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Case Report

Polypoid endometriosis of the ovary mimicking advanced ovarian carcinoma with extensive peritoneal metastases

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Abstract: Polypoid endometriosis of the ovary is a rare type of endometriosis and its imaging findings and clinical features may simulate malignancy. This report presents the medical history and clinical details of a 32-year-old woman with bilateral ovarian masses, a highly elevated serum CA-125 level, ascites, peritoneal dissemination, and rectosigmoid involvement. Computed tomography and magnetic resonance images showed bilateral complex cystic masses with large amounts of ascites, and multiple omental and peritoneal nodules, suspicious of ovarian malignancy. Widespread polypoid lesions were noted on bilateral ovaries, omentum, cul de sac, peritoneum, and rectosigmoid colon. Final pathologic findings led to a diagnosis of polypoid endometriosis. The patient was treated with gonadotropin-releasing hormone agonist and then with dienogest. The authors report a rare case of polypoid endometriosis of the ovary which appears very much alike to advanced ovarian carcinoma with extensive peritoneal metastases.

Keywords: Polypoid endometriosis, ovarian cancer, peritoneal dissemination

Introduction

Endometriosis is relatively common in women of reproductive age. It is considered as a tumor-like condition and is also associated with the development of ovarian malignancy [1]. Polypoid endometriosis is a rare presentation of endometriosis and its imaging findings and clinical features may simulate malignancy. Grossly, polypoid endometriosis forms large and often multiple polypoid masses with the appearance of endometrial polyps [2] and may involve various pelvic and peritoneal sites, such as rectosigmoid colon, ovary, uterine serosa, cervical and/or vaginal mucosa, ureter, fallopian tube, omentum, bladder, paraurethral and paravaginal soft tissues, and retroperitoneum [3].

Here, we report a rare case of polypoid endometriosis of ovary mimicking advanced ovarian carcinoma with extensive peritoneal metastases and describe its imaging findings and clinical features, including bilateral ovarian masses, ascites, disseminated peritoneal nodules, and a highly elevated serum CA-125 level.

Case presentation

A 32-year-old nulliparous woman presented with menorrhagia and dysmenorrhea. She was referred to our hospital due to bilateral ovarian masses with a highly elevated CA-125 level (1,046 U/ml). Ultrasonography of the abdomen depicted the bilateral masses, and abdominopelvic computed tomography (CT) revealed bilateral, complex solid, and cystic adnexal masses with focal calcifications; the right ovary measured 12 × 5 cm and the left 6 × 4 cm. Large amounts of ascites were noted in the perihepatic region, both paracolic gutters, and pelvic cavity, and omental masses were also observed. Non-enhanced magnetic resonance imaging (MRI) showed multiloculated cystic masses with solid portion in the pelvic cavity, along with poorly delineated, bilateral ovarian enlargement. Cystic components of the masses were

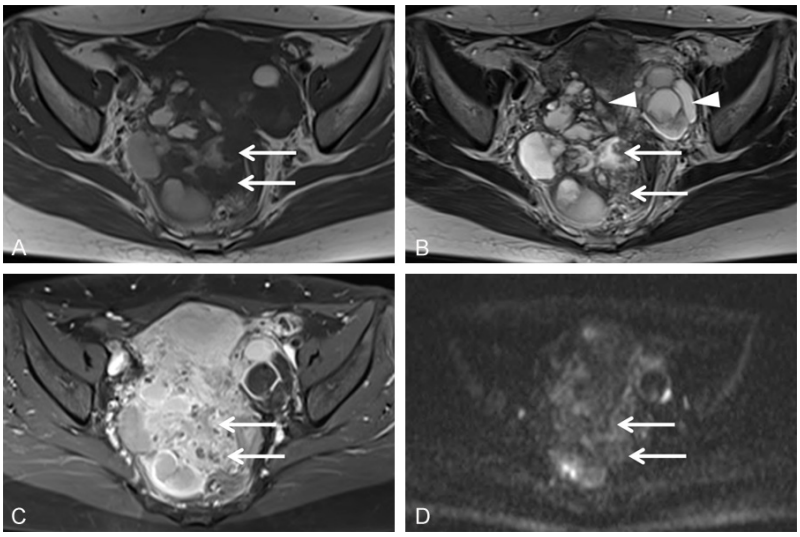

Figure 1. MRI findings of polypoid endometriosis. T1-weighted (A) and T2-weighted (B) images showing heterogeneous multiloculated cystic masses with hemorrhage and solid components (arrows) in both ovaries. Hypointense rims (arrowheads) surrounding masses were noted on T2-weighted images. (C) A gadolinium-enhanced fat-suppressed T1-weighted image showing well-enhanced solid components (arrows). (D) DW image obtained using a b value of 1,000 s/mm^2 showing no evidence of restricted diffusion in solid components (arrows).

