Abdominal Radiology (2022) 47:1968–1974
https://doi.org/10.1007/s00261-022-03530-4

CASE REPORT

MR findings of polypoid endometriosis of female genital organs: report of three cases

Ryo Yajima[1] · Aki Kido[1] · Sachiko Minamiguchi[2] · Yusaku Moribata[1] · Yasuhisa Kurata[1] · Yuki Himoto[1] · Satoshi Otani[1] · Yuka Matsumoto[1] · Akihito Horie[3] · Ken Yamaguchi[3] · Yuji Nakamoto[1]

Received: 3 March 2022 / Revised: 10 April 2022 / Accepted: 11 April 2022 / Published online: 6 May 2022

Abstract

Polypoid endometriosis is a benign, rare variant of endometriosis that forms polypoid nodules mimicking malignant tumors. For three cases of polypoid endometriosis of female genital organs, this report presents characteristic MR imaging features reflecting the histopathological findings. The solid and microcystic pattern or the multilocular pattern both reflecting dilated endometrial glands, and characteristic morphology of the nodules, multilobulated or polypoid-shaped, were helpful diagnostic clues present in these three cases. Earlier reported MR findings were also recognized, including signal intensity similar to that of the endometrium on T2-weighted image and contrast enhanced T1-weighted image, hypointense rim on T2-weighted image, lack of diffusion restriction, and hyperintense foci on T1-weighted image. Two cases were diagnosed preoperatively based on MR imaging findings as polypoid endometriosis. Fertility-preserving treatment was administered for one patient. Preoperative inference of polypoid endometriosis from MR imaging can avoid overtreatment and lead to fertility preservation.

Keywords Fertility · Malignant tumor · MR imaging · Polypoid endometriosis

Introduction

Polypoid endometriosis, a benign and rare variant of endometriosis, has histological features that resemble benign uterine endometrial polyps [1]. Because polypoid endometriosis macroscopically shows exophytic growth from the serosal surface or protrudes into the cavity, it resembles malignant tumors [1]. Although reports about image findings have remained limited to small case series or case reports, the features of MR imaging findings which can be clues for differentiation have been suggested by Ghafoor et al. [2]. Those were hyperintense tumor on T2-weighted images (WI) similar to uterine endometrium, a peripheral low T2 signal intensity rim reflecting fibrous tissue, lack of diffusion restriction, and mild enhancement following intravenous contrast administration like uterine endometrium [3–10]. Hyperintense foci within the lesion on T1WI reflecting hemorrhage have also been reported [9, 10]. Nevertheless, preoperative differentiation from malignant tumor remains challenging [2, 4, 11]. This is the first report on MR imaging findings of multiple cases of polypoid endometriosis in addition to specific examination of the correlation of these findings with histopathological features.

Case 1

A 24-year-old nulligravid woman complaining of dysmenorrhea was referred to our institution because of a left ovarian tumor with elevated tumor marker: CA125 129.1 U/ml (normal range ≤ 35.0 U/ml). She had no prior history or medication. Physical examination revealed a non-tender immobile mass on the left ovary. Ultrasonography (US) and MRI revealed a left ovarian cystic tumor with mural nodules (Fig. 1). The cystic component showed as hypointense on T2WI and hyperintense on fat-suppressed (fs) T1WI, which

✉ Aki Kido
akikido@kuhp.kyoto-u.ac.jp

1 Department of Diagnostic Imaging and Nuclear Medicine, Kyoto University Graduate School of Medicine, 54 Kawaharacho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan

2 Department of Diagnostic Pathology, Kyoto University Graduate School of Medicine, 54 Kawaharacho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan

3 Department of Gynecology and Obstetrics, Kyoto University Graduate School of Medicine, 54 Kawaharacho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan

