On the other hand, a primary peritoneal low-grade serous carcinoma presenting as a dominant mass in the colon and causing clinical symptoms mimicking a primary colonic carcinoma has not been reported in the literature to the best of the authors' knowledge. A case of a 66-year-old female patient who presented clinically with rectal bleeding and a rectosigmoid mass is described. The final histologic examination revealed a peritoneal low-grade serous carcinoma forming a dominant mass in the rectosigmoid colon. Of particular interest was a microscopic spectrum of serous epithelial proliferation in the peritoneal cavity and lymph nodes with morphologic features reminiscent of non-invasive and invasive implants in ovarian borderline serous tumors, which most likely denoted the precursors of the tumor in the colon.

Key words: Peritoneal; Low-grade serous carcinoma; Colonic mass.

Introduction

The colon is not uncommonly involved by neoplasms of Müllerian differentiation, with most of the cases secondary to direct invasion or indirect dissemination by a tumor from the adjacent gynecologic organs. There are however rare cases of primary tumors of Müllerian differentiation arising in the colon [1, 2], with the vast majority of these cases associated with foci of endometriosis located in the colonic wall. In the current case report, the authors describe an extraordinary case of a primary peritoneal low-grade serous carcinoma presenting with clinical symptoms of a colorectal carcinoma. The dominant mass was located in the rectosigmoid colon and was associated with a microscopic spectrum of peritoneal and nodal serous epithelial proliferation exhibiting histologic features reminiscent of non-invasive and invasive implants of the more common ovarian borderline serous tumors. To the best of the authors' knowledge, this case is the first report of a primary peritoneal low-grade serous carcinoma predominantly involving the colon and clinically presenting with rectal bleeding as the first manifestation of the disease.

Case Report

The patient, was a 66-year-old Caucasian female who presented at an outside hospital with a history of rectal bleeding. The outside colonoscopy revealed a friable mass in the rectosigmoid colon. Biopsy of the rectosigmoid mass demonstrated an adenocarcinoma with histologic and immunohistochemical features suggestive of an ovarian carcinoma involving the colon. The patient was referred to the hospital in November 2010 and underwent exploratory laparotomy with resection of the rectosigmoid colon, left salpingo-oophorectomy, omentectomy, appendectomy, pelvic and aortic lymphadenectomy, and peritoneal staging biopsies. Intraoperative findings indicated a mass in the rectosigmoid colon and possibly small-volume disease around the appendix and on the ascending colon mesentery. No additional evidence of disease was visible in the abdominal peritoneal cavity. The omentum and left ovary were unremarkable at the time of the surgery. After surgery, the patient underwent a chemotherapy protocol for serous carcinoma including six cycles of carboplatin and taxol. At the last follow-up in January 2012, the patients was alive and did not show any clinical or radiologic evidence of tumor recurrences.

On gross inspection, the rectosigmoid colon demonstrated a 5 x 4 x 2 cm mass involving all layers of the colon and invading the pericolic adipose tissue. The left ovary and Fallopian tube, omentum, appendix, and the resected lymph nodes were grossly unremarkable.

The colonic tumor was characterized by clusters and nests of relatively monotonous and eosinophilic cuboidal cells with mild to moderate cytologic atypia arranged in papillary architecture (Figures 1A and 1B). Numerous psammoma bodies were identified in the tumor. The neoplastic nests and clusters were surrounded by retraction clefts. The mitotic activity varied between five to ten mitoses per ten high-power fields. The histologic findings were consistent with those of a low-grade serous carcinoma based on the two-tier grading system for serous carcinomas proposed by Malpica *et al*. [3]. Nests of non-invasive low-grade serous proliferation were identified on the serosa of the colon, adjacent to the tumor (Figure 1C). Although grossly unremarkable, histologic examination of the omentum demonstrated a spectrum of serous epithelial proliferation. The vast majority of the serous proliferation displayed morphologic features reminiscent of non-invasive implants in the context of borderline serous tumors of the ovary (Figure 2A). Some foci measured up to 0.3 cm and exhibited desmoplastic reaction, an increased ratio of epithelial proliferation to stroma, and a deep invasion into the omentum consistent with invasive implant-like foci of serous neoplasms (Figure 2B). There were several positive pericolic lymph nodes that contained nests and clusters of serous neoplastic cells associated with a desmoplastic reaction (Figure 2C). On the other hand, two positive inguinal lymph nodes exhibited only rare nests of serous neoplastic cells adja-