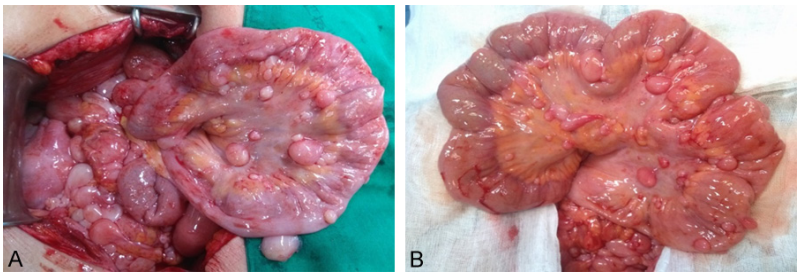

Figure 2. Gross findings of polypoid endometriosis. Intraoperative finding showing multiple nodules on bilateral ovaries and cul de sac (A), and on mesentery and bowel serosa (B).

mostly hypointense on T1-weighted images and hyperintense on T2-weighted images, but some cysts were hyperintense on T1-weighted images and hypointense on T2-weighted images, which is referred to as "shading," consistent with typical findings of endometriotic cysts (**Figure 1A**, **1B**). Rims surrounding the masses were hypointense on T2-weighted images. Multiloculated cystic and solid masses involving adnexa, uterus, rectosigmoid, small bowel, and bladder were demonstrated (**Figure 1A**, **1B**). Solid components of these masses exhibited strong enhancement on contrast-enhanced MR images, but no restricted diffusion on diffusion-weighted images (DWI) (**Figure 1C**, **1D**). Ascites and diffuse omental thickening were noted, but lymph node enlargement was not observed. The putative preoperative diagnosis based on CT and MRI findings was advanced ovarian carcinoma of both ovaries arising from endometriosis. Colonoscopy showed extraluminal compression at 15 cm above the anal verge.

Based on the above-mentioned imaging findings and the much elevated serum CA125 level, laparotomy was performed under a preoperative diagnosis of ovarian malignancy. Large amounts of hemorrhagic ascitic fluid and multiple, smooth nodules, or vesicles were found in and around the entire omentum, suggestive of peritoneal carcinomatosis, and a right adnexal mass was severely adherent to the posterior surface of the uterus, cul de sac, and retroperitoneum. Intraoperative frozen section of tissues from ovaries and omentum then revealed endometriosis. Right salpingo-oophorectomy, left ovarian cystectomy, and omentectomy were performed, and cul de sac, peritoneal masses, and rectosigmoid epiploicae were removed. Sigmoid segmental resection was also undertaken (**Figure 2**).

Grossly, both ovarian cystic lesions contained hemorrhage. In addition, multiple small, smooth, polypoid mass lesions arising from ovaries, omentum, and cul de sac were observed. The colonic segment showed multiple nodular masses on the serosal layer that were partially cystic and contained a blackish brown material. Microscopic findings revealed endometrial glands and stroma on all resected tissues. Polypoid nodules in mesentery, omentum, and rectosigmoid epiploicae also consisted of endometrial glands and stroma. Microscopic findings revea-

