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Study of Validity of O-RADS Ultrasonography in Risk Stratification and Management of Adnexal Masses

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ABSTRACT

Background: It is important to remember that ovarian cancer is a frequent and potentially fatal disease. For the purpose of characterizing the imaging properties of adnexal masses, the Ovarian-Adnexal Reporting and Data System (O-RADS) Committee have been established. **Objective:** The aim of the current work was to evaluate the validity of O-RADS to diagnose adnexal masses utilizing pelvic ultrasound.

Subjects and methods: This prospective cohort study included a total of 30 women having at least one adnexal mass detected by US, recruited from Department of radiodiagnosis, Zagazig University Hospitals.

Results: About 75.8% of the adnexal masses were benign and 24.2% were malignant. The most frequent benign lesion among patients who had O-RADS 2 or 3 was a hemorrhagic cyst. Only 2 patients with O-RADS 5 had benign lesions (mucinous cystadenoma and serous cystadenoma), while 5 patients had malignant lesions. Regarding only those adnexal masses classified as O-RADS 5 to predict adnexal masses malignancy, the O-RADS had a specificity, sensitivity, PPV, NPV and accuracy of 92%, 62.5%, 71.4%, 88.5%, and 84.8%, respectively. Considering combined O-RADS 4 and 5 as a malignancy predictor of adnexal masses, the specificity, sensitivity, PPV, NPV, and accuracy were 72%, 87.5%, 50%, 94.7%, and 75.8%, respectively.

Conclusion: It could be concluded that the U/S O-RADS classification system is a great noninvasive diagnostic tool for suspected ovarian masses with high sensitivity in differentiating between benign and malignant neoplastic tumors.

Keywords: O-RADS Ultrasonography, Adnexal Masses

INTRODUCTION

Early detection and treatment in high-volume clinics by trained clinicians is known to enhance survival rates for ovarian cancer, a prevalent and deadly disease [(1)].

Recognizing the nature of adnexal masses is crucial for providing the best care possible to patients. Lesions that are benign are better treated with less drastic measures. However, when cancer is detected, patients should be sent to a gynecologic oncologist because doing so improves outcomes. Maximizing long-term survival for women with ovarian cancer while reducing the number of needless operations performed on those with a minimal risk of the disease is the ultimate aim. Minimizing surgical morbidity and preserving hormonal competence are important goals for patients with low risk of cancer [(2)].

There is growing concern about the lack of standardized terminologies in gynecological imaging, in particular those pertaining to ovarian pathology [(3)].

Major discrepancies in interpretations are often the result of inconsistencies in the usage of morphologic imaging criteria and descriptors on a global, national, and even institutional scale. The authors Huang *et al.* note that ovarian cancer is a common and deadly disease, but that it can be effectively treated if caught early and brought to a busy hospital with trained medical professionals. Correctly characterizing adnexal masses is essential for optimal patient management. Lesions with a high probability of being benign require more conservative treatment [(4)].

For the sake of future research, **Timmerman *et al.*** [(3)] of the European-based International Ovarian Tumor Analysis Group (IOTA) established a set of words, definitions, and measurement procedures in the year 2000.

Under the guidance of the American College of Radiology (ACR), the Ovarian-Adnexal Reporting and Data System (O-RADS) Committee was formed in the summer of 2015 to construct a lexicon that would allow the development of a practical, universal vocabulary to define adnexal masses' characteristics [(4)]. The aim of the current work was to evaluate the validity of O-RADS to diagnose adnexal masses utilizing pelvic ultrasound.

SUBJECTS AND METHODS

This prospective cohort study included a total of 30 women having at least one adnexal mass detected by US, recruited from Department of radiodiagnosis, Zagazig University Hospitals.

Inclusion criteria:

1) Women with suspected adnexal mass based on clinician request.
2) Patients of all age groups.
3) Accidentally discovered adnexal masses in non-complaining females.

