Role of MRI in Detection of Recurrent Ovarian Cancer: Comparison with Integrated PET/CT

ESSAY

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MRI	**Magnetic Resonance Imaging**
FDG	**Fluoro-2-deoxy-d-glucose**
PET	**Positron emission tomography**
CT	**Computed tomography**
HRT:	**HormonReplacment Therapy**
NCI	**National Cancer Institute**
OEC	**Ovarian Epithelial Carcinoma**
BRCA1 and 2:	**Breast Cancer gene 1 and 2**
CA-125:	**Carcinoma Antigen-125**
LGSCs	**Low grade serous carcinomas.**
HGSCs	**High grade serous carcinomas**
BOTS:	**Borderline Ovarian Tumors**
HNPCC	**Hereditary non-polyposis colorectal cancer**
MOGCT	**Malignant Ovarian Germ Cell Tumors**
HCG	**Human chorionic gonadotropin**
CCCs	**Clear cell carcinomas**
MMMT	**Malignant Mixed Mù llerian Tumors**
NCCN	**National Cancer comprehensive network**
FIGO	**FéderationInternationale de Gynécologie et d'Obstétrique**
TCC	**Transitional Cell Carcinoma**
GCT	**Granulosa Cell Tumor**
LMP	**Low malignant potential**
SCSTs	**Sex Cord Stromal Tumors**
SPGR	**spoiled gradient-echo**
MDCT	**Multi-detector computed tomography**
Ce-CT	**Contrast enhanced computed tomography.**
SLL	**Second-look laparotomy**
LPS	**Laparoscopy**

SUV	**Standard uptake value**
WHO	**World Health Organization**

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INTRODUCTION

Ovarian cancer is the fifth most common cause of cancer death in women in the United States behind lung, breast, colorectal, and pancreatic cancers, accounting for more than 3% of all cancers in women and causing more deaths than any other gynecologic malignancy **(American Cancer Society, 2011).**

In Egypt, there is no national cancer registry, but one of the important regional registries is Gharbia Population Based Cancer Registry (GPBCR), according to its publications over a three years period (2000–2002), 225 ovarian cancer cases were registered with an average of 75 cases per year. They represented 2.2% of all incident cancers and accounting for 4.4% of all newly diagnosed female cancers **(Ibrahim Abd el-bar, 2002).**

The other important regional registry in Egypt is Aswan regional registry, in which over the year 2008, thirty-five cases of ovarian cancer were registered, representing 5.6% of all female cancers cases **(Egypt National Cancer Registry, 2008).**

Most ovarian cancer typically presents late, stage III-IV, after the disease has spread widely out of the pelvis **(Jemal et al., 2009).** The role of diagnostic imaging have been to

characterize the ovarian mass, determine the extent of preoperative disease, predict tumor resectability, and evaluate response to treatment **(Lutz et al., 2011).**

Magnetic resonance imaging (MRI) is excellent for characterizing adenexal masses that are indeterminate by US . It is an excellent problem-solving technique by virtue of its ability to define common conditions such as fibroids, dermoid cysts, endometriomas other benign lesions and malignant lesions like malignant teratoma and ovarian dysgerminoma **(Jeong et al., 2000).** It is more sensitive than PET/CT for detecting local pelvic recurrence and peritoneal lesions of recurrent ovarian tumors **(Kim et al., 2007).**

It is also more specific in identifying malignant masses. The greater specificity of MRI is due to its ability to identify correctly dermoid, endometriotic cysts, and fibroids which may appear malignant on US **(Sohaib et al ., 2005).**

Positron emission tomography (PET), particularly when combined with computed tomography (CT), has improved the accuracy of staging ovarian carcinoma **(Son et al., 2011).** It is also a valuable tool for diagnosing and staging advanced disease and detecting recurrent tumor **(Nam et al., 2010).**

For primary staging of ovarian carcinoma and detection of recurrent ovarian cancer, best performances have been reported with fusion PET/CT, which has higher accuracy than either CT or FD-PET alone **(Nam et al., 2010).**

AIM OF WORK

To compare the diagnostic performances of magnetic resonance imaging (MRI) and positron emission tomography / computed tomography (PET/CT) for the detection of recurrent ovarian cancer.