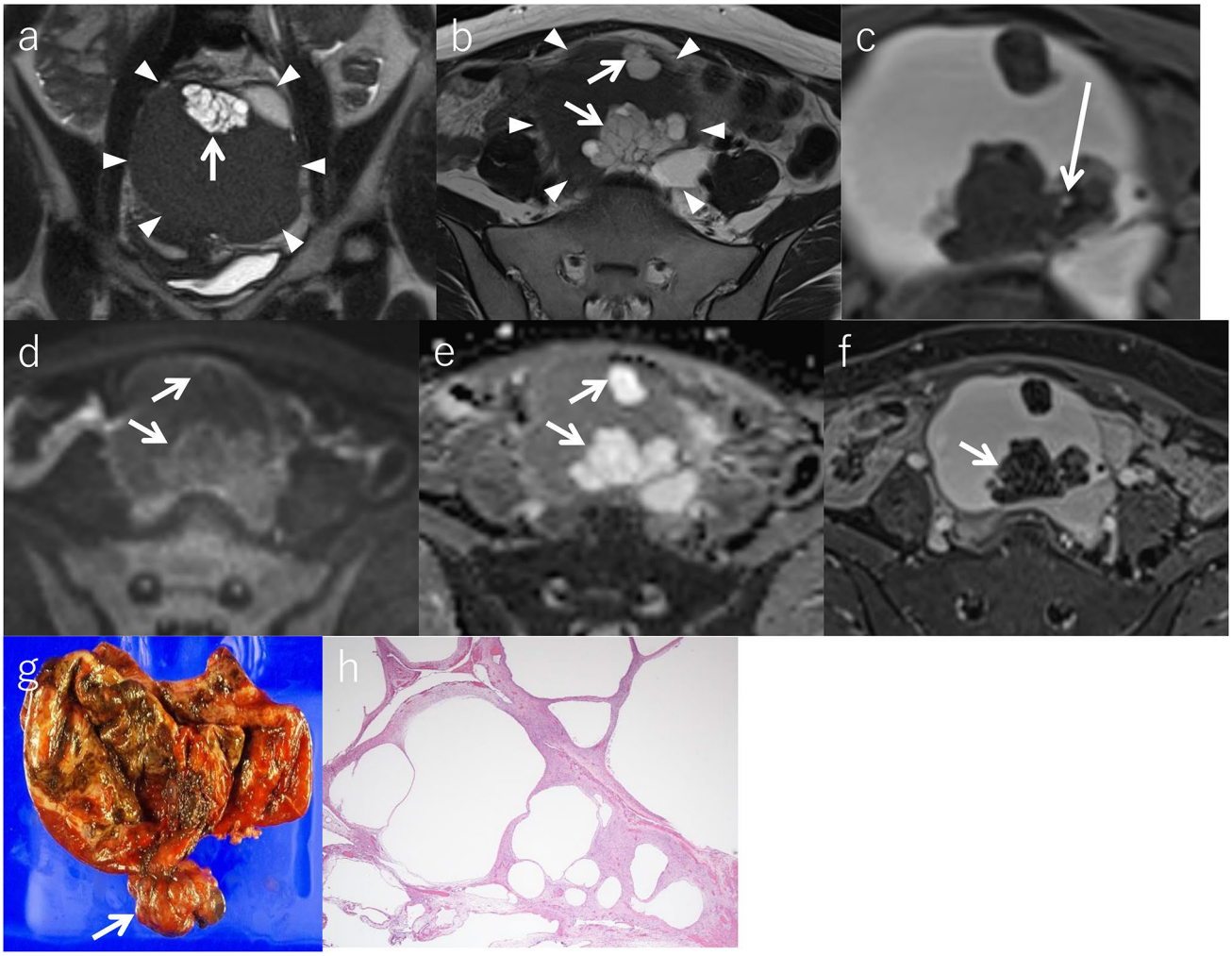

Fig. 1 Case 1: A 24-year-old woman with a complaint of dysmenorrhea. Coronal half-Fourier acquisition single-shot turbo spin-echo (HASTE) (**a**) and axial T2-weighted image (T2WI) (**b**) showed an endometriotic cyst (arrowheads) with mural nodules (short arrows). Mural nodules were polypoid-shaped or multilobulated. Some nodules contained hyperintense foci on fat-suppressed T1WI (**c**). Mural nodules were cystic and showed no signal or slight high signal intensity without diffusion restriction on ADC map (**d**, **e**). Nodules showed a multilocular appearance with reticular contrast enhancement (**f**). Intraoperatively, multilobulated mural nodules were found (**g**). Histopathologically (**h**), mural nodules were mainly composed of many large cystic lesions that corresponded to enlarged endometrial glands. Only a small amount of endometrial stroma existed between them, and reflected in the multilocular imaging pattern

