Clinical Case Reports Open Access   WILEY

A case of rectal metastasis of ovarian carcinoma diagnosed by endoscopic ultrasound-guided fine-needle aspiration: A case report and brief review of the literature (with videos)

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Abstract
When colorectal subepithelial lesions occur in ovarian carcinoma patients, EUS-FNA may help to diagnose colorectal metastasis, thereby guiding clinicians to select appropriate treatment and improve the overall outcome.

KEYWORDS
endoscopic ultrasound-guided fine-needle aspiration, ovarian carcinoma, rectal metastasis, subepithelial lesions

1 | INTRODUCTION

A 59-year-old woman with a history of ovarian cancer, total hysterectomy, bilateral adnexectomy, and adjuvant chemotherapy was found to have elevated CA125 on follow-up evaluation 2 years after treatment. CT revealed a lesion on the right side of the rectosigmoid junction, and colonoscopy showed a subepithelial rectal mass, but targeted biopsies were nonspecific. EUS-FNA of the rectal mass confirmed rectal metastases of ovarian cancer. The patient was treated with secondary cytoreductive surgery and chemotherapy. When colorectal subepithelial lesions occur in ovarian cancer patients, EUS-FNA may help to diagnose colorectal metastasis, thereby guiding clinicians to select appropriate treatment and to improve the overall outcome.

Endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA), as the name suggests, obtains specimens through puncturing the lesion and conducts pathology studies to confirm the nature, histological origin and pathological characteristics of lesions.[1] It has become a preferred minimally invasive method in diagnosing the small lesion of gastrointestinal tract and adjacent organs. Ovarian carcinoma

(OC) is a gynecological disease with high clinical incidence and has a biological characteristic of widely metastatic in the peritoneal cavity. More than 60% OC has already metastasized to other tissues at the time of diagnosis.[2] The common routes of metastasis in OC are peritoneal dissemination and direct invasion. Tumor cells can be implanted in the bowel serosa by both routes.[3,4] For this reason, when colorectal subepithelial lesions occur in OC patients, EUS-FNA may be helpful to suspect colorectal metastasis from OC, thereby guiding clinicians to stage the tumor accurately and select appropriate treatments.

2 | CASE REPORT

We present a female patient, 59-year-old, diagnosed in 2016 with OC. This patient underwent a total hysterectomy, a bilateral adnexectomy, and adjuvant chemotherapy. The postoperative pathology revealed the high-grade serous adenocarcinoma.

The patient's follow-up showed no abnormality until February 2018, when her serum CA125 level was elevated to 155 U/mL (normal, <35 U/mL). Meanwhile, the pelvic contrast-enhanced computed tomography (CT) demonstrated that the postoperative changes in ovarian cancer, a circular cystic space-occupying lesion was on the right side of rectosigmoid junction and localized rectal wall was thickening. (Figure 1). The lesion showed moderately uneven enhancement, and its margin was not clear. Given the patient's history of OC, we cannot rule out the possibility of rectal metastasis. Therefore, the patient underwent a colonoscopy and revealed a subepithelial lesion with smooth surface 8-10 cm from the anal margin, whose biopsy results were nonspecific (Figure 2). Subsequently, EUS-FNA was performed using a 22-gauge needle (EchoTip® Ultra needle; Cook Medical; Video S1). Echoendoscope (EG-530; Fuji Film Ltd.) showed that a medium-low-mixed echo mass approximately 22*25 mm in size was located in the pelvic cavity and pressed the rectal wall. The boundary between this mass and the rectal wall was unclear (Figure 3). These specimens were processed by rapid on-site cytological evaluation (ROSE), liquid-based cytology, cell block, and immunohistochemical staining. Pathological result demonstrated that tumor cells were atypia obviously and some of the cells were arranged in a serous papillary arrangement (Figure 4A-C). Immunohistochemical reactions showed positivity for CK7, CK125, WT1, PAX-8, and negativity for CK20 (Figure 4D-F). Considering the history of OC, this rectal subepithelial lesion was diagnosed as a metastatic ovarian serous adenocarcinoma. Finally, this patient received secondary cytoreductive surgery (resection of mass and adjacent intestine, then perform intestinal anastomosis). Postoperative pathological findings confirmed ovarian serous adenocarcinoma and the margin of mass was negative. The patient received second-line chemotherapy (docetaxel and carboplatin) after surgery in another hospital. Through
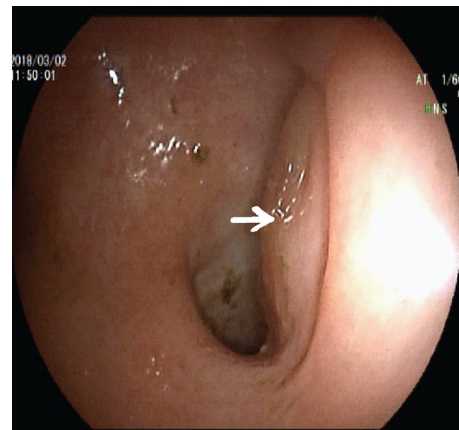

