Sonographic morphology score, Doppler ultrasound and tumor markers in the assessment of adnexal masses and the relation to the histopathology

THESIS

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CONTENTS

LIST OF ABBREVIATIONS

CA125	Cancer antigen 125
CA 19-9	Carbohydrate antigen 19-9
2DU/S	Two dimensional ultrasound
HCG	Human chorionic gonadotrophin
LPA	Lysophosphatidic acid
M-CSF	Macrophage-colony stimulating factor
NPV	Negative predictive value
OC125	Ovarian cancer 125
PI	Pulsatility index
PID	Pelvic inflammatory disease
PPV	Positive predictive value
"P" value	Probability value
RI	Resistance index
RMI	Risk of malignancy index
ROC	Risk of ovarian cancer
S/D	Systolic/diastolic
TAS	Transabdominal sonography
TOA	Tubo-ovarian abscess
TVS	Transvaginal sonography

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ABSTRACT

Adnexal masses are considered a group of the most common diseases in gynecology and ovarian tumors represent two thirds of these cases. 2D ultrasound has become the main diagnostic tool in Obstetrics and Gynecology. Color Doppler in addition to serum level of CA125 and CA 19-9 can help in the assessment of adnexal masses. This study included sixty patients with adnexal masses and the role of the previous tools was studied in the assessment of these lesions. It was found that, clinical picture has the lowest sensitivity to predict malignancy. Doppler studies and serum level of tumor markers can improve the assessment of adnexal masses and differentiation between benign and malignant ovarian tumors.

Key Words:

Adnexal masses-ovarian tumors-2D ultrasound-Doppler-CA125-CA 19-9.

INTRODUCTION

Ovarian neoplasms present an increasing challenge to the physician and ovarian cancer is the most lethal of all gynecological cancers, presenting late and responding poorly to treatment **(Gaughan et al.,2006)**. Malignant ovarian tumors are the fourth most common cause of death in women **(Poveda , 2005)**. Approximately 4-24% of adnexal masses in premenopausal women and 39-63% in postmenopausal women are malignant **(Myers et al., 2006).**

Ovarian masses may be encountered in patients being evaluated for a complaint referable to the pelvis or in asymptomatic patients. Most women with ovarian cancer have no symptoms for long periods of time. When symptoms develop, they are often vague and nonspecific. In early stage disease, the patient may experience irregular menses if she is premenopausal. If a pelvic mass is compressing the bladder or rectum, she may report urinary frequency or constipation. Occasionally, she may perceive lower abdominal distension, pressure, or pain, such as dyspareunia. Acute symptoms, such as pain secondary to rupture or torsion, are unusual **(Olson et al, 2001)**. Moreover, in advanced-stage disease, patients most often have symptoms related to the presence of ascites, omental metastases, or a bowel metastases. The symptoms include abdominal distension, bloating, constipation, nausea or anorexia. Premenopausal women may complain of irregular or heavy menses, whereas vaginal bleeding may occur in postmenopausal women **(Olson et al., 2001).**

Because the patient usually complains of abdominal symptoms, she may not have a pelvic examination, and a tumor may be missed. A variety of benign conditions of the reproductive tract, such as pelvic inflammatory disease, endometriosis, and pedunculated uterine leiomyoma, can simulate ovarian cancer. Non-gynecologic causes of an adnexal mass, such as inflammatory disease or neoplastic colonic mass or even a pelvic kidney can simulate ovarian cancer **(Berek and Hacker, 2000).**

A careful history taking and pelvic examination is an important step for the diagnosis, however, the diagnostic accuracy of pelvic examination varied in different series between 50% and 90%. It is affected by several variables including the experience of the gynecologist, the type of the patient and the characteristics of the mass. Several factors may hinder the diagnosis, even for an experienced gynecologist: virginity, obesity, associated pregnancy, ascites and pelvic tenderness **(Roman et al., 1997).**

Many diagnostic procedures have been used for a thorough evaluation of such cases, among them ultrasonography is a currently used tool for the diagnosis. The information about the likelihood that the mass is benign or malignant is important because it will affect the clinical management and the therapeutic approach.

Ultrasound examination for the prediction of malignancy in an ovarian mass has been limited by the lack of cut off criteria for evaluation of such masses but with the advent of high frequent transvaginal ultrasonography and 3D ultrasonography, new opportunities are presented in characterization of ovarian masses together with closer proximity to pelvic

vessels. Although, the gray scale prediction of benignity was quite reliable, many benign lesions were placed in the group of tumors suggestive of malignancy (false positive) because of their gray scale features **(Hata et al., 1999).**

Previous studies have shown that color Doppler ultrasonography may be able to detect neovascularization in some tumors of the ovary and together with a low resistance to blood flow, enabled the prediction of malignancy **(Jokubkiene et al., 2007).**

The observations made in the late 1980s indicated that the transvaginal color Doppler ultrasonography can be used in the detection of ovarian cancer and has generated a stream of clinical trials. However, the conflicting results of numerous publications have led to major controversy. Transvaginal color Doppler ultrasonography saves time and increases the accuracy of measurements, though masses over 10 cm in size are best evaluated using conventional transabdominal sonography. The most important advantage of this technique is the display of blood flow across the entire scanning plane of the pelvis. Therefore pulsed Doppler sample volume can be placed accurately on the area of interest using the guidance of the color flow, and spectral wave form analysis can be done easily, as each vessel imaged by color Doppler can be explored by pulsed Doppler and flow can be assessed without interference from other vessels lying distally, or in close proximity to the same axis of investigation and having a different circulatory patterns and hence color Doppler seems to produce a better characterization of pelvic tumor vascularity than any other current available diagnostic method **(Kurjak et al., 1989).**

Although the value of resistance and pulsatility indices have shown promise, various thresholds for these parameters have been proposed and significant overlap between benign and malignant (or border line) masses was found **(Czekierdowski, 2002).** Greater accuracy of color Doppler may be achieved with an additional qualitative assessment of blood flow in ovarian tumors as proposed by **Fleischer et al. (1993),** stressing the importance of blood vessel distribution within the tumor (peripheral in benign tumor and central in malignant tumor).

Tumor markers including CA-125 and CA 19-9 have been shown to contribute to early diagnosis of ovarien cancers **(Czekierdowski, 2002).**

Because of the many medical diagnoses that give false-positive CA-125 and CA 19-9 results, they cannot be used for general population screening for ovarian cancer in either premenopausal or postmenopausal women **(Erdogan et al.,2005)**.