The Role Of Doppler Ultrasound In The Management Of Adenxial Mass

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الخلاصة :

في دراسة تقدمية منتخبة اشتملت ٣٥ امرأه ممن ادخلوا في مستشفى الزهراء للولادة و الأطفال للفترة من كانون الثاني ٢٠٠٧- كانون الاول٢٠٠٧ والذين اثبت وجود ورم في الحوض لديهم (الى جانب الدم)عن طريق الفحص السريري والسونار البطني والمهبلي و كانت نتائج الدراسة وجود ٢٧ امرأه مع ورم حميد(٧٧%) و٨ (٢٣%)مع ورم خبيث.
- معدل العمر بالنسبة للاورام الحميده كان ٣٥ سنة وللاورام الخبيثة كان ٤٣ سنة .
- تم إجراء فحص الدوبلر للاوعية الدموية لغرض كشف عامل المقاومة والذي----- ان ٠.٤-٠.٩ للاورام الحميده و٠.١-٠.٣٢ للاورام الخبيثة و بمعدل قطعي عند الحد ٠.٣٤ والذي يؤشر انخفاض عند الاورام الخبيثة اكثر مما هو عند الاورام الحميده وليس هنالك تداخل بين الاثنين.
-اتضح من خلال هذه الدراسة أهمية وفعالية الدوبلر في تشخيص حالات الاورام في حوض المرأه الى جانب الفحص السريري والكيميائي لموشرات الاورام مع اهمية التشخيص النسائي عن طريق الجراحة البطنية .

Abstract

In controlled prospective study a 35 patient with adnexial masses were examined using vaginal Doppler sonography to measure the resistance index of tumor associated blood flow profiles preoperatively with follow up of patients postoperatively by histopathology.
The result of study revealed 77%had benign tumor, 23% had malignant tumor, RI value had ranging from 0.4-0.9 and 0.1-0.32 for benign and malignant tumor respectively with a cut off value mean of 0.34. RI was low in malignant with no overlapping between benign and malignant cases.

Introduction

Adenxial masses are frequently found in both symptomatic and asymptomatic women. Following menarche adnexial masses are most likely to be follicular and corpus luteum cysts of the ovary. Other nonneoplastic ovarian masses found in this age include endometriomas, polycystic ovaries and benign tumours. Ectopic pregnancy must always be excluded in women of reproductive age .Malignant ovarian neoplasms in younger women are usually germ cell tumors and of low-malignant or borderline malignancy.(1,2) With increasing age, the incidence of malignancy rises. The overall risk of primary ovarian neoplasm being malignant increases from 13% in premenopausal women to 45%following menopause(3) with incidence of 25% of all cancer in female and mortality rate 50% more than carcinoma of cervix and uterus(4). Malignant adenxial lesions include both primary ovarian carcinoma and metastatic disease from uterus-breast or GIT.
An ultrasound examination is the most valuable diagnostic study of adenxial mass.It can indicate whether a mass is cystic or solid, its contour is smooth or contains excrescences, and if contains any internal septa or papillae which is suggestive of malignancy. The presence of ascites also may indicate a malignancy.Trans-vaginal ultrasonographyis better than trans-abdominal by resolusion of pelvic structures with less artifact.(5,6,) Serum tumor markers are also helpful in some cases for screening like CA125, alpha-feto protein, B-hCG,and LDH.(7)
The use of Doppler flow studies of ovarian vasculature as a mean to differentiate benign from malignant ovarian tumors is based on the observed difference in resistance to flow between vessels supplying benign ovarian tissues and those associated with ovarian

malignancies.With malignant tumors angiogenesis there is an increased in the number and tortuisity of vessels, these vessels lack muscular intima and form multiple arterio-venous shunts so there is low impedance to flow in Doppler velocimetry. The flow velocimetry waveform obtained from a target vessel is evaluated according to standard parameters pulsatility index (PI) and resistive index (RI). (6,8)
The vessels supplyng benign ovarian tumors generally were peripheral in location and have high systolic flow, in contrast vessels supplying ovarian malignancies were centrally located and have low RI

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Aim of study: To evaluate the effect of Doppler flow sonography for the discrimination between benign and malignant ovarian masses and to find out the best RI cutoff value

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Material and methods: It is a prospective controlled study had been done between January 2007 and December 2007 in Al-Zahraa teaching hospital. 35 pre-and postmenopausal women with pelvic masses diagnosed by ultrasound formed our study.Transvaginal Doppler sonography was performed after appropriate evaluation of the lesion morphology,several measurements of RI were taken for each mass from the wall, septum or papillation if present and from a solid side or echogenic core and the mean of them was calculated. The resistance index RI was calculated as systolic peak minus diastolic peak divided by systolic peak. Laprotomy operations had been done and adenxial masses send for histopathological examination .The sensitivity , specificity and p-value were determined for different cutoff values of Doppler flow assessment for the prediction of malignancy

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Statistical analysis: Continuous variables between two groups were compared by the Student`s t-test for unpaired observations.A P-value<0.001 was considered as statistically significant. The receiver operator characteristic (ROC) curve for RI was assessed to determine cutoff values for the prediction of malignancy

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Results: Table-1 shows the mean age of the patients for benign were 35 and malignant were 43 years, the mean RI for benign was 0.61 (ranging from 0.4-0.9) while for malignant tumor was 0.23 (ranging 0.15-0.32).