Exclusion criteria:

1) Recurrent adnexal masses.
2) Patients receive neoadjuvant chemotherapy.
3) Patients lost during follow-up.

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4) Patients with O-RADS 1 status, indicating normal ovary findings by ultrasound.

All patients were subjected to the following:

1. **Complete history taking:** Which was confined to detailed personal history, history of present illness, clinical manifestations, family history and history of previous surgery or medication.
2. **Ultrasound (US) examination:**

- All US tests were performed on the same system (a SonoScape S40 Exp/S40 Pro/S40/S35 Digital Color Doppler ultrasound system) to rule out the possibility of a system-to-system variation in the ultrasound imaging.
- We used a high-frequency TV probe and a real-time sector scanner to conduct the TV US. When the patient has finished urinating, he put in the lithotomy posture. Patients who were either virgins or had particularly large tumors that could not be seen in their entirety via TV had a transabdominal US performed as well. An ultrasonic transabdominal scan was performed utilizing a real-time scanner and a low-frequency probe (3/3.5 MHz).
- The lesion was scanned with color doppler to locate any vascular color signals.
- Following evaluations, patients were categorized using the O-RADS.
- Cases that underwent surgery had their O-RADS scores compared to the final histological diagnosis, while those that did not have surgery were followed up on.

Ethical consent:

The study was authorized by Zagazig University's Ethical Institutional Review Board (ZU-IRB#6332/12-8-2020). All study participants provided written informed consent after being informed of the research's goals. The Declaration of Helsinki for human beings, which is the international medical association's code of ethics, was followed during the conduct of this study.

Statistical analysis

Version 27.0 of the IBM SPSS application was utilized. Minimum and maximum values, as well as means, standard deviations, medians, and interquartile ranges, were used to characterize numerical data. Using a 5-percent criterion, the significance of the obtained results was determined. Chi-square analysis was used. More than 20% of the cells with an estimated count of fewer than 5 required chi-square adjustment for categorical variables.

RESULTS

Table (1) shows that the median age of the patients was 34.9 years, ranged from 15 to 70years.

Regarding marital status, 83.3% of patients were married. Regarding parity 26.7% of the patients were nullipara and 73.3% were multipara. Regarding menopause, 80% of the patients were premenopausal.

Table (1): Age and history of the studied patients:

Variable		(n=30)	
Age (year)	Mean ± SD	34.9±16.4	
	Median	33	
	Range	15-70	
Variable		**No**	**%**
Marital status:	Married	25	83.3
	Unmarried	5	16.7
Parity:	Nulliparous	8	26.7
	1-3	17	56.7
	4-5	5	16.7
Menopause:	Pre	24	80
	Post	6	20

Table (2) shows that the most frequent echogenicity among the lesions was heterogeneous and anechoic (42.4% and 33.3%, respectively). Regarding wall and composition, 69.7% of the lesions had thin walls and 57.6% had cystic components. Approximately 27.3% of the adnexal masses were multilocular. Septations were found in 15.2% of the lesions, solid papillary projection in 6%, and ascites in 12.1%. Doppler evaluation showed peripheral flow in 69.7% and central flow in 30.3% of lesions. Finally, the lesion size ranged from 0.097 to 224 cm^2 with a mean of 54.40±60.19 cm^2.

Table (2): Ultrasound features of the studied lesions:

Variable		(n=33#)	
		No	**%**
Echogenicity	Anechoic	11	33.3
	Echogenic	2	6.1
	Hyperechoic	1	3
	Hypoechoic	3	9.1
	Heterogenous	14	42.4
	Homogenous	2	6.1
Wall thickness	Thin	24	69.7
	Thick	9	30.3
Composition	Cystic	19	57.6
	Solid	6	18.2
	Mixed	8	24.2
Uni or multilocular	Unilocular	6	18.2
	Multilocular	9	27.3
Septations	Absent	28	84.9
	Present	5	15.2
Solid papillary projection	Absent	31	94
	Present	2	6
Ascites	Absent	29	87.9
	Present	4	12.1
Doppler evaluation	Central flow	10	30.3
	Peripheral flow	23	69.7
Size (cm^2)	Mean ± SD	54.40±60.19	
	Median	35.28	
	Range	0.097-224	

According to the O-RADS classification system, 24.2% of adnexal masses were classified as score 2, 33.3% as score 3, 21.2% as score 4 and 21.2% as score 5 (Figure 1).

