STRATEGY OF IMAGING FOR EVALUATION OF EARLY OVARIAN CANCER

Thesis

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in Radiodiagnosis

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List of Abbreviations

2D : Two dimensional

2DPD : Two-dimensional power Doppler

3D : Three dimensional

3DPD : Three-dimensional power Doppler

AIF : Arterial input function

BRCA : Decoding Breast Cancer Risk

CA125 : Cancer antigen 125

CT : Computed tomography

DCE : Dynamic Contrast-enhanced

DWI : Diffusion-weighted imaging

GCT : Germ Cell tumors

MRI : Magnetic resonance imaging

MRS : Magnetic Resonance Spectroscopy

OC : Ovarian cancer

PET : Positron Emission tomography

ppm : Parts per million

RMI : Risk of malignant index

ROI : Region of interest

SUV : Standardized uptake values

TVUS : Trans-vaginal ultrasound applications

US : Ultrasound

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INTRODUCTION

Ovarian cancer is the fifth most common cause of cancer death over all in women ***(Jemal et al., 2010).***

The vast majority (90%-95%) of ovarian cancer are sporadic, with increased incidence after the age of 50 years. The high mortality rates of ovarian cancer are partly due to its late detection, with 67% of patients presenting with advanced disease ***(Kosary, 2012).***

Early ovarian cancer is often asymptomatic or associated with nonspecific symptoms such as persistent abdominal distention. However, symptomatic ovarian cancer is more frequently associated with advanced disease ***(Bazot et al., 2006).***

US imaging either transvaginal US or transabdominal US or both are considered the first line imaging tool whenever an ovarian lesion is suspected and is used to confirm the presence of a mass, identify the organ of origin, and characterize the features of the mass and the likelihood of malignancy or benignity. For complex ovarian lesions, US can, when properly performed, reach a high sensitivity (up to 100%) in ovarian tumor but it often does not yield a high specificity (reported to be lower than 50%) in tumor characterization ***(Sohaib et al., 2005).***

Computed Tomography is not a primary imaging tool in the early diagnosis of ovarian cancer. CT offers much lower inherent tissue contrast than does MRI even with the use of contrast agents. CT is mainly used as a helpful complementary imaging tool in conjunction with functional imaging modalities such as PET ***(Balan, 2006).***

PET and PET/CT: The role of FDG PET/CT in the intial evaluation of patients with ovarian cancer is limited but it can provide functional information on cell metabolism or rate of cell synthesis and the presence of specific tissue. In general, FDG PET is better accepted as an imaging tool for staging and detection of tumor recurrence ***(Rockall et al., 2012).***

MRI plays a crucial role in characterizing adenxal masses that are indeterminate at US and determining the origins of pelvic masses.

Both MR imaging and US have a high sensitivity (97% and 100%, respectively) for depicting malignant adnexal masses. However, MR imaging has a much higher specificity (84%) and accuracy (89%) for depicting malignant characteristics than Doppler US (40% specificity and 64% accuracy) ***(Sohaib et al., 2005).***

MRI provides excellent soft tissue contrast with native T2 weighted imaging and contrast agent enhanced T1 weighted imaging. MRI allows reliable differentiation

of dermoids, ovarian fibromas and most endometriomas. Standard and fat saturated T2 weighted and T1 weighted sequences can usually be used to help diagnose teratomas ***(Mohaghegh and Rockall, 2012).***

Clinical assessment and US are widely accepted as the most appropriate initial tools for evaluating adnexal masses. MR imaging plays an important role in characterizing adnexal masses that are indeterminate at US, and the benefits of conventional MR imaging are well established. Emerging MR imaging techniques, such as dynamic contrast - enhanced MR imaging with semiquantitative or quantitative analysis of the enhancement characteristics of adnexal masses, have the potential to further reduce the number of lesions that remain indeterminate at MR imaging and may help direct more appropriate management ***(Mohaghegh and Rockall, 2012).***

Aim of the Work

The aim of the study is to emphasize the role of different imaging modalities in early ovarian carcinoma detection, and to put forth an appropriate imaging strategy.