FIGURE 2 A colonoscopy revealed a rectal subepithelial lesion with smooth surface 8-10 cm from the anal margin (arrow)

FIGURE 1 Contrast-enhanced CT showed the localized rectal wall thickening (long arrow). A circular cystic space-occupying lesion was on the right side of rectosigmoid junction (short arrow)
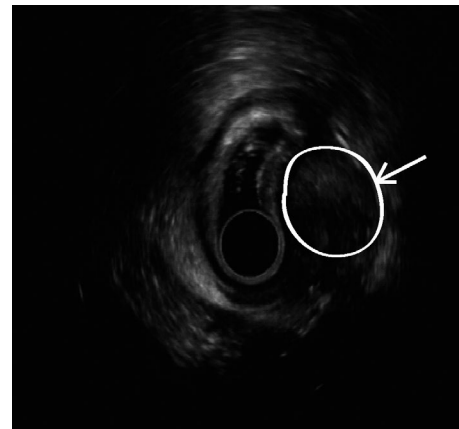

FIGURE 3 Echoendoscope showed that a medium-low-mixed echo mass approximately 22*25 mm in size was located in the pelvic cavity (arrow)
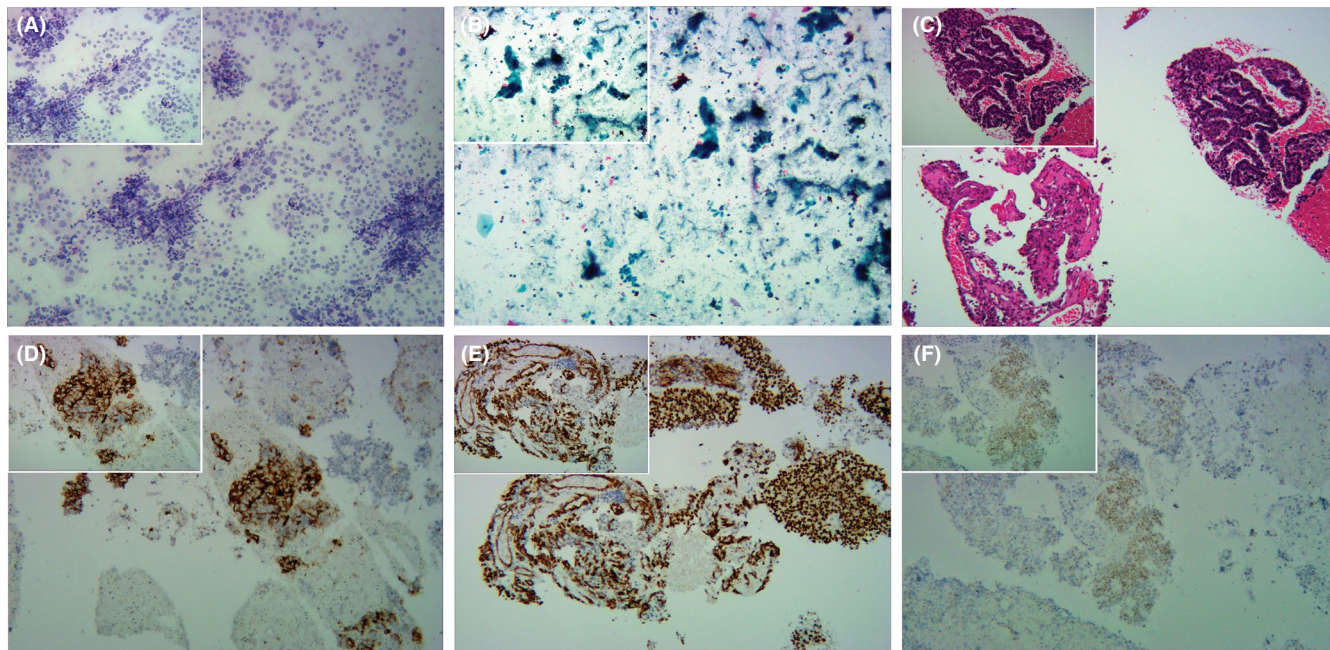
FIGURE 4 Photomicrograph and Immunohistochemical staining of the FNA specimen. A, Rapid on-site cytological evaluation (Giemsa stain, ×100); inset (×200). B, Liquid-based cytology (Papanicolaou stain, ×100); inset (×200). C, Cell block (H&E, ×100); inset (×200). D, Positive anti-CA125 staining (×100); inset (×200). E, Positive anti-WT1 staining (×100); inset (×200). F, Positive anti-PAX-8 staining (×100); inset (×200)