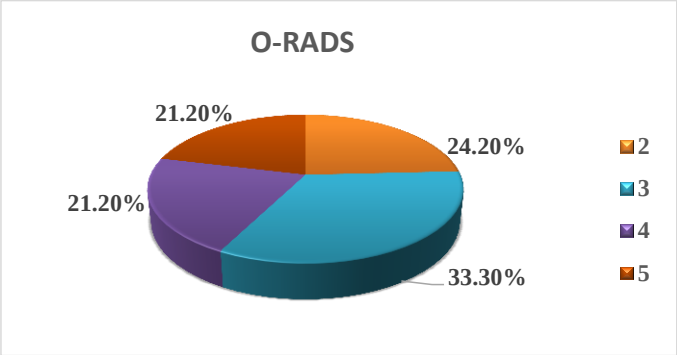


Figure (1): The O-RADS score in the studied lesions.

Table (3) shows that 75.8% of the adnexal masses were benign and 24.2% were malignant. The most frequent benign lesions were hemorrhagic cysts, mucinous cystadenomas and dermoid cysts (18.2%, 15.2%, and 15.2%, respectively) whereas serous cystadenocarcinoma was the most frequent malignant lesion (12.2%).

Table (3): Definitive histopathological diagnosis of lesions:

Diagnosis	**(n=33)**	
	No	**%**
Benign:	**25**	**75.8**
• Mucinous cystadenoma	5	15.2
• Serous cystadenoma	2	6.1
• Seromucinous cystadenoma	1	3
• Hemorrhagic cyst	6	18.2
• Dermoid cyst	5	15.2
• Chocolate cyst	3	9.1
• Simple cyst	2	6.1
• Tubo-ovarian abscess	1	3
Malignant:	**8**	**24.2**
• Mucinous cystadenocarcinoma	2	6
• Borderline mucinous cystadenoma	2	6
• Serous cystadenocarcinoma	4	12.2

Table (4) shows that compared to women with benign lesions, women with malignant lesions were significantly older on average and more likely to be postmenopausal.

Table (4): Comparison between patients who had benign and patients who had malignant adnexal masses in demographic characters and history:

Variable		**Malignant (n=7)**		**Benign (n=23)**		**MW**	**P**
Age (year)	Mean ± SD Median Range	54.43±18.05 60 21-70		28.96±10.43 26 15-50		**2.92**	**0.003***
Variable		**No**	**%**	**No**	**%**	**χ^2**	**P**
Marital status	Married Unmarried	7 0	28 0	18 5	72 100	1.83	0.18 NS
Parity	Nulliparous 1-3 4-5	1 3 3	12.5 17.6 60	7 14 2	87.5 82.4 40	4.59	0.10 NS
Menopause	Pre Post	2 5	8.3 83.3	22 1	91.7 16.7	**15.09**	**<0.001 ****

Table (5) shows that transvaginal ultrasound was used significantly more often among benign patients.

Table (5): Comparison between patients with benign and those with malignant lesions in the type of US used and side of lesions:

Variable		Malignant (n=7)		Benign (n=23)		χ^2	P
		No	%	No	%		
Type of US	Transabdominal	2	28.6	5	71.4	**6.79**	**0.03***
	Transvaginal	0	0	12	100		
	Both	5	45.5	6	54.5		
Side	Right	2	20	8	80	0.23	0.89 NS
	Left	4	23.5	13	76.5		
	Bilateral	1	33.3	2	66.7		

Table (6) shows that there was a statistically significant difference in wall thickness, ascites, central blood flow and lesion size between malignant and benign lesions.

