ROLE OF MAGNETIC RESONANCE SPECTROSCOPY AND DIFFUSION WEIGHTED IMAGING IN EVALUATION OF OVARIAN TUMORS

Essay

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List of Abbreviations

Abb.	Full term
ADC	Apparent diffusion coefficient.
BHCG	Human chorionic gonadotropin.
BOT	Border line ovarian tumors.
CA125	Cancer antigen 125.
DWI	Diffusion weighted imaging.
FDG	Fludeoxyglucose.
FIGO	International federation of gynecology and obstetrics.
FOV	Field of view
FSE	Fast spin echo
MRS	Magnetic resonance spectroscopy.
MS	Milli seconds
MVS	Multivoxel spectroscopy.
OEC	Ovarian Endometrioid carcinoma
OMGT	Ovarian malignant germ cell tumor.
PET	Proton Emisson Tomgraphy.
PPM	Parts per million.
PRESS	Point resolved spectroscopy in the steady state.
RF	Radiofrequency
RMI	Risk of malignancy index.
ROI	Region of interest.
SNR	Signal to noise ratio.
STEAM	Stimulated echo acquisition mode.
STIR	Short inversion time recovery.
T1WI	T one weighted image.
T2WI	T two weighted image.
TE	Time to echo.
TNM	Tumor Node Metastasis.

Introduction

Ovarian cancer is the eighth most common cancer and the fifth leading cause of cancer death after bronchial carcinoma, breast, colorectal and pancreatic cancers. Ovarian cancer causes more deaths than any other cancer of female reproductive system; despite accounting for only 3% of all cancers in women. When ovarian cancer is found in its early stages, treatment is most effective ***(U.S. Cancer Statistics Working Group, 2015).***

Precise characterization of an adnexal lesion is important as it dictates further management hence, the role of radiology is very important. Until the last decade, exploratory laparotomy was used for the diagnosis and staging of adnexal masses. However, modern imaging techniques have demonstrated similar accuracy in diagnosing and staging of ovarian carcinoma ***(Pérez-López et al., 2010).***

Ultrasound is the first-line imaging investigation for the suspected adnexal masses and helps to characterize the majority. But there is a minority of masses that are "indeterminate." The main reason for indeterminate sonographic diagnosis was the inability to determine the origin of masses, assess large masses and characterize purely solid and complex cystic masses ***(Spencer and Ghattamaneni, 2010).***

CT has a limited role in the primary evaluation and characterization of ovarian lesions; however it can be used in

evaluating the extent of the disease, in pretreatment planning including cytoreduction and post treatment follow up ***(Wasnik et al., 2015).***

Pelvic magnetic resonance (MR) imaging is the best imaging technique to characterize indeterminate or complex adnexal masses due to its excellent tissue contrast ***(Kinkel et al., 2005).***

The accuracy of MRI to differentiate benign from malignant masses using only the conventional sequences is about 80% according to the published literature ***(Bazot et al., 2013).***

Functional imaging is becoming increasingly important in the evaluation of cancer patients because of the limitations of morphologic imaging, particularly in the assessment of response to therapy ***(Whittaker et al., 2009).***

Diffusion weighted imaging (DWI) is a functional technique that provides information about tissue cellularity and integrity of cellular membranes ***(Koh and Padhani, 2006).***

Other advantages of DWI include its cost-effectiveness, brevity of execution, complete noninvasiveness', lack of ionizing radiation, no contrast injection and detecting peritoneal dissemination ***(Motoshima et al., 2011)*** & small recurrent lesions ***(Kyriazi et al., 2011).***

Molecular imaging through magnetic resonance spectroscopy (MRS) can detect metabolic characteristics of malignancy. As molecular changes often precede morphological alterations, so sensitivity is improved by MRS ***(Belki'c and Belki'c, 2008).***

Aim of the Work