Uterine papillary serous carcinoma; MR imaging

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Purpose

Uterine papillary serous carcinoma (UPSC) is an uncommon variant of endometrial carcinoma accounting for less than 10% of endometrial carcinoma. Unlike typical endometrial carcinomas, UPSC often behaves aggressively and has a propensity for early dissemination and metastasis. The prognosis is poor and women with stage1 UPSC have a 5-year survival rate of only 30-50%1).

The purpose of this study is to clarify the MR imaging characteristics of UPSC.

Methods and Materials

Patients

From 2005 to 2009, we experienced 10 continuous cases which were histopathologically confirmed as having UPSC (4 pure papillary serous adenocarcinoma and 6 mixed (endometrial-serous adenocarcinoma (>=25%)) of the uterus at our institution. The patients were from 51 to 81 years old.

MR imaging

MR imaging were performed in 7 cases with 1.5T MR unit (Magnetom Avanto; Siemens Healthcare, Erlangen, Germany) and in 2 cases with 3T MR unit (Magnetom Verio; Siemens Healthcare, Erlangen, Germany). A phased-array surface multicoil is used for signal reception. Conventional T2-weighted images and dynamic contrast-enhanced MRI were obtained in all cases.

Contrast enhancement was performed with intravenous administration of 0.1ml/kg of gadopentate dimeglumine (Magnevist®, Bayer Schering Pharma AG, Germany) as a bolus at a rate of 2 ml/s which was flushed with 10 ml saline.

Two board-certified radiologists interpreted and evaluated the MRIs retrospectively.

Image analysis

Two board-certified radiologists interpreted and evaluated the MR images retrospectively. Analyzed items were as follows: 1. MR imaging (a)Detectability of tumors, (b)Growth pattern, (c)Signal intensity on T2WI, (d)Contrast enhancement pattern on dynamic MRI, (e) Comorbidity, 2. Comparison between preoperative FIGO staging and postoperative FIGO staging.
Results

Table 1 shows MRI findings and pre/post operative FIGO staging of all cases. Tumors were detected in 8 of 10 cases at MRI, while in the remaining 2 cases tumor could not be detected because of their early stage (1a). Growth pattern was classified into 2 types: exophytic type in 4 cases and infiltrative type in 6 cases. Signal intensity on T2WI was low intensity in 4 cases (Fig.1), iso intensity in 2 cases and high intensity in 2 cases. Enhancement pattern on dynamic MRI was rapid enhancement in 5 cases, poor enhancement in 3 cases, and gradual enhancement in 1 case. Adenofibroma (Fig.2), adenomyoma and leiomyoma were found as comorbidity. Preoperative staging was FIGO1a:4, 1b:2, 1c:3, 4b:1, and postoperatively histopathological staging was FIGO1a:2, 1b:2, 1c:1, 3a:1, 3c:2, 4b:2.

Images for this section:

![Table1. MRI findings and FIGO staging](chart.png)

**Fig. 1:** Table 1. MRI findings and FIGO staging of the cases
Fig. 2: Fig. 1 A 73-year-old woman with UPSC. Axial T2WI(a) shows infiltrative, low signal intensity mass on the right side of the uterus (arrow). Tumor shows iso intensity on axial T1WI(b). Hematometra is also shown. Contrast enhanced T1WI(c) shows rapid, strong and heterogeneous enhancement. Pre- and post FIGO staging was #c.
Conclusion

Uterine corpus cancer is the common gynecologic malignancy and is divided into two clinicopathologic subtypes. Type1 is estrogen-related and develop slowly from endometrial hyperplasia in the setting of hormonal imbalance. Type2 is non-estrogen-related (variant of nonendometrial carcinoma such as UPSC and clear cell). UPSC is a rare variant of endometrial carcinoma accounting for approximately 5~10% of all uterine carcinoma. Hendrickson et al. first reported UPSC in 1982 as having distinctive microscopic features similar to those seen with ovarian papillary serous adenocarcinoma. Unlike typical endometrial carcinomas, it behaves aggressively and has a propensity for early metastasis and vascular invasion. Its prognosis is significantly poorer compared to tumors of endometrial histology. In fact, previous studies have found that women with stage1 UPSC have a 5-year survival rate of only 30-50% compared to 85-90% in those with stage1 endometrial adenocarcinoma of the uterus1). There is no report about imaging findings of UPSC in spite of such an aggressive feature.

Endometrial carcinoma was reported to show slightly high signal intensity on T2WI and weaker enhancement in the delayed phase of contrast MR 4)5). In our study, MRI findings of UPSC had propensity for infiltrative, low signal intensity on T2WI, strong enhancement. Adenofibroma, adenomyoma and leiomyoma were found as comorbidity.

Preoperative staging was FIGO1a:4, 1b:2, 1c:3, 4b:1, and postoperatively histopathological staging was FIGO1a:2, 1b:2, 1c:1, 3a:1, 3c:2, 4b:2. In 5 of 10 patients, there was agreement between the imaging and histological staging. Five of 10 patients were understaged. None was overstaged. If we could have retrospectively diagnosed the patients on the basis of the histopathological findings, we could have arrived at a correct diagnosis in 2 more patients (Fig.3). We could not retrospectively diagnose the 2 patients with dissemination or metastasis because these tumors were too small to be seen on the MR images. In the previous clinical and pathological reports, the tendency of UPSC to be clinically understaged was confirmed1). When USPC is diagnosed in the preoperative setting, careful interpretation should be performed even if the primary disease is seems to be early stage.

In conclusion, UPSC reveals atypical findings on MR imaging: low intensity on T2WI and rapid strong enhancement on dynamic MRI. If UPSC is preoperatively diagnosed in cytological examination, we should be careful in staging because this tumor shows atypical findings on MR imaging and often has dissemination and distant metastases.

Images for this section:
Fig. 1: A 54-year-old woman with UPSC arising in adenofibroma. Sagittal T2WI(a) and axial T2WI(b) show exophytic, low signal intensity mass (arrow). Dynamic enhanced T1WI(c) show rapid and strong, heterogeneous enhancement. In this case, MRI findings were affected to adenofibroma although UPSC infiltrated into adenofibroma.
**Fig. 2:** A 61-year-old woman with UPSC. Sagittal T2WI(a) and axial T2WI(b) show infiltrative, high signal intensity mass on the left side of the uterus (arrow). Dynamic enhanced T1WI(c) show poor enhancement. Preoperative FIGO was #c because it seemed to destroy subendometrial enhancement and infiltrate into myometrium deeply. Post FIGO staging was #a, metastasis of left ovary was proved histopathologically. On axial T2WI(d), left ovary was slightly enlarged and iso intensity lesion indicate tumor was shown retrospectively. In this case, we could notice this metastasis if we were careful in interpretation.
References


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