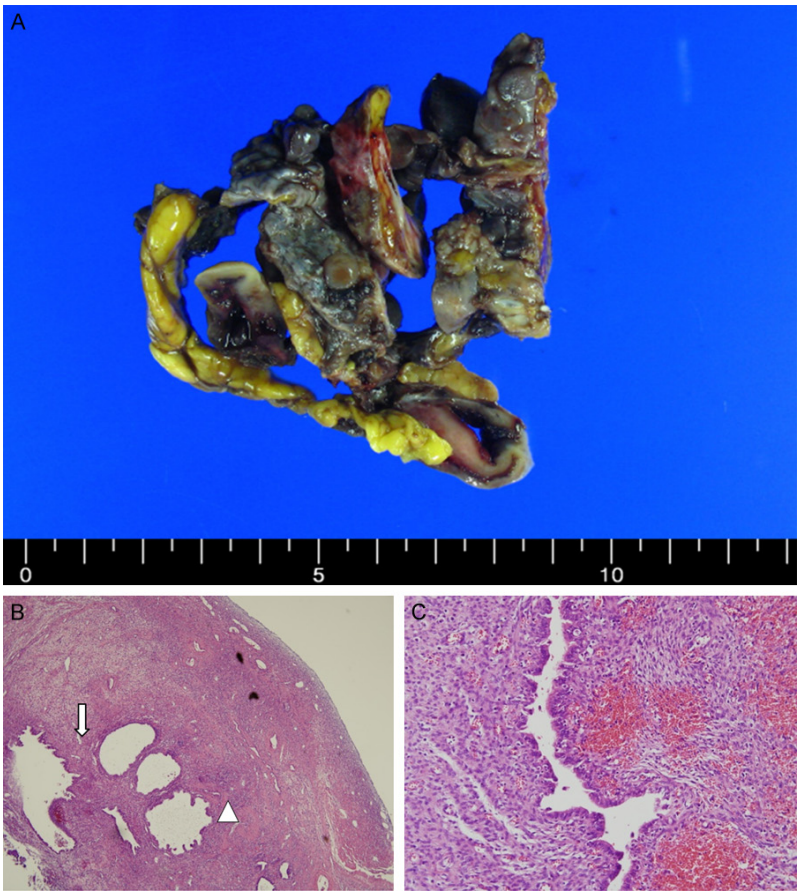

Figure 3. Gross and microscopic findings of polypoid endometriosis. The mass with surface polypoid nodules involving the right ovary (A), with histologic features such as variable sized endometrial glands (arrow) and thick walled blood vessels (arrow head) simulating an endometrial polyp in low power (B, H&E, x40) and high power fields (C, H&E, x200).

led endometrial tissue with dilated endometrial glands, hemorrhagic stroma, fibrosis, and thick-walled blood vessels resembling endometrial polyps in all resected tissues. The increased stromal cellularity or atypia was not noted. Accordingly, pathologic findings of excised specimens led to a diagnosis of polypoid endometriosis (**Figure 3**).

Postoperative recovery was uneventful, and the patient was treated with gonadotropin-releasing hormone agonist alone for six months, and then with dienogest for 16 months. No recurrence occurred over 22 months of postoperative follow-up.

Discussion

Endometriosis affects approximately 10% of women of reproductive age, and polypoid endometriosis was first described in 1980 as a rare form of endometriosis. The rectosigmoid colon and ovary have been reported to be the most frequently involved sites [3]. Endometriosis is a multifactorial disease caused by interactions between multiple gene loci and the environment. Proposed pathogenic theories include retrograde menstruation, coelomic metaplasia, endometrial stem cell implantation, and Müllerian remnant abnormalities. However, none of these theories to date explain all types of endometriosis. Dysfunctional immune response, genetic predisposition, and aberrant peritoneal environment may all be involved in the establishment and propagation of endometriotic lesions, and determine the phenotypic manifestations of the disease [4]. The etiology of polypoid endometriosis is uncertain, though associations between hormonal factors, such as, tamoxifen use or unopposed estrogen therapy, and the development of polypoid endometriosis have been suggested [3]. In our case, the patient had no history of tamoxifen or estrogen intake.

Preoperative assessment of our patient, based on MRI findings and an elevated CA-125 level, of our patient indicated advanced ovarian carcinoma of both ovaries arising from endometriosis with peritoneal carcinomatosis. However, lesions were later pathologically confirmed to be polypoid endometriosis of ovaries. A retrospective analysis of the case demonstrated characteristic findings of polypoid endometriosis on magnetic resonance images, which could have been useful for its preoperative identification (**Table 1**).