is consistent with an endometriotic cyst. Mural nodules showed a multilocular appearance with reticular contrast enhancement without diffusion restriction. The mural nodule shape was polypoid or multilobulated. Some nodules contained hyperintense foci on fsT1WI. No hypointense rim on T2WI was found. Small endometriotic cyst of left ovary was suspected. Lymphadenopathy was not found. Based on radiologic findings, polypoid endometriosis within a left ovarian endometriotic cyst was suspected. Considering fertility preservation, laparoscopic left ovarian cystectomy was performed for definitive diagnosis. The histopathological diagnosis was polypoid endometriosis within an endometriotic cyst. Mural nodules were mainly composed of many large cystic lesions that corresponded to enlarged endometrial glands. Only a small amount of endometrial stroma existed between them. She had no recurrence for 22 months after surgery.

Case 2

A 52-year-old nulligravid premenopausal woman was referred to our institution complaining of lower abdominal pain. She had a history of enucleation of uterine adenomyosis and leiomyomas and cystectomy of a right endometriotic cyst 10 years prior. She received a gonadotropin-releasing hormone antagonist for 3 months. She had no wish for fertility preservation. Physical examination revealed a

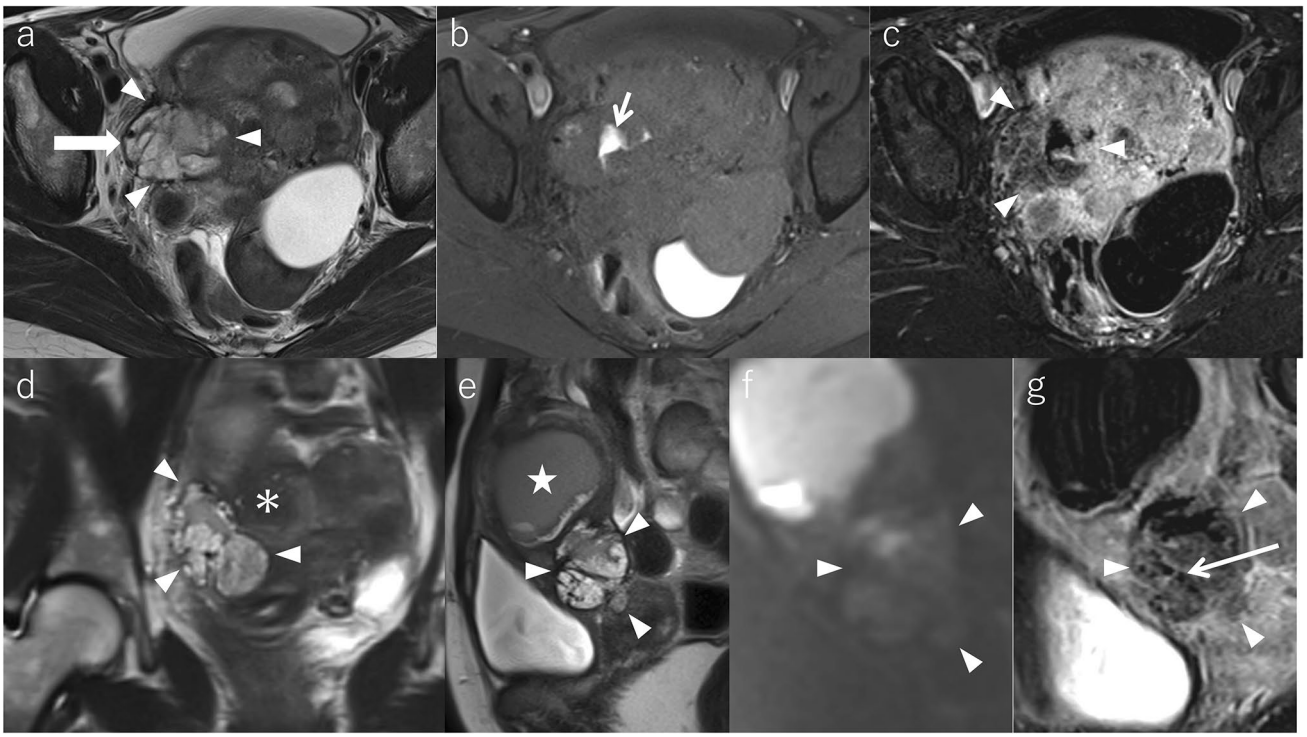

Fig. 2 Case 2: A 52-year-old woman complained of lower abdominal pain. Axial T2WI (**a**) showed a hyperintense lesion (arrowheads) protruding from uterine myometrium. The lesion showed predominantly high signal intensity (SI) on T2WI similar to that of the endometrium. Hypointense rim (white arrow) was also noted. On fat-suppressed (fs) T1WI (**b**), the lesion contained high SI area (short arrow). On axial subtraction image with contrast enhancement (**c**), the solid portion of the mass predominantly showed weak contrast enhancement