telephone follow-up, the patient stopped chemotherapy one year ago, the current quality of life is good.

3 | DISCUSSION

Ovarian carcinoma is the second-most common gynecologic cancer and has a biological characteristic of widely metastasis.[5,6] Therefore, patients with OC must make a regular long follow-up because early detection of recurrent OC is of great significance in identifying patients who may benefit from second-look surgery or in whom chemotherapy therapy should be planned.

To improve the diagnostic rate of recurrent OC, clinicians need to understand its routine metastatic ways first. The metastasis of OC can occur in four different ways: peritoneal dissemination, direct invasion, lymphatic metastasis, and hematogenous metastasis. The peritoneal dissemination and direct invasion are the most frequent ones.[3] Concretely speaking, exfoliated tumor cells will be carried by the physiological movement of the peritoneal fluid to all organs in the peritoneal cavity, including the diaphragms, bowel serosa, omentum, and the entire peritoneum. In addition, tumor cells can metastasize by direct extension from the ovary to neighbor pelvic organs, such as colorectum, uterus, and fallopian tubes.[7] It can be seen that the serosa of colorectum becomes a common implantation site of tumor cells. Mahdi et al reported that the colorectal metastasis rate of OC was 25%-78%, and the inferior part of the sigmoid colon and the superior part of rectum are invaded easily by left ovarian cancers.[8] In this

case, the incomplete rectal serosa orient us toward peritoneal dissemination or direct invasion. Currently, OC has been the most frequent primary tumor to invade the colorectum in females.[9] As we all know, metastatic colorectal tumor poses a great threat to the health of patients because it may cause complications such as intestinal perforation, acute peritonitis, and intestinal fistula. Without active intervention, patients can die of intestinal obstruction in the short term.[10] Therefore, early diagnosis and treatment of metastatic colorectal tumor are crucial to prolong the survival time of patients.

According to the NCCN ovarian cancer clinical practice guideline (version 2020), the follow-up examinations of postoperative OC patients should include pelvic examination, serum CA-125 or other tumor markers, chest/abdominal/pelvic CT, MRI, PET/CT, or PET (skull base to mid-thigh).[11] Although serum CA-125 has been proven to be a sensitive marker for tumor recurrence, it does not provide information on the location, number, and size of metastatic foci.[12-14] If serum CA125 increases abnormally during the follow-up, as reported in this case, additional imaging examination will be necessary. Taking account of the cost-effectiveness of surveillance techniques, CT and MRI become the preferred methods for patients treated for OC. Gu et al made a meta-analysis of 34 relevant literatures from 1995 to 2007 to evaluate the diagnostic ability of imaging examinations for detection of recurrent OC. This article showed the pooled sensitivity, specificity, and the area under the curve (AUC) of CT were 0.79 (95% CI: 0.74-0.84), 0.84 (95% CI: 0.76-0.90), and 0.8845. The pooled sensitivity, specificity, and AUC of MRI, respectively, were 0.75 (95% CI: 0.69-0.80), 0.87 (95%