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Fig. 1A

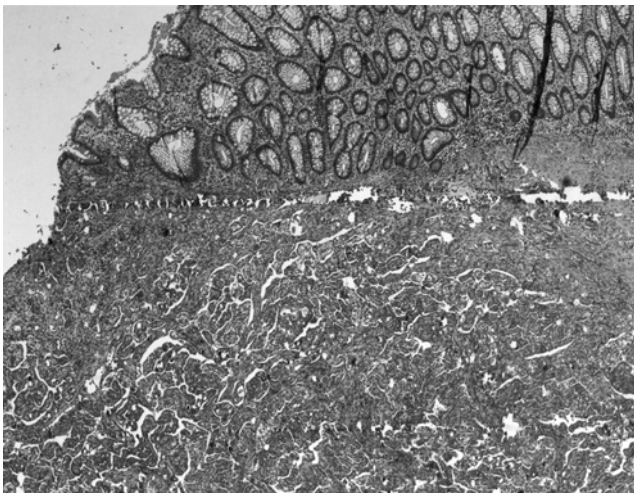

Fig. 1B

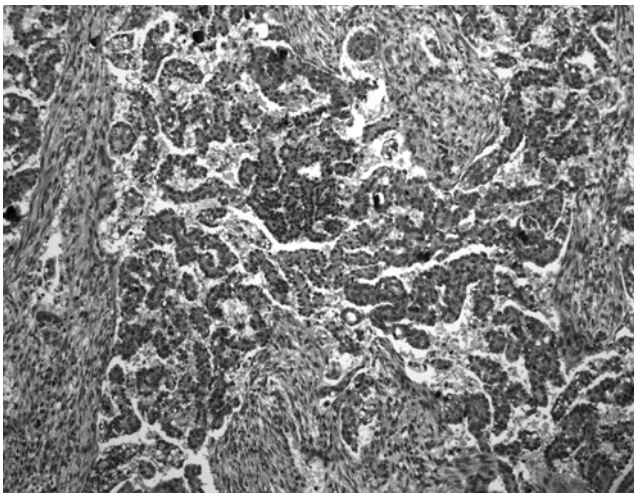

Fig. 1C

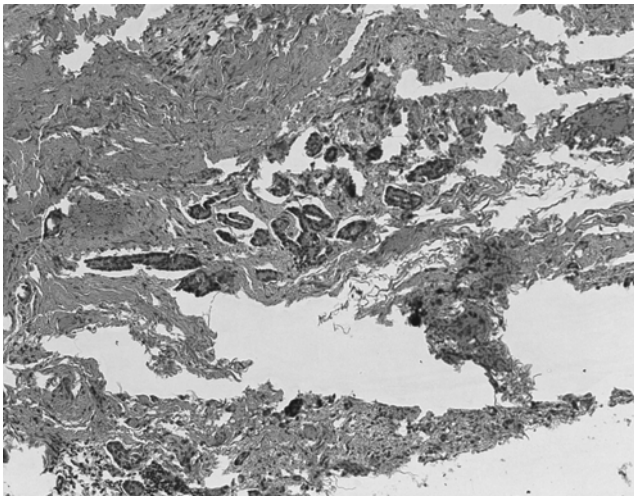

Figure 1. — Classic histologic features of a low-grade serous carcinoma involving the colonic wall (A and B) and a microscopic focus of non-invasive serous proliferation on the adjacent serosa of the colon (C, x100).

cent to benign epithelial inclusion cysts/endosalpingiosis without any desmoplastic reactions (Figure 2D). Immunohistochemical studies revealed that the tumor cells were strongly positive for cytokeratin 7 (Figure 3A), Estrogen receptor, and WT-1 (Figure 3B). Although the neoplastic cells were immunoreactive for cytokeratin 20 (Figure 3C), they were negative for Cdx-2. The immunohistochemical results further supported a serous carcinoma involving the colon.

Discussion

Tumors of Müllerian origin involving the gastrointestinal (GI) tract, particularly the colon, is not an infrequent occurrence. These tumors involve the colon in two major pathways. The most common pathway is direct or indirect spreading of tumors from an adjacent gynecologic organs or peritoneal cavity to the colon. Less commonly are primary neoplasms of Müllerian origin that arise from foci of endometriosis or endosalpingiosis located in the colonic wall [1, 2]. However, a primary peritoneal low-grade serous carcinoma presenting as a colonic tumor without any visible extracolonic mass is until now an unreported phenomenon.