similar to the endometrium, but the left side of the solid component showed intense enhancement similar to the myometrium. Coronal HASTE (**d**) and sagittal HASTE (**e**) showed the multilobular appearance adjacent to adenomyosis (asterisk) and to cystic adenomyosis (star). The solid portion of the lesion showed no diffusion restriction (**f**). On sagittal subtraction image with contrast enhancement (**g**), microcysts (long arrow) embedded in the solid portion were noted, solid and microcystic pattern

tender immobile mass on the right side to the uterus. The relevant tumor marker was elevated: CA125 166.9 U/ml. Subsequently, US revealed a mass on the right side of the uterus and a left ovarian cystic lesion. MRI revealed uterine adenomyosis and a thick-walled hemorrhagic cyst within the myometrium, suspected as cystic adenomyosis (Fig. 2). Adjacent to this cystic mass and adenomyosis, a well delineated lesion was also found in the myometrium of the right uterine wall. The lesion was multilobulated; it contained microcysts on T2WI, showing a solid and microcystic pattern. It showed predominantly hyperintense on T2WI and weak contrast enhancement, similar to those of the endometrium. The lesion had hypointense rim on T2WI and contained a hyperintense area on fsT1WI. The ADC map was not referable. An endometriotic cyst of the left ovary was suspected; the right ovary was not detectable. Lymphadenopathy was not found. Based on the radiologic findings, polypoid endometriosis of the myometrium, concurrent with adenomyosis and endometriotic cyst, was suspected. Total abdominal hysterectomy and bilateral salpingo-oopherectomy was performed for definitive diagnosis. Microscopically, the lesion comprised enlarged endometrial glands and edematous endometrial stroma without cellular atypia. The diagnosis was polypoid endometriosis. She has had no recurrence for 7 months after surgery.