A literature review revealed that up to 40 case reports have been issued on polypoid endometriosis in patients aged from 23 to 89 years (mean 52.2 years) [5]. Among them, twelve cases of polypoid endometriosis of ovary have been reported, and one-half of these cases

Table 1. Features differentiating polypoid endometriosis from endometriosis-associated ovarian carcinoma

	Polypoid endometriosis (PE)	Endometriosis associated ovarian carcinoma (EAOC)
Clinical		
Age	· Often occurs in postmenopausal women (60% of patients were aged > 50 years)	· Younger women (45 to 50 years old) than the general population of women with ovarian cancer, premenopausal
	· Mean age 52.2 years (23-89 years)	· Lower parity than EOC without endometriosis
Site	· Multifocal in distribution	· A preponderance of left-sided cancers of endometrioid type, a slightly but not statistically significant higher left sided proportion for clear cell type
	· Various pelvic and peritoneal sites(ovary, sigmoid colon, rectum, uterus, cervix, bladder/ureter, pelvic peritoneum)	
Symptoms	· Variable depending on the sites of the lesion	· Abdominal mass and abdominal pain
	· Non-specific symptoms (dysmenorrhea, menorrhagia, or vaginal spotting)	· Typical symptoms of endometriosis may facilitate earlier diagnosis whereas ovarian cancers are frequently asymptomatic until advanced stages
Key characteristics	· Mimic a malignant neoplasm clinically and radiologically	· Diagnosed in earlier stages (I/II)
	· Usually associated with exogenous hormone therapy	· Lower grade lesions
		· Lower rate of recurrence
		· Longer disease-free survival than EOC without endometriosis
		· Rarely associated with lymphadenopathy or peritoneal carcinomatosis
Radiologic		
MR images	· Prominent hyperintense solid components on T2-WI	· Enhancing mural nodules on the walls of cysts
	· Hypointense rim-like structures and linear areas surrounding the mass on T2-WI	· Lack of shading on T2-WI
	· Round and smooth margin of nodules	· Nodule margins are not smooth but irregular
	· Not reveal restricted diffusion in the solid components	· No low-signal-intense marginal edge on T2-WI
	· Relatively high ADC values on an ADC map image	· A mural nodule diameter of more than 3 cm
		· An interval increase in the size of the cyst
		· Relatively low ADC values on an ADC map image
Pathologic		
Gross and Microscopic	· Is solid and frequently forms large, multiple nodular polypoid masses with the appearance of endometrial polyps	· Mainly endometrioid or clear cell carcinoma
	· Involve mucosal or serosal surfaces or the lining of endometriotic cysts and thus permits polypoid growth	
	· Resemble an endometrial polyp with thick-walled blood vessels	
	· Cut surface can be solid and fleshy with cystic change and hemorrhage	

were found within endometriotic cysts; one-third was associated with peritoneal lesions [5]. Polypoid endometriosis is often detected in postmenopausal women and ascites is uncommon. However, our patient was a woman of reproductive age, and large amounts of ascites were present.

The clinical issue related to ovarian polypoid endometriosis is the need for accurate preoperative identification of this rare disease. This form of endometriosis often simulates malignant ovarian carcinoma preoperatively and intraoperatively. Multiloculated solid and cystic complex ovarian masses require meticulous differential diagnosis preoperatively. When an ovarian mass is associated with a highly elevated serum CA-125 level, ovarian malignancy might be suspected. CA125 is an extensively studied marker in the context of ovarian tumors. However, although serum CA125 levels provide information preoperatively that could aid the differentiation of benign and malignant adnexal masses, it is not a tumor-specific antigen, and is also elevated in endometriosis, adenomyosis, leiomyoma, and pelvic inflammatory disease [6]. Contrast-enhanced MRI helps differentiate benign and malignant ovarian masses, and the presence of an enhancing solid component or papillae is suggestive of malignancy. Women with endometriosis rarely develop an endometriosis-assisted neoplasm, such as, clear cell or endometrioid carcinoma. The typical MRI feature of an endometriosis-associated carcinoma is a large hemorrhagic cystic mass containing enhancing mural nodules [5]. Enhancing solid components within an endometrioma on MR images are sensitive diagnostic features of endometriosis-associated ovarian carcinoma, but these are not specific, as inflammation, decidual reaction, and polypoid endometriosis can also present with enhancing mural nodules in endometrioma [7].