With the advancements in colonic endoscopy, more tumors of Müllerian differentiation are diagnosed preoperatively as in this case. Because the preoperative biopsy revealed a possible ovarian carcinoma involving the colon, it was suspected at the time of the surgery that the tumor was most likely an endometriosis-related colonic carcinoma. Unexpectedly, the histologic examination revealed a low-grade serous carcinoma in the colon without any other macroscopically obvious mass in the ovaries and omentum. The omentum, however, demonstrated a spectrum of serous epithelial proliferation with morphologic features reminiscent of non-invasive and invasive implants commonly described in borderline serous tumors of the ovary. In the absence of a dominant mass in the omentum and ovaries, it is highly unlikely that the serous carcinoma in the colon represented a metastasis from an adjacent gynecologic organ. Extensive histologic evaluation of the colon did not reveal any foci of endometriosis, which was not unexpected since serous carcinomas do not belong to the endometriosis-related carcinomas. As a matter of fact, in a recent study of endometriosis-associated intestinal tumors with a review of the literature, no case of low-grade serous carcinoma was documented in the series [1]. Therefore, the low-grade serous carcinoma in the colon in the current case report was most likely related to the background of serous

Fig. 2A

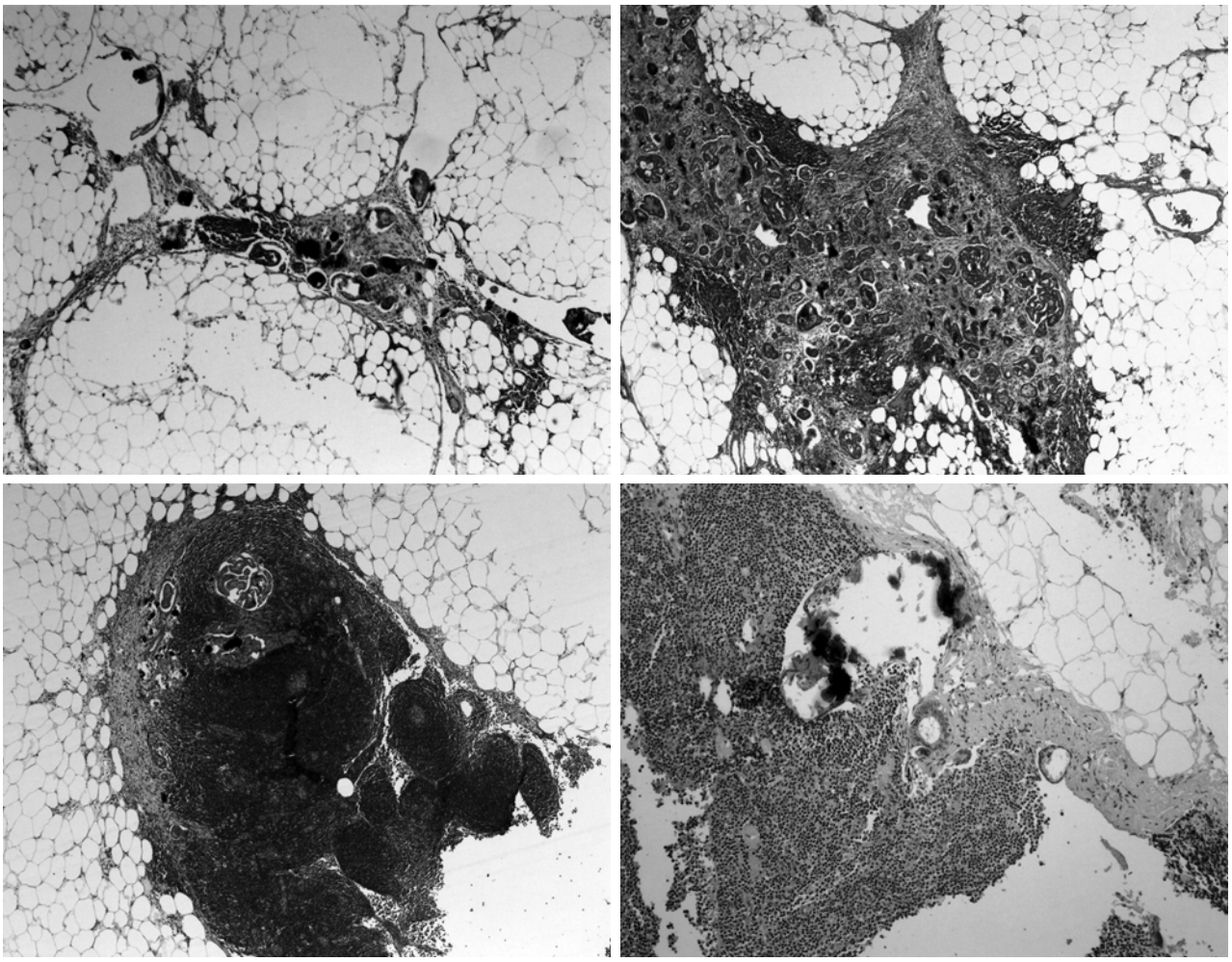

Fig. 2B

Fig. 2C

Fig. 2D

Figure 2. — A microscopic non-invasive (A) and a 0.3 cm invasive (B) focus of implant-like serous proliferation in the omentum. Nests of serous neoplastic cells associated with a desmoplastic reaction in a pericolic lymph node (C). An inguinal lymph node showing a small focus of endosalpingiosis and clusters of serous cell proliferation (D).