CI: 0.70-0.85), and 0.7955.[15] Although there was no statistical difference between CT and MRI in terms of its sensitivity or specificity ($P > .05$), MRI had the advantage that it does not involve radiation exposure, and that it is more sensitive to detect the lesions on bowel serosa.[15,16] However, no matter how advanced imaging technology is, it cannot be compared with pathological diagnosis because it cannot give the surgeon an absolutely clear indication of surgery. Therefore, EUS-FNA seemed to be a more useful supplement for OC patients with suspected colorectal metastasis.

Endoscopic ultrasound-guided fine-needle aspiration has been widely used in the clinic since its first report in 1992.[17] It could replace many invasive diagnostic procedures, such as mediastinoscopy, laparoscopy, and laparotomy or thoracotomy, and opens up a new way to distinguish the benign or malignant nature of the lesion. So, what are the advantages of diagnosing metastatic colorectal tumors with EUS-FNA? First, EUS is of high sensitivity. It can judge the infiltration degree of the tumor according to the integrity of each layer of the intestinal wall. The endosonographer first injects no air-water into the bowel where the lesion is located so that fully extending the bowel's wall. This can avoid the interference of intestinal cavity collapse, and the structure of each layer of intestinal wall and surrounding tissues can be observed more clearly. After locating suspicious lesions, the endosonographer can explore the lesions by using higher ultrasound frequency to further improve the sensitivity. Second, FNA has high safety. Under the guidance of ultrasound, the puncture needle can avoid the blood vessels and important organs, and choose the safest route puncture. The research showed that the incidence of complications in EUS-FNA was only 0%-2.2%, and most complications could be cured by conservative treatment.[18] Finally, EUS-FNA can obtain specimens by fine-needle aspiration for cytological, histological, and immunohistochemistry analysis. Itonaga et al[19] demonstrated that combining multiple pathological methods could maximize specimens' utilization and improve diagnostic accuracy as much as possible. On the premise of sufficient specimens, our hospital can provide four methods (smear cytology, liquid-based cytology, cell block, and histopathology) to process specimens. In our case, this patient had a history of OC. The immunohistochemical staining of cell block showed CK7, CK125, WT1, PAX-8 positive, and CK 20 negative, which is usually the case with ovarian serous adenocarcinoma.

EUS-FNA also has several limitations. First, EUS has high requirements for endoscopists and FNA has high requirements for pathologists, so the popularity of EUS is not as wide as that of CT/MRI. Second, the detection range of EUS is limited and can only reach the area closer to the intestinal wall. The last but not least, the failure rate of EUS will be high when the intestine is so narrow that the ultrasound probe is difficult to pass.

To date, there are fewer reports about diagnosis of rectal metastasis from OC by EUS-FNA, its value is rarely known by people. When intestinal space-occupying lesions occur in OC patients, it is important to identify which one is the primary tumor. With the help of EUS-FNA, doctors can accurately identify the site of intestinal involvement and confirm the pathological characteristics of lesions. It is of great significance for selecting appropriate treatment and improving the overall outcome.

CONFLICTS OF INTEREST
The authors have no conflicts of interest to declare.

AUTHOR CONTRIBUTIONS
DH: conceived the idea for this case report. JH: drafted the manuscript. WW and GC: performed the endoscopic ultrasound-guided fine-needle aspiration and macroscopically assessed the EUS-FNA specimens. LX: provided rapid on-site cytological evaluation, explained all pathological results and selected typical pathologic figures. LX and WT: revised the manuscript professionally.

ETHICAL APPROVAL
Ethics approval was not required for this article.