Table (6): Comparison between benign and malignant adnexal masses regarding ultrasound features of the studied lesions:

Variable		Malignant (n=8#)		Benign (n=25#)		χ^2	P
		No	%	No	%		
Echogenicity	Anechoic	0	33.3	11	100	10.31	0.07 NS
	Echogenic	0	6.1	2	100		
	Hyperechoic	0	3	1	100		
	Hypoechoic	1	33.3	2	66.7		
	Heterogenous	7	50	7	50		
	Homogenous	0	0	2	100		
Wall thickness	Thin	2	8.3	22	91.7	**12.13**	**<0.001 ** **
	Thick	6	66.7	3	33.3		
Composition	Cystic	2	10.5	17	89.5	4.88	0.09 NS
	Solid	3	50	3	50		
	Mixed	3	37.5	5	62.5		
Uni or multilocular	Unilocular	0	0	6	100	18.71	0.10 NS
	Multilocular	4	50	5	20		
Septations	Absent	5	17.9	23	82.1	4.1	0.04 NS
	Present	3	60	2	40		
Solid papillary projection	Absent	7	22.6	24	77.4	0.77	0.38 NS
	Present	1	50	1	50		
Ascites	Absent	4	13.8	25	86.2	**14.22**	**<0.001 ** **
	Present	4	100	0	0		
Doppler evaluation	Central flow	8	80	2	20	**24.29**	**<0.001 ** **
	Peripheral flow	0	0	23	100		
Size: (cm^2)	Mean ± SD	130.38±76.59		30.08±24.07		**MW 3.26**	**<0.001 ** **
	Median	151.69		30.16			
	Range	30.16-224		0.097-107.35			

Table (7) shows that all patients with O-RADS 2 had benign lesions. The most frequent benign lesion among patients who had O-RADS 2 or 3 was a hemorrhagic cyst. Only 2 patients with O-RADS 5 had benign lesions (mucinous cystadenoma and serous cystadenoma), while 5 patients had malignant lesions. There was a statistically significant increase in the malignancy rate among patients with a score of 5 compared with the other scores.

Table (7): The O-RADS score of adnexal masses according to the final histopathological diagnosis, and Malignancy rate of the O-RADS classification system:

Diagnosis	O-RADS 2		O-RADS 3		O-RADS 4		O-RADS 5	
	No	%	No	%	No	%	No	%
Benign:	**8**	**32**	**10**	**40**	**5**	**20**	**2**	**8**
• Mucinous cystadenoma	0	0	3	60	1	20	1	20
• Serous cystadenoma	0	0	0	0	1	50	1	50
• Seromucinous cystadenoma	0	0	0	0	1	100	0	0
• Hemorrhagic cyst	3	50	3	50	0	0	0	0
• Dermoid cyst	2	40	2	40	1	20	0	0
• Chocolate cyst	2	26.7	1	33.3	0	0	0	0
• Simple cyst	1	50	1	50	0	0	0	0
• Tubo-ovarian abscess	0	0	0	0	1	100	0	0
Malignant:	**0**	**0**	**1**	**12.5**	**2**	**25**	**5**	**62.5**
• Mucinous cystadenocarcinoma	0	0	0	0	0	0	2	100
• Borderline mucinous cystadenoma	0	0	0	0	0	0	2	100
• Serous cystadenocarcinoma	0	0	1	25	2	50	1	25

		Benign (n=25)		Malignant (n=8)		Malignancy rate	χ^2	P
		No	%	No	%			
O-RADS	2 (n=8)	8	32	0	0	**0%**		
	3 (n=11)	10	40	1	12.5	**9.1%**		
	4 (n=7)	5	20	2	25	**28.6%**	**12.5**	**0.006***
	5 (n=7)	2	8	5	62.5	**71.4%**		

Table (8) displays the sensitivity (92.5 percent), specificity (92.5 percent), positive predictive value (71.4 percent), negative predictive value (88.5 percent), and accuracy (84.8 percent) of the O-RADS for predicting malignancy of adnexal masses. The sensitivity, specificity, PPV, NPV, and accuracy of determining whether or not adnexal masses are malignant using a combination of O-RADS 4 and 5 were 87.5%, 72%, 50%, 94.7%, and 75.8%, respectively.