proliferation in the omentum and lymph nodes. It is reasonable to postulate that the serous carcinoma in the colon represented the final tumor progression step of the multifocal serous proliferative process in the abdominal cavity, which probably began as a non-invasive implant-like foci, with one focus eventually transformed into the low-grade serous carcinoma of the colon. Based on these considerations, the tumor in the colon is best classified as a primary peritoneal low-grade serous carcinoma. Also of interest was the discrepancy in the morphology of the microscopic foci of serous proliferation in the lymph nodes along the colon and those in the inguinal lymph nodes. Whereas those in the lymph nodes along the colon were associated with a desmoplastic reaction and therefore most likely represented true metastases, the serous nests in the inguinal lymph node appeared to arise from benign epithelial inclusion cysts/endosalpingiosis and hence were more likely independent foci of serous proliferation. In agreement with this idea is a recent study from the MD Anderson Cancer Center, which demonstrated that "in up to a third of patients with ovarian serous tumors of low malignant potential and lymph node involvement, nodal foci of serous tumor of low malignant potential may derive independently from nodal endosalpingiosis due to a field effect" [4]. The dual immunoreactivity of the neoplastic cells for both cytokeratin 7 and cytokeratin 20 in the current case report is unusual but has been reported in the literature. Groisman *et al*. [5] detected weak to strong staining for cytokeratin 20 in up to 67% of their cohort of serous carcinomas.

A recent study of 13 cases of "carcinoma of Müllerian origin presenting as colorectal cancer" revealed a spectrum of neoplasms including endometrioid carcinoma, mixed papillary serous and endometrioid carcinoma, undifferentiated carcinoma, and malignant mixed Müllerian tumor [1]. Endometriosis was identified in nine out of 13 cases. One case of malignant mixed Müllerian tumor was associated with endosalpingiosis. Therefore, the authors preferred the term "carcinoma of Müllerian origin" instead of "endometriosis associated carcinoma" for this type of neoplasms in the colon. Based on that conceptual model, this current case report of a peritoneal