ANATOMY OF THE OVARY

The ovaries are almond-shaped structures each measuring about 3 cm long ovaries are usually located medial to the external iliac vessels and anterior to the internal iliac vessels and ureter **(Hagan et al**., **2006).**

The ovaries are the only structures within the abdomen-opelvic cavity that are not covered by visceral peritoneum ,they typically lie posterolateral to the uterus within the adnexa , ovaries produce the reproductive cell, the ovum, and two known hormones estrogen, secreted by the follicles, and progesterone, secreted by the corpus luteum **(Ferguson , 2006) .**

- **Structure of the ovary**:

The ovary is encapsulated by a thin fibrous layer (the tunica albuginea), within the capsule lies the ovarian stroma, which consists of fibroblasts, smooth muscle cells, arteries, veins, lymphatics, nerves, and follicles.

Histologically, the ovaries contain three ill defined zones: the outer cortex, the highly vascular inner medulla, and the hilum ,The cortex is predominantly composed of follicles, corpora lutea, fibroblasts, and smooth muscle cells.

(Forstner, 2007)

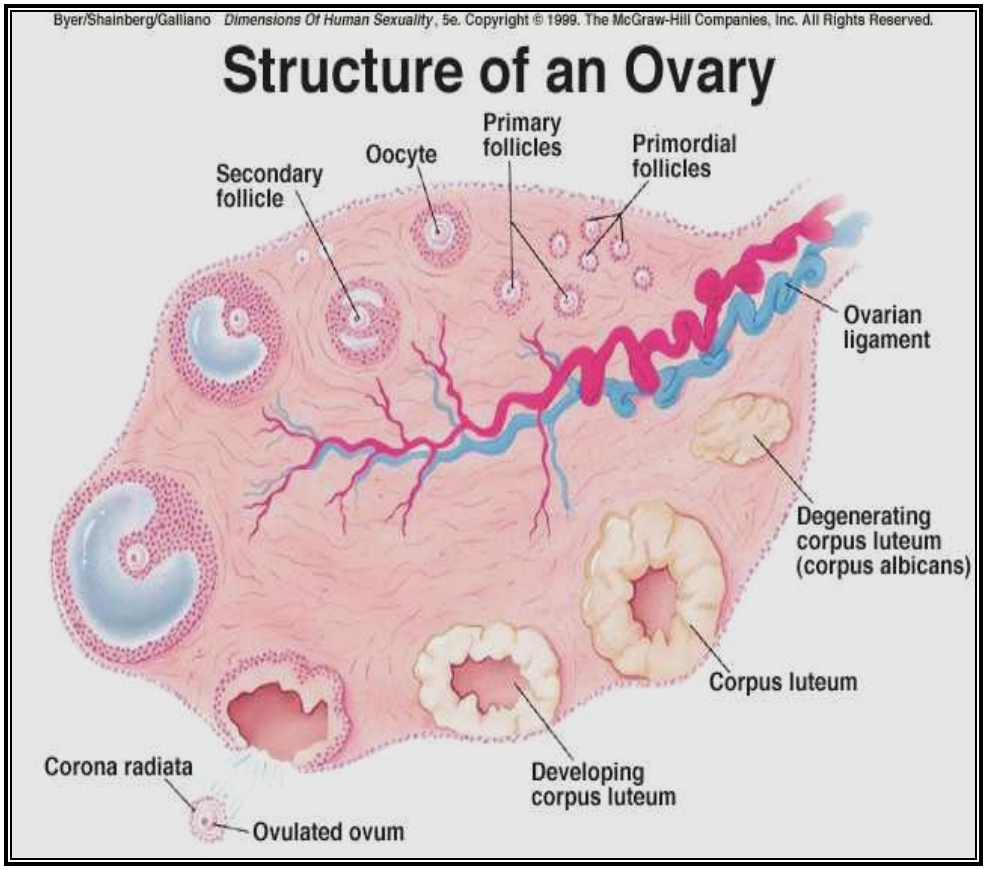

Figure (1) :the structure of the ovary **(Mohiedean ., 2011).**

- **Ovarian embryology:**

The ovary is thus formed mainly from the genital ridge and partly from the mesonephros. Later the mass is differentiated into a central part, the medulla of ovary, covered by a surface layer, the germinal epithelium. Between the cells of the germinal epithelium a number of larger cells, the immature ova, are found. The immature ova, in turn, are carried into the stroma beneath by bud-like ingrowths (genital cords of the germinal epithelium). The