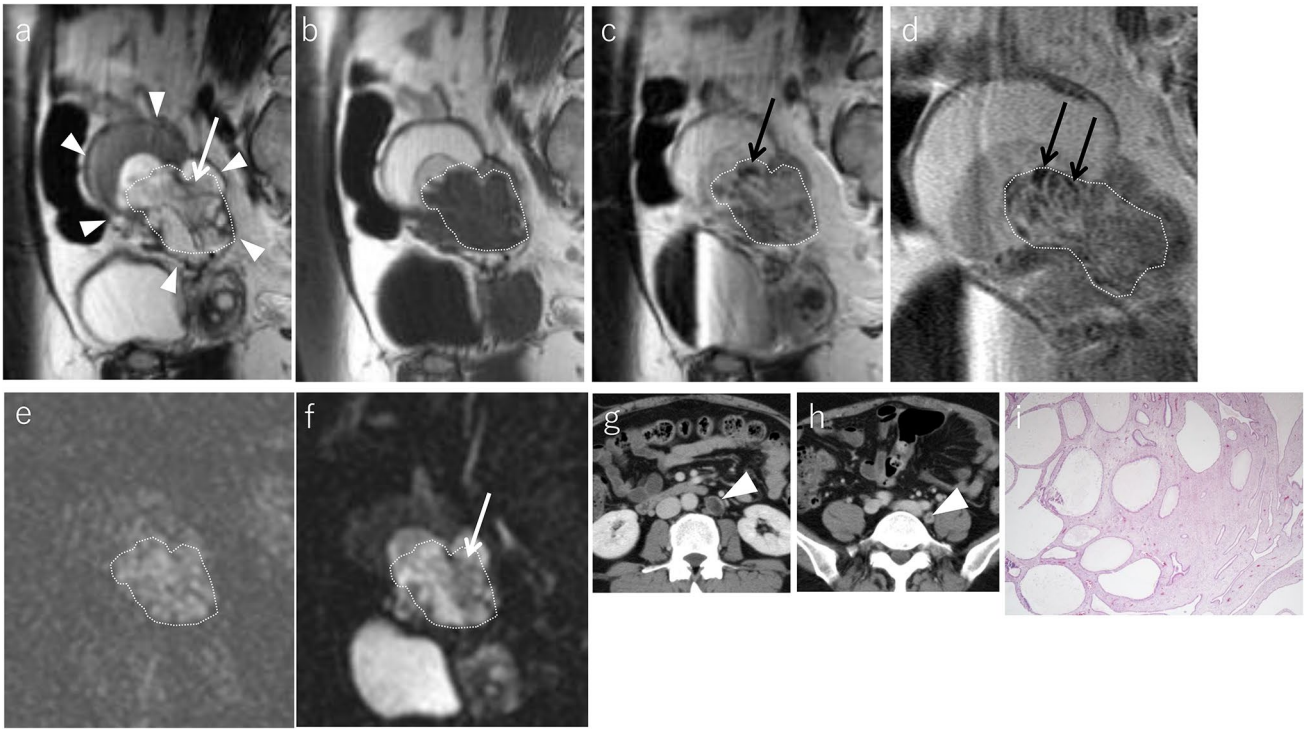

Fig. 3 Case 3: A 47-year-old woman complaining dysmenorrhea with left ovarian endometriotic cyst increasing in size. Sagittal T2WI (**a**), sagittal T1WI (**b**), and sagittal T1WI with contrast enhancement (**c**, **d**) revealed a left ovarian cystic tumor (arrowheads) with the internal polypoid solid component (encircled by a white line). SI of cyst fluid was heterogeneous on T2WI and high on T1WI, consistent with an endometriotic cyst. On T2WI (**a**), most of the solid component showed high SI similar to that of the endometrium, but areas with slightly lower SI were also found (white arrows); the same area showed diffusion restriction (**e**, **f**). The solid component was not accompanied by a hyperintense area on T1WI (**b**). On T1WI with contrast enhancement (**c**, **d**), the solid component was enhanced heterogeneously; it contained small cystic areas (black arrows). Computed tomography (**g**, **h**) revealed pelvic and paraaortic lymph node enlargement up to 19 mm in short-axis diameter with cystic change (large arrowheads). Histopathologically (**i**), the solid component was mainly composed of edematous endometrial stroma with lesser amounts of dilated endometrial glands, reflected in the solid and microcystic imaging pattern. This figure was presented at the same magnification as Fig. 1h

