Clear cell carcinoma of the ovary: imaging findings with pathologic correlation

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Authors: A. C. Tsili1, G. Koliopoulos2, A. Batistatou3, M. Doukas3, E. Paraskevaidis2, K. Tsampoulas1
1Department of Clinical Radiology
2Department of Gynecology & Obstetrics
3Department of Pathology University Hospital of Ioannina, Ioannina, GREECE.
Patient: 70 years, female

Clinical History:
Clear cell carcinoma of the ovary (OCCC) is a distinct histologic subtype of epithelial ovarian cancer, with non-specific imaging findings.

Imaging Findings:
A 70-year-old woman visited the Gynecologic clinic complaining of postmenopausal vaginal bleeding and lower abdominal pain. Multidetector CT examination of the abdomen revealed a complex left adnexal mass, partly cystic-solid, with papillary projections enhancing after contrast material administration (Fig. 1). The dimensions of the tumor were 10.7 x 11.8 x 9.2 cm. Neither ascites nor lymphadenopathy was seen. The endometrium was thickened and heterogeneous (Fig. 1b). The diagnosis of left adnexal malignancy was suggested. A synchronous malignancy of the endometrium could not be excluded, based on the CT findings. MR imaging examination of the pelvis confirmed the presence of a left adnexal mass, suspicious of malignancy (Fig. 2). The endometrial lesion extended to the cervix and was heterogeneous, of high signal intensity on T2-weighted images, with areas of low signal intensity centrally, the latter suggesting the diagnosis of an endometrial polyp (Fig. 2b). Total hysterectomy, bilateral salpingooophorectomy and omenectomy were performed. Macroscopically, the adnexal mass was predominantly solid and partly multicystic, with serous content (Fig. 3a). A cystic lesion with a maximal diameter of 3mm was found in the right adnexa (Fig. 3a). Cross-sectioning of the uterus revealed an endometrial polyp reaching up to the outer cervix os (Fig. 3b). Microscopically, the diagnosis of clear cell adenocarcinoma was made for the left adnexal mass (Fig. 4a). Small-sized neoplastic foci of the same histologic type were found in the right adnexa and the endometrial polyp (Fig. 4b). The patient after six cycles of chemotherapy had no signs of disease on follow-up CT.

Discussion:
Clear cell carcinomas of the ovary (OCCCs) comprise less than 5% of all ovarian malignancies and 3.7% - 12.1% of epithelial ovarian neoplasms [1-6]. These tumors are always malignant and related with distinctive clinical features, compared to the more common types of epithelial ovarian cancer. The majority of patients (75%) are diagnosed at early stage, frequently presenting with large pelvic masses, as in our case, rarely bilaterally and often associated with endometriosis, vascular thrombotic events and hypercalcemia [1-3]. These neoplasms have been reported as possibly resistant to chemotherapy, associated with a poorer prognosis than the other subtypes of epithelial ovarian cancer [1-4]. There are a few reports in the English-language literature regarding the cross-sectional imaging
findings of OCCCs. On CT scans, these tumors were detected as large, unilateral, mainly cystic lesions, smoothly-marginated, with hyperdense cystic parts and solid elements [7]. The above findings were confirmed on MR imaging by Matsuoka et al [8]. The presence of solid protrusions, which are usually round and few in number in a cystic adnexal mass, should include a CCC in the differential diagnosis, according to this group of authors. Our case was detected as a large, unilateral, sharply-demarcated, multicystic adnexal tumor, with abundant papillary projections, which enhanced after contrast material administration. These findings although suggestive of a CCC, were not specific. A serous ovarian tumor of low malignant potential or a serous cystadenocarcinoma were included in the differential diagnosis, based on imaging findings in our patient. Cystic elements were of 20 HU CT density, found histologically to correspond to serous content. Histopathologic examination in this case revealed the presence of small-sized (less than 5 mm) metastatic deposits of the same histologic type in the contralateral ovary and within the endometrial polyp. These findings were appreciated neither on CT, nor on MR imaging examination. The difficulty in recognizing microscopic disease or small-sized neoplastic deposits is a known limitation of imaging [9, 10].

Suggestive MR imaging findings for the diagnosis of endometrial polyps have been reported in the literature [11-13]. Polyps usually appear heterogeneous, of high signal intensity on T2-weighted images. The presence of fibrous core, detected as a low signal intensity area, of variable size within the polyp, as in our case, is considered as suggestive of an endometrial polyp [11-13]. The coexistence of intratumoral cysts within the mass, seen as smooth-walled, well-defined cystic lesions represents another MR feature allowing the differentiation of endometrial polyps from endometrial carcinomas. However, these findings have not been proved accurate enough to obviate biopsy in these patients [11]. This is partly due to the presence of microscopic carcinomas, as in this case and the coexistence of polyps and carcinomas in the same patients.

**Differential Diagnosis List:** Ovarian clear cell carcinoma.

**Final Diagnosis:** Ovarian clear cell carcinoma.

**References:**


Description: Transverse (a) and sagittal (b) multiplanar reformatted images depict a sharply demarcated left adnexal mass lesion, in close proximity to the uterine body. The mass is mainly cystic (asterisk), with solid protrusions (small arrow), enhancing after contrast material administration. The uterus is retroverted, with thickened and heterogeneous endometrium (endometrial thickness: 1.6 cm, long arrow). Origin:
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Figure 2

Description: Transverse (a) and sagittal (b) T2-weighted, transverse (c) fat-suppressed post-contrast T1-weighted images show a multicystic (asterisk) left adnexal tumor, with papillary projections (small arrows), the latter of high signal intensity on T2-weighted images and strong enhancement after gadolinium administration. The endometrial lesion is heterogeneous, both on plain and post-contrast images, of high signal intensity on T2-weighted images. Areas of low signal intensity (long arrow) within the mass corresponding histologically to fibrous core enabled the diagnosis of endometrial polyp preoperatively. Origin:
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Description: (a) Cross-sectioning of the left adnexal mass and right ovary. The adnexal mass was predominantly solid and partially cystic, with multiple cysts containing watery fluid. The solid component was soft, tan and yellow, with foci of haemorrhage. A small cystic lesion (arrow), filled with watery fluid was seen on the surface of the right ovary. Origin:
Description: (b) Cross-sectioning of the uterine cavity revealing the presence of an endometrial polyp.
Origin:
Figure 4

Description: (a) Low-power view (H-E X400). The left adnexal mass was composed of clear cells arranged in a tubular-cystic, papillary and solid sheet fashion. Origin:
Description: (b) Low-power view (H-E X400) showing neoplastic infiltration of the endometrial polyp.
Origin: