The Role of MR Imaging in the Diagnosis of Malignant Ovarian Germ Cell Tumors

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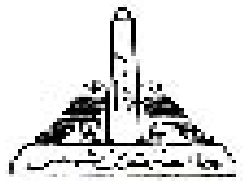

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ADC	Apparent diffusion coefficient
AFT	Alpha feto protein
B-HCG	Beta- Human Chorionic Gonadotrophin
BOT	Borderline ovarian tumors
DCE-MRI	Dynamic Contrast Enhanced MRI
DWI	Diffusion-weighted imaging
FOV	Field of view
FSE	Fast spin echo
Gd	Gadolinium
JZ	Junctional zone
MRI	Magnetic Resonance Imaging
MRS	Magnetic Resonance Spectroscopy
NPV	Negative predictive value
OMGCTs	Ovarian Malignant Germ Cell Tumors.
PET/CT	Positron emission tomography – computedtomography
PPV	Positive predictive value

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Introduction

Ovarian tumors are classified on the basis of tumor origin as epithelial tumors, germ cell tumors, sex cord stromal tumors and metastatic tumors **(*Jung et al, 2009).***

Ovarian cancer is the second most common pelvic tumor and the leading cause of death from a gynecological malignancy.

Caucasian and African American females have similar risk of ovarian and other germ cell tumors ***(Outwater et al, 2011).***

Germ cell tumors account for approximately 15-20% of all ovarian tumors, while in children and adolescents up to 60% of the tumors can be of germ cells origin. Up to 30% are found to be malignant.

They include ovarian teratoma which is the commonest primary ovarian tumor and commonest ovarian germ cell tumor, **ovarian dysgerminoma, choriocarcinoma, yolk sac tumors, carcinoid tumors, endodermal sinus tumors and malignant mixed germ cell tumors (collision tumors)** ***(Brammer et al., 2011).***

The exact cause of germ cell tumors is not completely understood, yet some exposures are assumed as predisposing factors ***(Marc et al, 2010).***

Malignant ovarian tumors have vague clinical presentation thus it's mostly a late diagnosis carrying non promising prognosis ***(Jung et al., 2009).***

The goal of imaging in ovarian cancer detection is to expeditiously distinguish benign adenexal lesions from those requiring further pathological evaluation for malignancy. For lesions indeterminate on ultrasound, Magnetic Resonance Imaging (MRI) increases the specificity of imaging evaluation, thus decreasing benign resections. CT is useful in diagnosis and treatment planning of advanced cancer. Tumor markers are helpful in the diagnosis. Although F18-FDG avid ovarian lesions in postmenopausal women are considered suspicious for malignancy, PET/CT is not recommended for primary cancer detection because of high false positive rates ***(American Cancer Society, 2009).***

MRI helps to locate large solid masses and to distinguish benign from malignant ovarian tumors with overall accuracy of 88% to 93% for the diagnosis of malignancy. It's the superior modality in the characterization of ovarian malignancy and in the detection of lymphatic, peritoneal and distant metastasis; both for preoperative planning and post treatment follow up. That's why it is important to highlight its role in the diagnosis of such tumors with high fatality rate.

It's a common assumption that if an ovarian cancer is diagnosed during pregnancy, treatment necessitates sacrificing the well being of the fetus, however, in most cases, it's possible to offer appropriate treatment without placing the fetus at serious risk ***(Marret*** et al***, 2010).***

Aim of the work

The aim of the work is to demonstrate the role of MRI in the diagnosis of malignant ovarian germ cell tumors.

ANATOMY OF THE OVARIES

The ovaries are almond shaped but may vary in size, position, and appearance, depending on the age and the reproductive activities of the individual ***(De Lancey et al., 1997).***

Age and hormonal status coalesce to influence ovarian size and appearance, with the typical ovaries are ovoid, almond shaped structures measuring 3 mm in length in neonates and 3-5 cm in women of child bearing age; in general, ovarian size begins to decrease starting at age 30, with the length of a typical ovary shrinking to 2 cm in post menopausal women. Pregnancy leads to increase of ovarian size, as does the use of hormone replacement therapy ***(kleeman and Silva, 2007).***

The normal adult woman ovaries range from 2.5–5 cm long, 1.5–3 cm thick, and 0.7–1.5 cm wide, with a weight of 3–8 gm ***(kleeman and Silva, 2007).***

The ovary is encapsulated by a thin whitish fibrous capsule called the tunica albuginea.

It's divided into cortex which harbor the ovarian follicle and medulla which contain the ovarian vessels, nerve supply and lymphatics which penetrate through the hilum ***(Tortora, 1998***).