

Comparative Study between use of IOTA and ORADS Consensus Scores in Diagnosis of Ovarian Masses Using Ultrasound

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Introduction

In general, adnexal lesions are common and usually benign. Benign ovarian tumors have been shown to be associated with an increased risk of ovarian cancer, although they may be found incidentally during imaging for other unrelated conditions or in individuals with symptoms (such as pelvic discomfort or a palpable pelvic mass). With a five-year survival rate of about 40%, ovarian cancer is the most aggressive gynecological cancer and is responsible for about half of all gynecological cancer-related deaths. Referral to a gynecological oncology center for additional diagnosis or staging and therapy with a multidisciplinary team is a significant factor that determines prognosis in addition to stage at diagnosis, which is the most critical determinant for survival. Accurate description of adnexal lesions on imaging is critical to avoid unnecessary surgery for benign lesions and to refer suspicious tumors to a gynecologic oncologist. Ultrasound is considered the first choice useful imaging test for diagnosis of ovarian and adnexal masses because it is a noninvasive, widely available, inexpensive imaging technique with little risk or pain to the patient.

Aim of the work

To compare IOTA (International Ovarian Tumors Analysis) and O-RADS (Ovarian-adnexal Reporting and Data System) consensus scores in diagnosis of ovarian masses using ultrasound.

Subjects and Methods

To reach the aim of this study, a prospective observational analytical cross-sectional study was conducted including 120 patients with adnexal masses diagnosed by ultrasound who met the inclusion criteria and presented to the Oncology unit of El Shatby Maternity University Hospital which is the department of Obstetrics and Gynecology of the Faculty of Medicine of Alexandria University from March 2023 to September 2024. The inclusion criteria included the following: at least one adnexal lesion identified by transvaginal and/or transabdominal ultrasonography, the lesion removed surgically and evaluated histopathologically; a maximum of 90 days between ultrasound detection and surgery; and, if indicated, magnetic resonance imaging of the suspected benign lesions. The exclusion criteria were the following: history of bilateral salpingo-oophorectomy,

ultrasound limitations, uncertain of pathology results, pregnancy, previous radiotherapy or chemotherapy for ovarian cancer and any case which should be managed only by follow up. The patients were subjected to a history taking and demographic data, physical examination, laboratory assessment, ultrasound assessment, magnetic resonance imaging examination (if indicated) and histopathology of specimen after surgical procedure.For statistical purposes, Borderline ovarian tumors were considered malignant. Data were gathered for statistical analysis and fed into the computer using the IBM SPSS (Statistical Package for Social Science) software version 20.0 (Armonk, NY: IBM Corp, released 2011).

Results

The current study found that 58.3% of adnexal masses were pathologically benign. The age of the studied patients ranged from 10 to 73 years with a mean of 48 years. It was found that 55 patients (45.8%) were pre-menopausal with 14 of them (25.4%) had a malignant adnexal masses and 65 patients (54.2%) were post-menopausal with 36 of them (55.4%) carrying a malignant adnexal masses.

Table (1):Distribution of studied cases according to IOTA Simple Rules, ADNEX Model, ORADS US and ORADS MRI

	Total		Pathology results				Test of sig.	p
			Benign		Malignant			
	No.	%	No.	%	No.	%		
IOTA Simple Rule	(n =120)		(n =70)		(n =50)		$\chi^2=17.746^*$	0.001*<
Benign	42	35.0	32	45.7	10	20.0		
Malignant	50	41.7	18	25.7	32	64.0		
Inconclusive	28	23.3	20	28.6	8	16.0		
IOTA ADNEX MODEL	(n =118)		(n =68)		(n =50)		U=486.00*	0.001*<
Min. – Max.	0.50 – 99.60		0.50 – 88.60		2.60 – 99.60			
Mean ± SD.	39.65 ± 38.82		19.46 ± 24.26		67.12 ± 38.18			
Median (IQR)	88.60)–16.20(6.90		–7.30 (41.50 76.05)		–92.10(92.10 98.90)			
ORADS US								
ORADS 2	7	5.8	7	10.0	0	0.0	FET=22.811*	0.001*<
ORADS 3	19	15.8	15	21.4	4	8.0		
ORADS 4	50	41.7	34	48.6	16	32.0		
ORADS 5	44	36.7	14	20.0	30	60.0		
ORADS MRI								
Not AVAILABLE	88	73.3	52	74.3	36	72.0	FET=26.238*	0.001*<
ORADS 1	2	1.7	2	2.9	0	0.0		
ORADS 2	2	1.7	2	2.9	0	0.0		
ORADS 3	10	8.3	8	11.4	2	4.0		
ORADS 4	6	5.0	6	8.6	0	0.0		
ORADS 5	12	10.0	0	0.0	12	24.0		

Table (2): Comparison of Prognostic performance for IOTA Simple Rules, ORADS US and to IOTA ADNEX model to predict malignancy of pathological results

	IOTA Simple rules	ORADS US	IOTA ADNEX model
AUC	0.629	0.735	0.857
P	0.017*	<0.001*	<0.001*
p ₁ ^{\$}		0.003*	<0.001*
p ₂ ^{\$}			0.002*
95% C.I	0.529 – 0.729	0.786 – 0.928	0.645 – 0.825
Cut off	–	5 [#]	>11.2
Sensitivity	80.0	60.0	88.0
Specificity	45.71	80.0	61.76
PPV	51.28	68.2	62.9
NPV	76.19	73.7	87.5
Accuracy	60.0	71.67	72.69

AUC, area under a curve; p-value, probability value; CI, confidence interval; NPV, negative predictive value, PPV, positive predictive value, p1, p-value for comparing between IOTA Simple rules with ORADS US and IOTA ADNEX model; p2: p-value for comparing between ORADS US and IOTA ADNEX model. *; statistically significant at $p \leq 0.05$; #, for Youden index; \$, DeLong method.

Conclusion

Using ultrasound, the IOTA simple rules, ADNEX model, or ORADS US can differentiate well between benign and malignant adnexal masses with reasonable accuracy. The sensitivity of ADNEX model and IOTA simple rules is superior to ORADS US. However, ORADS US has a higher specificity than the ADNEX model and the IOTA simple rules. The PPV of ORADS US is superior to the ADNEX model and the IOTA simple rules. The NPV is higher for the ADNEX model than for ORADS US and IOTA simple rules.