DATA AVAILABILITY STATEMENT
Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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REFERENCES
1. Polkowski M, Jenssen C, Kaye P, et al. Technical aspects of endoscopic ultrasound (EUS)-guided sampling in gastroenterology: European Society of Gastrointestinal Endoscopy (ESGE) Technical Guideline – March 2017. *Endoscopy*. 2017;49(10):989-1006.
2. Thomakos N, Diakosavvas M, Machairiotis N, et al. Rare distant metastatic disease of ovarian and peritoneal carcinomatosis: a review of the literature. *Cancers*. 2019;11(8):1044.
3. Lengyel E. Ovarian cancer development and metastasis. *Am J Pathol*. 2010;177(3):1053-1064.
4. Seidman JD, Kurman RJ. Pathology of ovarian carcinoma. *Hematol Oncol Clin North Am*. 2003;17(4):909-925.

5. Coburn SB, Bray F, Sherman ME, et al. International patterns and trends in ovarian cancer incidence, overall and by histologic subtype. *Int J Cancer*. 2017;140(11):2451-2460.

6. Doubeni CA, Doubeni AR, Myers AE. Diagnosis and management of ovarian cancer. *Am Fam Physician*. 2016;93(11):937-944.

7. Kono M, Nagami Y, Ominami M, et al. A metastatic gastric tumor from ovarian cancer. *Intern Med*. 2018;57(3):345-349.

8. Mahdi H, Gojayev A, Buechel M, et al. Surgical site infection in women undergoing surgery for gynecologic cancer. *Int J Gynecol Cancer*. 2014;24(4):779-786.

9. Trastour C, Rahili A, Schumacker C, et al. Hematogenous rectal metastasis 20 years after removal of epithelial ovarian cancer. *Gynecol Oncol*. 2004;94(2):584-588.

10. Heng S, Hardy J, Good P. A retrospective audit on usage of Diatrizoate Meglumine (Gastrografin((R))) for intestinal obstruction or constipation in patients with advanced neoplasms. *Palliat Med*. 2018;32(1):294-298.

11. Armstrong DK, Alvarez RD, Bakkum-Gamez JN, et al. Ovarian Cancer, Version 2.2020, NCCN Clinical Practice Guidelines in Oncology. *J Natl Compr Canc Netw*. 2021;19(2):191-226.

12. Clarke T, Galaal K, Bryant A, et al. Evaluation of follow-up strategies for patients with epithelial ovarian cancer following completion of primary treatment. *Cochrane Database Syst Rev*. 2014;(9):CD006119.

13. Goonewardene TI, Hall MR, Rustin GJS. Management of asymptomatic patients on follow-up for ovarian cancer with rising CA-125 concentrations. *Lancet Oncol*. 2007;8(9):813-821.

14. Patsner B, Orr JW, Mann WJ, et al. Does serum CA-125 level prior to second-look laparotomy for invasive ovarian adenocarcinoma predict size of residual disease? *Gynecol Oncol*. 1990;38(3):373-376.

15. Gu P, Pan LL, Wu SQ, et al. CA 125, PET alone, PET-CT, CT and MRI in diagnosing recurrent ovarian carcinoma: a systematic review and meta-analysis. *Eur J Radiol*. 2009;71(1):164-174.

16. Gadducci A, Cosio S. Surveillance of patients after initial treatment of ovarian cancer. *Crit Rev Oncol Hematol*. 2009;71(1):43-52.

17. Vilmann P, Jacobsen GK, Henriksen FW, et al. Endoscopic ultrasonography with guided fine needle aspiration biopsy in pancreatic disease. *Gastrointest Endosc*. 1992;38(2):172-173.

18. Al-Haddad M, Wallace MB, Woodward TA, et al. The safety of fine-needle aspiration guided by endoscopic ultrasound: a prospective study. *Endoscopy*. 2008;40(3):204-208.

19. Itonaga M, Murata SI, Hatamaru K, et al. Diagnostic efficacy of smear plus liquid-based cytology for EUS-FNA of solid pancreatic lesions: a propensity-matched study. *Medicine (Baltimore)*. 2019;98(19):e15575.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

How to cite this article: Huang J, Xu L, Cheng G, et al. A case of rectal metastasis of ovarian carcinoma diagnosed by endoscopic ultrasound-guided fine-needle aspiration: A case report and brief review of the literature (with videos). *Clin Case Rep*. 2021;9:2276–2280. https://doi.org/10.1002/ccr3.4011