Table (8): Validity of O-RADS ultrasonography in the diagnosis of adnexal masses in comparison to histopathology:

Variable	O-RADS	
Cut off	***O-RADS 4 and 5***	***O-RADS 5***
Number of true-positive findings	7	5
Number of false-negative findings	1	2
Number of false-positive findings	7	3
Number of true-negative findings	18	23
Accuracy (%)	75.8%	84.8%
Sensitivity (%)	87.5%	62.5%
Specificity (%)	72%	92%
Positive Predictive Value (%)	50%	71.4%
Negative Predictive Value (%)	94.7%	88.5%
Positive Likelihood Ratio	3.13	7.81
Negative Likelihood Ratio	0.17	0.41

With a best threshold of O-RADS3, ROC tests evaluating the validity of O-RADS ultrasonography for the diagnosis of adnexal masses showed an AUC of 0.87 (95 percent CI= 0.71 - 0.96, P 0.0001). After using this cutoff, the sensitivity was 87.5% (95 percent CI= 47.4 to 99.7), the specificity was 72.0% (95 percent CI= 50.6% to 88.7%), and the likelihood ratio was 3.12 (95% CI= 1.9 to 27.5%). (Figure 2)

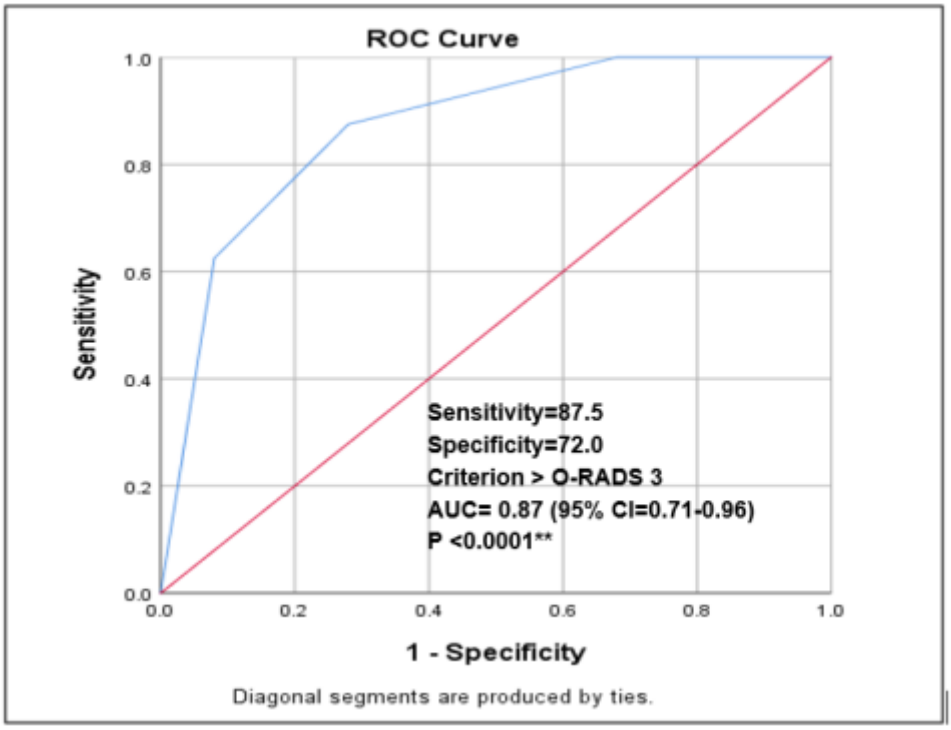


Figure (2): Using histology as a gold standard, we performed ROC analyses to determine the accuracy of O-RADS ultrasonography in diagnosing adnexal masses.