Tumor	Cases	Age			RI		
		mean	±SD	Range	mean	±SD	Range
Benign	27(77%)	35	10.323	22-55	0.612	0.116	0.4-0.9
Malignant	8(23%)	43	16.371	20-74	0.234	0.630	0.15-0.32

Table-2 shows different histopathological types of benign tumors and their RI values which is not significantly differs .

Table (2): Benign cas

Histopathology	Cases	Age			RI		
		mean	±SD	Range	mean	±SD	Range
Follicular cyst	13	30.538	6.728	18-43	0.70	0.108	0.5-0.9
Serous Adenoma	5	27.40	2.792	24-30	0.74	0.114	0.6-0.9
Fibromayoma	4	35.5	13.329	25-55	0.60	0.082	0.5-0.7
Endometrioma	2	40	7.07	35-34	0.5	0.141	0.4-0.6
Mature cyst teratoma	2	25.5	3.535	23-28	0.45	0.071	0.4-0.5
Corpus luteum cyst	1	29	-	-	0.6	-	-

Table-3 shows different malignant tumors and their different RI values which is not statistically different.

Table (3): Malignant Case

Histopathology	Cases	Age			RI		
		mean	±SD	Range	mean	±SD	Range
Serous cyst Adenocarcinoma	4	47	3.5	43-50	0.212	0.063	0.15-0.3
Endometriod Adenocarcinoma	2	58	22.6	42-74	0.26	0.084	0.2-0.32
Dysgerminoma	2	23	4.2	20-26	0.25	0.071	0.2-0.3

Table-4 shows comparism of mean RI values between benign and malignant ovarian tumors which shows low RI to flow in malignant cases which is statistically significant (P-value ≤0.001) than benign cases.

Table (4): T-test Statistics of RI

Tumor	cases	mean	±SD	P-value
Benign	27	0.6481	0.1341	0.000**
Malignant	8	0.2243	0.0616	

Table-5 to determine the cutoff value of RI for differentiating between malignant and benign cases ROC was done taking each observed value as cutoff, ROC gives sensitivity and specificity of the test. When 0.36 is taken as cutoff sensitivity decreased though specificity have no change , when 0.31 is taken as cutoff specificity increased though sensitivity have no change , so 0.335 (mean of two values) is better cutoff value with specificity of 93% and sensitivity 97%

Table (5):

IR test value observed	Sensitivity	Specifity	P value
0.175	1.000	0.125	<0.001
0.250	1.000	0.375	<0.001
0.310	1.000	0.875	<0.001
0.360	0.926	1.000	<0.001
0.450	0.857	1.000	<0.001
0.550	0.778	1.000	<0.001
0.650	0.481	1.000	<0.001
0.750	0.222	1.000	<0.001
0.850	0.074	1.000	<0.001
1.000	0.000	1.000	<0.001

The cut off points of the IR in the best differentiation of malignant from benign masses was 0.335

Discussion: Early detection of ovarian cancer remain a challenge and still to be one of the most important causes of death in gynecologic malignancy. Majority of patients are first identified at stage 3 or 4 , so early detection is important to improve the quality of life and reduction
mortality so several diagnostic methods have been introduced for early detection . High frequency transvaginal sonography produce greater image resolution.(4,7). Recently color Doppler has been used to identify neovascularity in malignant masses (8) .
In our study there is a relationship between age of the patients and occurrence of benign and malignant masses , where the mean age of the patient with benign tumors was 35 and 43 for malignant and this is similar to what Curtin JP said (9-1994) that the most patient characteristics is the age with majority of malignant adenxial masses occur in women over age of 45 , with exception of germ cell tumors which occur in younger age
The RI for benign tumors were 0.5-0.9 and for malignant were 0.15-0.32 which not goes with Dr Tayfam (turkey-1997) whose find that RI value were 0.27-0.87 in malignant and 0.35-1.0 in benign however it goes with Jacobs et al .(10)
Several authors used 0.6 as demarcation between benign and malignant lesions others have suggested it should be 0.4 and some others 0.8 (11.12). While in our study cutoff is 0.34 which is goes with Kurjak et al(13) , this is due to most our patients come in stage 3 or 4 of ovarian cancer because no much facilities for screening and early detection of ovarian cancer.

Conclution: Doppler flow measurements are effective in differentiation of benign and malignant adnexial masses and for screening and early detection of malignancy.

Recommendations:

1- Transvaginal Doppler provides high sensitivity and specificity .It can be used as superior to other methods as a diagnostic for preoperative evaluation of ovarian masses.
2- Two dimensional sonography and assessment of CA125 serum level are well established indices for prediction of malignancy .
3-A pelvic mass can represent a number of different benign and malignant conditions. The final diagnosis has been perform on exploratory laprotomy.

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