Fig. 3A

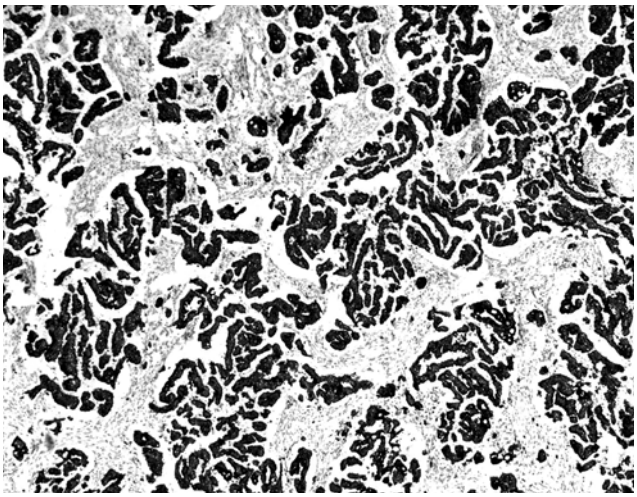

Fig. 3B

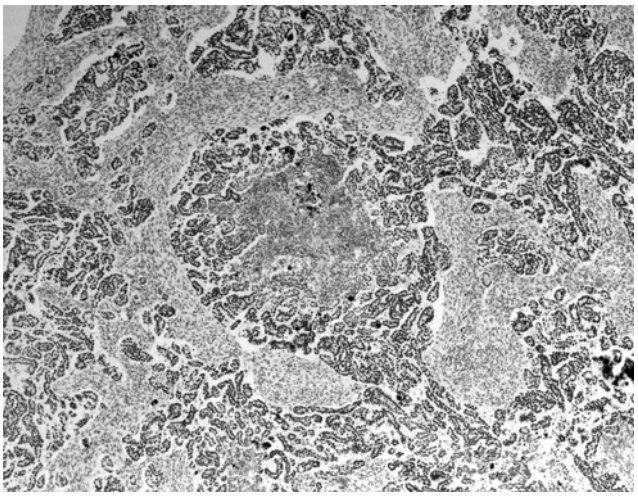

Fig. 3C

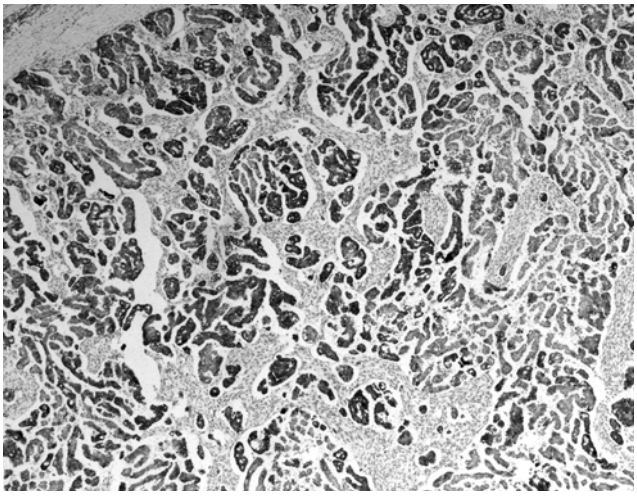

Figure 3. — Immunohistochemistry showing that the neoplastic cells are positive for cytokeratin 7 (A), Cytokeratin 20 (B), and WT-1 (C).

low-grade serous carcinoma primarily involving the colon broadens the spectrum of "carcinoma of Müllerian origin presenting as colorectal cancer".

Because the pathologic staging, treatment, and prognosis of a primary carcinoma of Müllerian differentiation arising in the colon differ significantly from those of a conventional primary colonic adenocarcinoma, or a metastatic carcinoma of Müllerian origin from an adjacent gynecologic organ to the colon, an accurate diagnosis and staging of a tumor of Müllerian origin involving the colon are critical for clinical managements. From a therapeutic standpoint, this tumor should be considered as a primary peritoneal low-grade serous carcinoma with an unusual clinical manifestation as a colonic tumor instead of the more common abdominopelvic mass and call for a proper chemotherapic protocol.

Conclusion

In summary, the authors report a case of a primary peritoneal low-grade serous carcinoma with clinical presentation mimicking a primary colonic cancer. The case underscores the importance of the awareness of such a rare phenomenon, not only from a diagnostic standpoint, but also in terms of therapeutic considerations.

References

[1] Yang Q., Wang H., Cho H.Y., Shen S.S.: "Carcinoma of müllerian origin presenting as colorectal cancer: a clinicopathologic study of 13 cases". *Ann. Diagn. Pathol*., 2011, *15*, 12.

[2] Kondi-Pafiti A., Spanidou-Carvouni H., Papadias K., Smyrniotis V.: "Malignant neoplasms arising in endometriosis: clinicopathological study of 14 cases". *Clin. Exp. Obstet. Gynecol*., 2004, *31*, 302.

[3] Malpica A., Deavers M.T., Lu K., Bodurka D.C., Atkinson E.N., Gershenson D.M., Silva E.G.: "Grading ovarian serous carcinoma using a two-tier system". *Am. J. Surg. Pathol*., 2004, *28*, 496.

[4] Djordjevic B., Clement-Kruzel S., Atkinson N.E. *et al*.: "Nodal endosalpingiosis in ovarian serous tumors of low malignant potential with lymph node involvement: a case for a precursor lesion". *Am. J. Surg. Pathol*., 2010, *34*, 144.

[5] Groisman G.M., Meir A., Sabo E.: "The value of Cdx2 immunostaining in differentiating primary ovarian carcinomas from colonic carcinomas metastatic to the ovaries". *Int. J. Gynecol. Pathol*., 2004, *23*, 52.

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