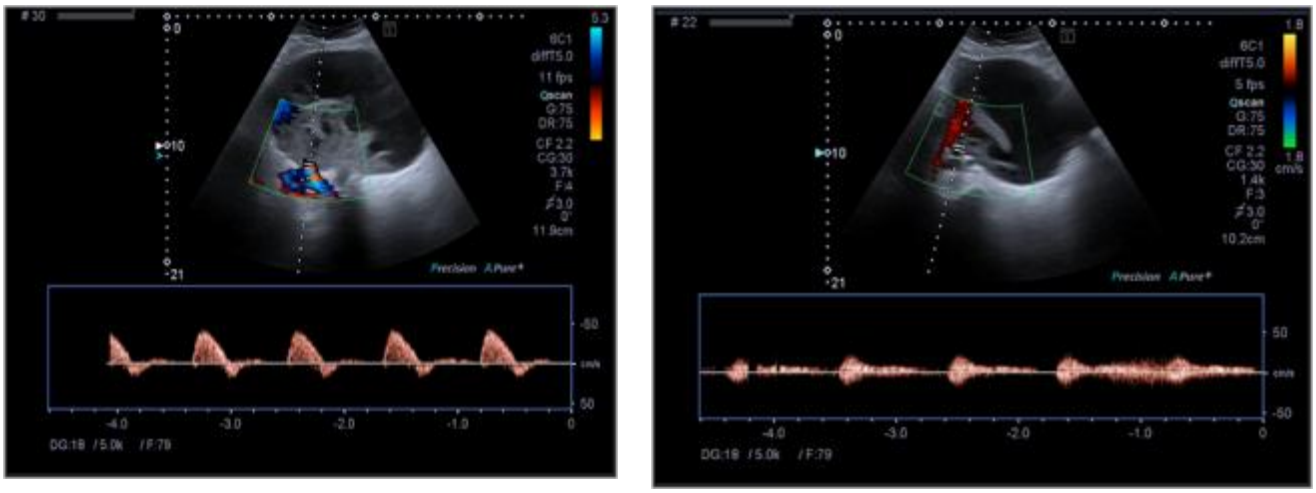
Table (9): Coordinates on the ROC curve with the corresponding criterion values:

Criterion	Sensitivity (%)	95% CI	Specificity (%)	95% CI	+LR	-LR
≥ O-RADS 2	100.00	63.1 - 100.0	0.00	0.0 - 13.7	1.00	
> O-RADS 2	100.00	63.1 - 100.0	32.00	14.9 - 53.5	1.47	0.00
> O-RADS 3	87.50	47.3 - 99.7	72.00	50.6 - 87.9	3.12	0.17
> O-RADS 4	62.50	24.5 - 91.5	92.00	74.0 - 99.0	7.81	0.41
> O-RADS 5	0.00	0.0 - 36.9	100.00	86.3 - 100.0		1.00

This table shows revealed the O-RADS was 100% sensitive and 100% specific for detecting benign adnexal masses (O-RADS 2), and 100% sensitive and 32% specific for detecting malignant adnexal masses, in low-risk adnexal masses (O-RADS 3), 87.5% and 72% in indeterminate-risk adnexal masses (O-RADS 4); and 66.7% and 95%, respectively, in high-risk adnexal masses (O-RADS 5.