A small number of case reports have described the characteristic MRI findings of polypoid endometriosis, and these findings can be useful for the differentiation of polypoid endometriosis and endometriosis-associated ovarian carcinoma. On T2-weighted images, polypoid endometriosis appears as a mixed solid-cystic mass containing heterogeneous, hyperintense, polypoidal solid areas [8, 9]. The MRI findings characteristic of polypoid endometriosis are round, smooth nodules with a hypointense rim or marginal edge surrounding a mass on T2-weighted images [9, 10]. Previous studies have shown a hypointense rim on T2-weighted images correlates with fibrous tissue associated with endometriosis [5, 8, 9]. In contrast, a hypointense marginal edge on T2-weighted images is not observed in endometriosis-associated ovarian carcinoma, and nodule margins are not smooth but irregular [8].

DWI can also be useful for differentiating polypoid endometriosis and endometriosis-related ovarian carcinoma. A previous study reported polypoid endometriosis did not exhibit a low apparent diffusion coefficient (ADC) by DWI [9]. Similarly, in our patient, DWI did not reveal restricted diffusion in the solid components of polypoid endometriosis, which consist of abundant endometrial glands and stroma and may not show restricted diffusion. On the other hand, the solid components of ovarian cancer consist of hypercellular cancer cells, which lead to hyperintensity on DWI images [9].

Notably ovarian endometriosis has been reported to develop into malignant tumors in about 0.7~0.8% of cases [10]. Endometrioid adenocarcinoma is the most common malignant tumor after clear cell adenocarcinoma, when the primary endometriosis site is an ovary. Extraovarian endometriotic lesions are reported to be predominantly endometrioid tumors and sarcomas. The presence of enhancing mural nodules on the walls of hemorrhagic endometriotic cysts is considered the most sensitive diagnostic MRI feature of malignancy in an endometrioma. Lack of shading on T2-weighted images, a mural nodule diameter of more than 3 cm, and an interval increase in cyst size are also helpful, though less reliable signs of malignant degeneration [11]. Cancers arising in extraovarian endometriosis typically manifest as solid lesions with intermediate signal intensity on T1- and T2-weighted images. These pelvic lesions characteristically enhance after gadolinium administration and demonstrate restricted diffusion [6]. In addition, carcinoma can arise occasionally in polypoid endometriosis. Hansen et al. reported a rare case of endometrioid adenocarcinoma arising in polypoid endometriosis in postmenopausal woman [12].

In patients with a solid component in endometriotic cysts, careful analysis of MRI findings, such as, of the presence of a mass with a T2-hypointense rim and nodules with relatively high ADC values may lead to the accurate preoperative prediction of polypoid endometriosis of the ovary [9].

The preoperative and intraoperative detection of multiple peritoneal lesions in the pelvic/abdominal cavity may lead surgeons to presume ovarian carcinoma dissemination [5]. In our case, a highly elevated serum CA-125 level and imaging findings, which included ascites and widespread peritoneal lesions, led to the preoperative suspicion of epithelial ovarian malignancy. It should be noted, intraoperative frozen biopsy can prevent extensive surgery in polypoid endometriosis, and that awareness of its characteristic MRI findings might avoid unnecessary radical surgery.

Ruptured endometrioma with an extremely high serum CA-125 level and ascites may resemble ovarian carcinoma [13]. Accordingly, when a pelvic mass with a high serum CA-125 level and ascites are encountered, ruptured endometrioma and polypoid endometriosis of the ovary should be considered in addition to ovarian cancer. Furthermore, our investigation of p16 immunoreactivity in lesions revealed marked stromal staining, which supports the suggestion that eutopic endometrial polyps and polypoid endometriosis share a common pathogenetic basis [14].

In conclusion, we report a case of polypoid endometriosis of ovary mimicking advanced ovarian carcinoma with extensive peritoneal metastases, and describe its MRI and pathologic findings. The described case demonstrates that polypoid endometriosis presenting as bilateral, multicystic ovarian complex masses with ascites and omental and rectosigmoid involvement may simulate advanced ovarian cancer. Awareness of this rare condition should ensure that gynecologists and radiologists accurately diagnose and appropriately manage polypoid endometriosis of ovary with extensive peritoneal metastases.

Disclosure of conflict of interest

None.

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