Case 3

A 47-year-old woman, gravida 1 para 1, with dysmenorrhea was referred to our institution because left ovarian endometriotic cyst had increased in size 16 months after discontinuation of hormonal therapy. She did not wish to preserve fertility. US revealed left ovarian solid and cystic tumor. The relevant tumor marker was elevated: CA125 418.5 U/ml. MRI revealed a left ovarian cystic tumor, which showed hyperintensity on T1WI consistent with endometriotic cyst with a polypoid solid component (Fig. 3). The solid component contained small cystic areas showing a solid and microcystic pattern. It showed heterogeneous high to intermediate SI both on T2WI and ADC map, and was enhanced heterogeneously. Those SI were partially similar to that of the endometrium. Hyperintense foci on fsT1WI or hypointense rim on T2WI were not found. Uterine adenomyosis was also found. Computed tomography results revealed pelvic and paraaortic lymph node enlargement up to 19 mm in short-axis diameter with cystic change. Left ovarian carcinoma associated with endometriotic cyst with lymph node metastasis was suspected. Total abdominal hysterectomy, bilateral salpingo-oophorectomy, pelvic and paraaortic lymph node dissection, and total omentectomy were planned. Intraoperatively, left ovarian tumor was found with severe adhesion to the uterus, sigmoid colon, and rectum. Intraoperative diagnosis of polypoid endometriosis was obtained on the frozen section of the left ovarian tumor. Finally, supravaginal hysterectomy, bilateral salpingo-oophorectomy, and pelvic and paraaortic lymph node sampling were performed. Macroscopically, left ovarian multicystic tumor had a polypoid solid component. Histopathologically, the solid component was mainly composed of edematous endometrial stroma with lesser amounts of dilated endometrial glands, reflected in the solid and microcystic imaging pattern. Various metaplasia such as tubal and mucinous metaplasia were found in the epithelium, but cellular atypia was not found. The diagnosis was polypoid endometriosis associated with and arising in an endometriotic

Table 1 MR imaging findings of three cases of polypoid endometriosis

	Case 1	Case 2	Case 3
Concurrent or history of endometriosis or adenomyosis	+	+	+
Polypoid or multilobular shape	+	+	+
Solid and microcystic pattern or multilocular pattern	+	+	+
High SI foci on T1WI	+	+	+
SI of solid lesion on T2WI	NA	High	Heterogeneously high
SI of solid lesion on ADC map	NA	NA	Heterogeneous
T2 low SI rim	−	+	−
Lymphadenopathy	−	−	+

SI signal intensity; *ADC* apparent diffusion coefficient

cyst. Lymph node endometriosis and uterine adenomyosis were also diagnosed. She has had no recurrence 3 years after surgery.

Discussion

This is the first report of MRI findings of multiple cases of polypoid endometriosis correlated with the histology. All women were premenopausal; one of them wished to preserve fertility. In two cases (cases 1 and 2), preoperative diagnoses were polypoid endometriosis based on MRI findings, which contributed to successful preservation of fertility in case 1. In case 3, although the preoperative diagnosis was malignancy, intraoperative pathological diagnosis of polypoid endometriosis could prevent overtreatment. Although earlier studies have indicated patients with polypoid endometriosis as older, typically perimenopausal or postmenopausal in age, several case series reported polypoid endometriosis in their twenties, as in our case 1 [1, 3, 5, 11–15]. Therefore, preoperative diagnosis is important to avoid overtreatment and fertility-preservation.

In two of our cases (cases 2 and 3), MR findings showed the solid component containing multiple small cysts, i.e., solid and microcystic pattern. In the other case (case 1) the mural nodules were consisted of a honeycomb appearance composed of multiple cysts, i.e., multilocular pattern. Correlated with the histopathology, both of these cystic areas reflected dilated endometrial glands. Histopathological pictures of case 1 and 3 showed multiple cystic lesions, which were enlarged endometrial glands, and stroma between the glands. The pictures clearly showed that the volume of stroma in case 3 was larger than those in case 1, as both of figures were presented at the same magnification. Therefore, it is estimated that solid lesion in case 3 corresponded to edematous stroma and the difference of stromal volume might cause the MR imaging appearances between two cases. These two imaging patterns, those are the solid and microcystic pattern or the multilocular pattern, were also described in the case series reported by Miyoshi et al., which were from the same institution as in this case series [16]. We regard this image findings of the solid and microcystic pattern or the multilocular pattern as important clues supporting the diagnosis of polypoid endometriosis, not has been emphasized much. In addition, all of our cases presented the characteristic lesion shapes, either multilobulated, or polypoid-shaped, which are thought to be attributable to the soft and expansile characteristics of the lesion. These characteristic shapes might also be important clues to conceive of the diagnosis of polypoid endometriosis. This is another point that has been observed in earlier reports [2, 3, 9, 10, 16, 17]. The diagnostic performance of these imaging findings needs to be verified on a larger study.