(A)

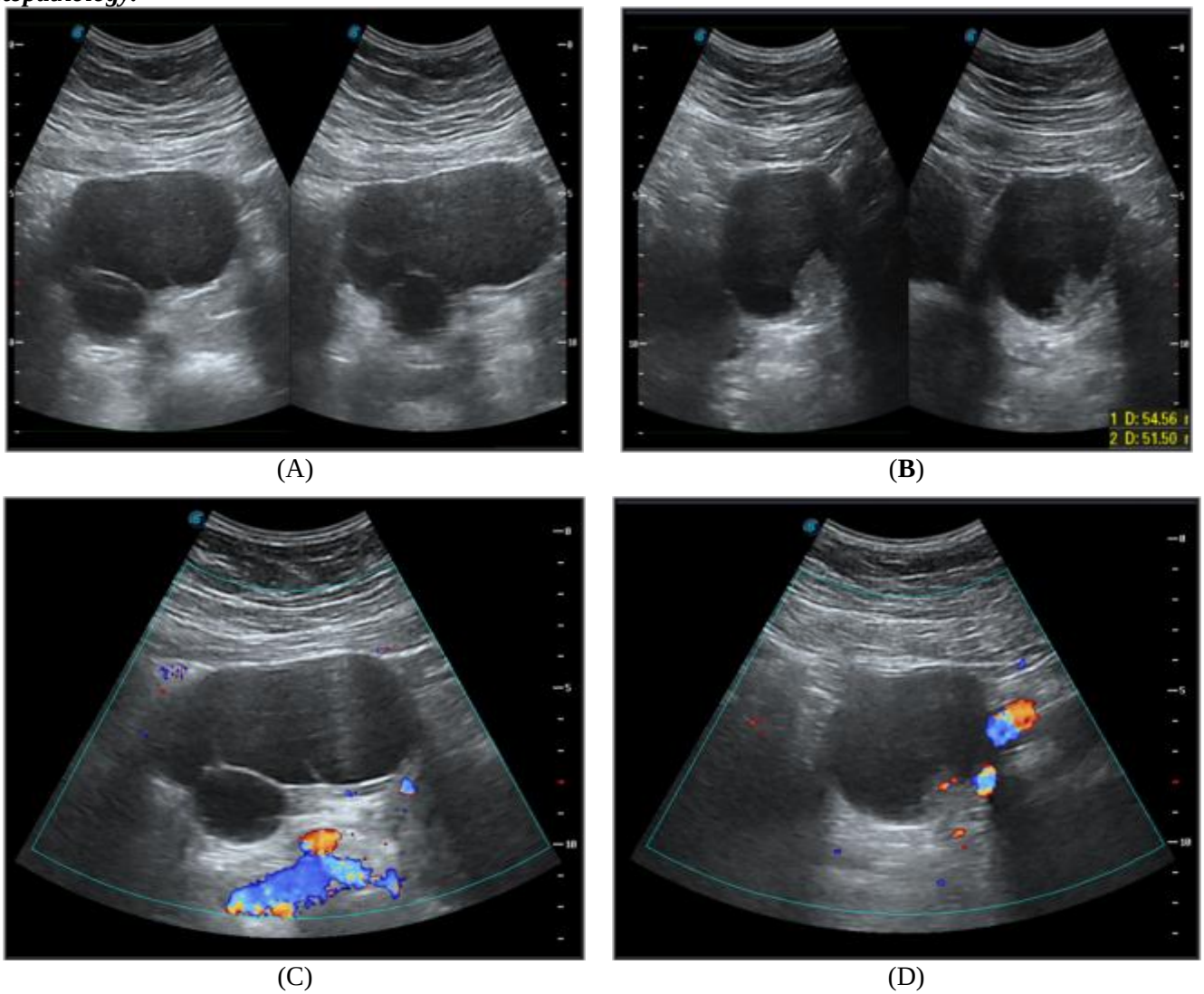
(**B**)



(C) (D)

Figure 3: A woman in her 70s complained of postmenopausal bleeding abnormalities and abdominal pain. **Ultrasound examination: (A)** and **(B)** Transabdominal gray-scale ultrasound images show a large complex adnexal mass with turbid fluid content and multiple internal solid papillary projections. **(C)** and **(D)** Transabdominal color Doppler ultrasound images reveal moderate vascularity (Score 3).

