Role of Imaging in Screening and Early Detection of Ovarian Cancer

ESSAY

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ABSTRACT

Ovarian cancer is currently the most common leading cause of death among the gynecologic malignancies. Its prevalence in the population, and the fact that diagnosis at an earlier stage leads to markedly improved survival, makes it an ideal candidate for a screening program. However, to date, trials of screening programs have not been shown to have any effect on mortality from the disease and screening presents several challenges. **First**, a distinct precursor lesion for ovarian cancer has not been identified. **Second**, identification of the appropriate groups in the general population to be selected for screening is problematic. **Third**, detection of early stage disease requires developing tests with high sensitivity and specificity.

Trials have incorporated multimodal screening protocols which utilize transvaginal ultrasound and measurement of serum CA125 levels. Either to be use concurrently, or one of them as first line, and the other as second line. Serum CA125 as the first line and transvaginal ultrasound as the secondary line achieved a high specificity and positive predictive value and can positively impact the survival.

Key ward :-

- Role of Imaging in Screening
- Early Detection
- Ovarian Cancer

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List of Abbreviation

AFP	Alpha-fetoprotein.
AP	Antroposterior.
BRCA1	Breast cancer gene 1.
BRCA2	Breast cancer gene 2.
CA125	Cancer antigen 125.
CT	Computed Tomography.
Ed	Editor.
Edn	Edition.
Eds	Editors.
EOC	Epithelial ovarian cancer.
FDG	Fluoro-2-deoxy-D-glucose.
Fig.	Figure.
FIGO	International Federation of Gynecology and Obstetrics.
FLASH	Fast low-angle shot.
FSE	Fast Spin Echo.
GCT	Germ Cell tumor.
HCG	Human chorionic gonadotrophin.
NPV	Negative predictive value.
OC	Ovarian cancer.
MOE	Massive ovarian edema.
MR	Magnetic Resonance.
MRI	Magnetic Resonance Imaging.
PBSO	Prophylactic bilateral salpingo-oophorectomy.
PCOS	Polycystic ovarian syndrome.
PET	Positron Emission Tomography.
PI	Pulsatility index.
PID	Pelvic inflammatory disease.
PPV	Positive predictive value.

RI	Resistive index.
RMI	Risk of malignancy index.
S2	Sacral segment 2.
S3	Sacral segment 3.
S4	Sacral segment 4.
SE	Spin Echo.
SDs	Standard deviations.
SGE	Gadolinium-enhanced fat-suppressed.
SI	Signal intensity.
STIR	Short time inversion recovery.
SUV	Standardized uptake value.
T	Transverse.
T10	Thoracic 10.
T11	Thoracic 11.
3D	Three dimensional.
3DPD	Three-dimensional power Doppler
TOA	Tubo-ovarian abscess.
TV	Transvaginal.
TVS	Transvaginal ultrasound.
TVCD	Transvaginal color Doppler.
T1WI	T1 weighted images.
T2WI	T2 weighted images.
2DPD	Two-dimensional power Doppler.
U	Ultrasound score.
US	Ultrasound.
WHO	World Health Organization

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INTRODUCTION

The comprehensive global cancer statistics from the International Agency for Research on Cancer indicate that gynecological cancers accounted for 19% of the 5.1 million estimated new cancer cases (***Sankaranarayanan and Ferlay, 2006***).

Ovarian carcinoma often is called the "silent killer" because the disease usually is not detected until an advanced stage (***Goff et al, 2000***). Ovarian cancer is the most frequent cause of death from gynecological malignancies in the Western world. Most cases of epithelial ovarian cancer are detected at late stages and the resultant overall five-year survival is poor. However, when epithelial ovarian cancer is detected with the disease confined to the ovary the prognosis is favorable (***Varras, 2004***).

Prospective studies have demonstrated that both CA125 and transvaginal ultrasound can detect a significant proportion of preclinical ovarian cancers, and refinements in interpretation of results have improved sensitivity and reduced the false-positive rate of screening. There is preliminary evidence that screening can improve survival, but the impact of screening on mortality from ovarian cancer is still unclear (***Jacobs and Menon, 2004***).

Imaging has become an essential part in the clinical management of patients with ovarian cancer, contributing to tumor detection, characterization, staging, treatment planning, and follow-up. Imaging findings incorporated into the clinical impression assist in creating a treatment plan specific for an individual patient. Advances in cross-sectional imaging and nuclear medicine (PET) have yielded new insights into the evaluation of tumor prognostic factors. A multimodality approach can satisfy the complex imaging needs of a patient with ovarian cancer; however, the success of such

an approach always depends on available resources and on the skills of the physicians involved (***Mironov et al, 2007***).

An optimal screening test with high levels of sensitivity and specificity is essential for early detection of ovarian cancer. Serological screening with serum Ca125 can be used as a first-line screening test. In combination with TVS or color-flow Doppler imaging, this may prove very effective in early detection of ovarian cancer (***Munkarah et al, 2007***).

Application of 3D ultrasonography and power Doppler imaging In patients with "positive" standard ultrasound tests (annual TVS, followed by TVCD in selected cases) represents a novel approach for the early and accurate detection of ovarian cancer through screening (***Kurjak et al, 2005***).

MRI is more specific and accurate than US and Doppler assessment for characterizing adnexal masses. Women who clinically have a relatively low risk of malignancy but who have complex sonographic features may benefit from MRI (***Sohaib et al, 2005***).

Combined PET/CT demonstrates high diagnostic value in identifying primary ovarian cancer in patients with a pelvic mass of unknown origin and risk of malignant index > 150. It is suggested that PET/CT is the imaging modality of choice when US shows a pelvic tumor and additional information prior to surgery is needed (***Risum et al, 2007***).

Aim of work

To review the role of different imaging modalities in screening and early detection of ovarian cancer and thus decreasing the morbidity and mortality in those cases.