Reported MRI findings characteristic to polypoid endometriosis were also observed in our cases. As presented in Table 1, hyperintense foci on fsT1WI reflecting hemorrhage was detected in all cases. Solid components of cases 2 and 3 showed hyperintensity on T2WI and contrast enhancement resembling those of the endometrium, although lesions of case 3 showed heterogeneous SI. Partial diffusion restriction was found in case 3. The cause of heterogeneous SI was not clear, but it might be attributable to the histological variety such as fibrosis, hemorrhage, and metaplasia [1, 8]. A peripheral T2WI hypointense rim reflecting fibrous tissue was detected in case 2.

It is noteworthy that a few case reports of polypoid endometriosis have described concurrent lymph node endometriosis or mullerianosis: in fact, some of the cases exhibited lymph node enlargement [1, 18, 19]. In addition, some cases of polypoid endometriosis have been associated with multiple peritoneal lesions of polypoid endometriosis [1, 4, 5, 20]. Among the cases examined for the present study, case 3 showed pelvic and paraaortic lymph node enlargement, which contributed to the suspicion of malignancy with lymph node metastasis. It was histologically diagnosed as lymph node endometriosis. Although enlarged lymph nodes or peritoneal nodules are usually

suggestive of malignancy [10], it is noteworthy that lymph node enlargement or peritoneal nodules might be associated with polypoid endometriosis. Therefore, awareness of the characteristic MRI findings of polypoid endometriosis itself is important to alert gynecologists to the possibility of benign lesions and to prevent overtreatment.

In our case 3, ovarian carcinoma was suspected based on MRI findings. Heterogeneous SI and contrast enhancement of tumor, partial diffusion restriction, lack of T2 low SI rim, and lymph node enlargement led to the suspicion of malignancy. Polypoid endometriosis could have been included among differential diagnoses based on the findings of solid and microcystic pattern of the tumor and the characteristic shape of the tumor, although the possibility of malignancy should also have been considered.

In conclusion, this report describes three cases of polypoid endometriosis of the female genital organs, which present with characteristic MR imaging features reflecting histopathological findings. In addition to the image findings reported earlier, MR findings of solid and microcystic pattern or multilocular pattern, and the characteristic shape were thought to be important diagnostic clues. Although definitive diagnosis requires histopathological examination, preoperative indication of possible polypoid endometriosis can avoid overtreatment and can lead to fertility preservation.

Funding No funding was received for this study.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were conducted in accordance with ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. For a study of this type, formal consent is not required.

Informed consent The requirement for written informed consent was waived for this case report based on the opt-out system of our institution.

