Ovarian granulosa cell tumour: MR imaging findings
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Section: Genital (female) imaging
Area of Interest: Genital / Reproductive system female
Procedure: Comparative studies
Imaging Technique: MR
Special Focus: Neoplasia Case Type: Clinical Cases
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Patient: 48 years, female

Clinical History:
A 48-year old woman was referred for a complex left adnexal mass lesion, detected incidentally on sonography. Laboratory analysis, including tumour markers and hormonal parameters was unremarkable. MR imaging of the pelvis followed.

Imaging Findings:
MR imaging examination revealed the presence of a heterogeneous solid pelvic mass originating from the left adnexa (Fig. 1). The dimensions of the lesion were (4.4 x 3.4 x 3.7cm). The mass had a smooth contour and was mainly solid, with signal intensity similar to that of normal myometrium on both T1 (Fig. 1a) and T2-weighted images (Fig. 1b), enhancing strongly and heterogeneously after gadolinium administration (Fig. 1c). No haemorrhagic components were detected within the lesion. Internal cysts were revealed as hyperintense areas on T2-weighted images with absence of contrast enhancement. No endometrial abnormalities were seen. Neither ascites nor pelvic lymphadenopathy was detected. Based on MRI findings, the presence of an early-stage ovarian malignancy was suggested.

Discussion:
Background
The diagnosis of an early-stage (FIGO IA) granulosa cell tumour of the ovary was made on pathology, following total abdominal hysterectomy and bilateral salpingo-oophorectomy.
Sex cord-stromal tumours of the ovary are rare, representing 8% of all ovarian neoplasms [1, 2]. Granulosa cell tumour (GCT) of the ovary is the commonest malignant sex cord-stromal tumour and the most common oestrogen-producing ovarian tumour. Approximately two-thirds of these tumours occur in peri- and postmenopausal women [1-4].
The clinical manifestations depend on the hormonal status and size of the neoplasm and age of the patient. Hyperstimulation of the endometrium by oestrogen may cause endometrial hyperplasia, or carcinoma. Endometrial carcinoma is associated with these neoplasms in 3%–25% of cases. In hormonally active tumours, the most frequent complaint is abnormal genital bleeding and abdominal pain. In hormonally less active tumours, the usual clinical presentation is adnexal mass. In women with uterine adenocarcinoma and an ovarian mass, a diagnosis of an ovarian GCT should be suggested [1-4].
Prognosis is excellent, with more than 90% of patients having a 10-year survival rate. However, adult GCT is potentially aggressive. Between 10-50% of patients develop recurrences, even 10–20 years after the initial
diagnosis and when GCT recurs, it can progress quite rapidly [1-4].

Imaging Perspective

Imaging findings of adult ovarian GCTs vary widely and are closely correlated with the histopathologic characteristics [1-7]. They range from homogeneously solid masses, to heterogeneously solid tumours with intratumoral bleeding, infarct, fibrous degeneration, irregularly arranged tumour cells, to multilocular cystic lesions filled with watery fluid or haemorrhage or even clotted-blood, separated by solid tissue, to completely cystic tumours [1-7]. Large multilocular cystic mass and medium-sized solid adnexal mass with internal cysts, as it was in this patient, are common presentations of GCTs [7]. On MR imaging, a “sponge-like” pattern in which numerous cysts are detected within the tumour is considered a unique appearance of GCT, rarely seen in other ovarian tumours [4]. Gross haemorrhage within a solid ovarian tumour is also a common feature of GCT. The presence of a haemorrhagic adnexal mass with multiple cystic spaces and associated uterine changes, including uterine enlargement and/or endometrial thickening or haemorrhage in postmenopausal women should strongly suggest the diagnosis of ovarian GCT [4].

Diffusion-weighted imaging (DWI) represents a useful additional tool in the characterization of complex adnexal masses, although no data on the DWI characteristics of ovarian GCTs exist in the literature [8].

**Differential Diagnosis List:** Granulosa cell tumour of the ovary, Serous cystadenocarcinoma, Endometrioid carcinoma, Malignant germ cell tumor (yolk sac tumour, etc.)

**Final Diagnosis:** Granulosa cell tumour of the ovary

**References:**


Description: Transverse T1-weighted image shows an ovoid, well-delineated left adnexal mass lesion (arrow), mainly isointense to the normal uterus (long arrow). Origin: Tsili A, Department of Radiology, University of Ioannina, Greece.

Description: Transverse T2-weighted image depicts inhomogeneous left adnexal mass (arrow), with signal intensity mainly similar to that of normal myometrium (not shown on this image), and small hyperintense areas, corresponding to internal cysts on pathology. Origin: Tsili A, Department of Radiology, University of Ioannina, Greece.
Description: Axial contrast-enhanced T1-weighted image obtained with fat saturation shows intense and heterogeneous mass enhancement (arrow). Origin: Tsili A, Department of Radiology, University of Ioannina, Greece.