References

1. Parker RL, Dadmanesh F, Young RH, Clement PB. Polypoid endometriosis. A clinicopathologic analysis of 24 cases and a review of the literature. Am J Surg Pathol 2004; 28: 285–297.
2. Ghafoor S, Lakhman Y, Park KJ, Petkovska I (2020) Polypoid endometriosis: a mimic of malignancy. Abdom Radiol 45:1776–1782. https://doi.org/10.1007/s00261-019-02143-8
3. Ling R, Jin H, Yang Y, Cheng L (2020) Polypoid Endometriosis of the Rectum and Vagina in an Adolescent. J Pediatr Adolesc Gynecol 33:581–585. https://doi.org/10.1016/j.jpag.2020.06.006
4. Lee NK, Kwon BS, Choi KU, et al (2018) Polypoid endometriosis of the ovary mimicking advanced ovarian carcinoma with extensive peritoneal metastases. Int J Clin Exp Med 11:4279–4284
5. Yamada Y, Miyamoto T, Horiuchi A, et al (2014) Polypoid endometriosis of the ovary mimicking ovarian carcinoma dissemination: A case report and literature review. J Obstet Gynaecol Res 40:1426–1430. https://doi.org/10.1111/jog.12358
6. KOZAWA E, INOUE K, IWASA N, et al (2012) MR Imaging of Polypoid Endometriosis of the Ovary. Magn Reson Med Sci 11:201–204. https://doi.org/10.2463/mrms.11.201
7. Takeuchi M, Matsuzaki K, Nishitani H (2008) Magnetic resonance manifestations of decidualized endometriomas during pregnancy. J Comput Assist Tomogr 32:353–355. https://doi.org/10.1097/RCT.0b013e3181238362
8. Marugami N, Hirohashi S, Kitano S, et al (2008) Polypoid endometriosis of the ureter mimicking fibroepithelial polyps. Radiat Med - Med Imaging Radiat Oncol 26:42–45. https://doi.org/10.1007/s11604-007-0188-5
9. Ozaki K, Gabata T, Tanaka M, et al (2008) Polypoid endometriosis: An uncommon and distinctive variant of endometriosis. Eur J Radiol Extra 65:97–100. https://doi.org/10.1016/j.ejrex.2008.01.004
10. Jacquot A, Gertych W, Golfier F, et al (2021) Polypoid endometriosis of the Douglas pouch. Radiol Case Reports 16:612–614. https://doi.org/10.1016/j.radcr.2020.12.054
11. Tsai C, Huang SH, Huang CY (2019) Polypoid endometriosis – A rare entity of endometriosis mimicking ovarian cancer. Taiwan J Obstet Gynecol 58:328–329. https://doi.org/10.1016/j.tjog.2019.03.007
12. Stewart CJR, Bharat C (2016) Clinicopathological and immunohistological features of polypoid endometriosis. Histopathology 68:398–404. https://doi.org/10.1111/his.12755
13. Jaiman S, Gundabattula SR, Pochiraju M, Sangireddy JR (2014) Polypoid endometriosis of the cervix: A case report and review of the literature. Arch Gynecol Obstet 289:915–920. https://doi.org/10.1007/s00404-013-3112-5
14. Syrcle SM, Pelch KE, Schroder AL, et al (2011) Altered gene expression profile in vaginal polypoid endometriosis resembles peritoneal endometriosis and is consistent with increased local estrogen production. Gynecol Obstet Invest 71:77–86. https://doi.org/10.1159/000320736
15. Lambrechts S, Van Calsteren K, Capoen A, et al (2011) Polypoid endometriosis of the bladder during pregnancy mimicking urachal carcinoma. Ultrasound Obstet Gynecol 38:475–478. https://doi.org/10.1002/uog.8985
16. Miyoshi S, Yamaguchi K, Chigusa Y et al (2021) Fertility preservation of polypoid endometriosis: Case series and literature review. J Obstet Gynaecol Res. 2021 Nov 11. https://doi.org/10.1111/jog.15096
17. Koyama S, Kobayashi M, Tanaka Y, et al (2013) Laparoscopic repair of a post-myomectomy spontaneous uterine perforation accompanied by a bizarre tumor resembling polypoid endometriosis. J Minim Invasive Gynecol 20:912–916. https://doi.org/10.1016/j.jmig.2013.05.018
18. Zhuang L, Eisinger D, Jaworski R (2017) A case of ureteric polypoid endometriosis presenting in a post-menopausal woman. Pathology 49:441–444. https://doi.org/10.1016/j.pathol.2016.12.351
19. Iida Y, Tabata J, Yorozu T, et al (2017) Polypoid endometriosis of the ovary and müllerianosis of pelvic lymph nodes mimicking an ovarian carcinoma with lymph node metastasis. Int Cancer Conf J 6:145–148. https://doi.org/10.1007/s13691-017-0295-9

20. Chang CK, Chen P, Leu FJ, Lou SMA (2003) Florid polypoid endometriosis exacerbated by tamoxifen therapy in breast cancer. Obstet Gynecol 102:1127–1130. https://doi.org/10.1016/S0029-7844(03)00628-8