An O-RAD 5 classification indicates that the mass is very suspect for malignant neoplastic transformation. ***Diagnosis: After a biopsy and surgical removal, the diagnosis of mucinous cystadenocarcinoma was confirmed on histopathology.***



(A) (**B**)

(C) (D)

Figure 4: A woman in her fifties complained of severe abdominal distention and pain.

Ultrasound examination:

(A) and **(B)** Transabdominal gray-scale ultrasound images show multilocular cystic adnexal mass with turbid fluid, thin internal septations, and intramural solid echogenic nodule.

(C) and **(D)** Transabdominal color Doppler ultrasound images show reveal minimal internal vascularity (Score 2) within solid nodule.

The worrisome malignant neoplastic lesion was given an O-RAD 4 classification, suggesting more investigation is required. ***Diagnosis: After undergoing surgery, the diagnosis of serous cystadenoma was confirmed by histopathology.***

DISCUSSION

Ovarian cancer ranks among the top five cancers that kill women in the developed world. It's the leading cause of pain and death for women with gynecological cancers. As an additional fact, it is the sixth leading cause of death among women. Most people are only diagnosed at a late stage, when the prognosis is already bleak [(5)].

Any time a pelvic ultrasound detects an adnexal lesion, **Armstrong *et al.*** [(6)] determining whether the lesion is benign or precancerous is important for guiding subsequent care, which may involve referral to a gynecologic oncologist.

In order to standardize the terminology used to describe imaging features of adnexal masses, the American College of Radiology (ACR) established the Ovarian-Adnexal Reporting and Data System (O-RADS) Committee in the summer of 2015 [(7)].

Regarding the demographic data in our study, the median age of the patients was 34.9 years, ranged from 15 to 70years. Regarding marital status, 83.3% were married. Regarding parity, 26.7% of the studied patients were nullipara and 73.3% were multipara. Regarding menopause, 80% were pre-menopausal. 40% of the studied patients had transvaginal US, 23.3% had transabdominal and 36.7% had both. Regarding the side of lesions, 33.3% had lesions on the right side, 56.7% on the left side and 10% had bilateral lesions which makes the total lesions number 33.

Hack *et al.* [(8)] performed a retrospective research including all women who had pelvic US at a tertiary referral cancer hospital between August 2015 and April 2017. As many as 2801 pelvic US studies were found during the study period, and 227 individuals with 262 lesions (9 percent) were included. There was a wide range of ages represented, with 52 being the mean. In terms of when they entered and exited menopause, the breakdown was as follows: 113 (50% of the sample) were postmenopausal, 107 (47%) were premenopausal, and 7 (2% of the sample) were perimenopausal (3 percent).

In the current study, 75.8% of the adnexal masses were benign and 24.2% were malignant. The most frequent benign lesions were hemorrhagic cysts, mucinous cystadenomas and dermoid cysts (18.2%, 15.2%, and 15.2%, respectively) whereas serous cystadenocarcinoma was the most frequent malignant lesion was (12.2%). 75.8% of the adnexal masses were benign and 24.2% were malignant. The most frequent benign lesions were hemorrhagic cysts, mucinous cystadenomas and dermoid cysts (18.2%, 15.2%, and 15.2%, respectively) whereas serous cystadenocarcinoma was the most frequent malignant lesion (12.2%).

Prasad *et al.* [(9)] investigated 56 tumors; 4 were cancerous; 24 were noncancerous; the rest were physiological cysts or infectious processes. Seventy percent of the lesions in Ahmed's research had a malignant origin, whereas only 15 (or 30 percent) were benign [(10)].

Bhagde *et al.* [(11)] 50 patients, most of whom were less than 45 years old, were analyzed; all lesions were determined to be benign.

By analyzing the O-RADS score among our patients, 24.2% of adnexal masses were classified as score 2, 33.3% as score 3, 21.2% as score 4 and 21.2% as score 5. **Hack *et al.*** [(8)] found numbers of lesions within each O-RADS risk category were as follows: 100 (38%) for O-RADS 2, 32% for O-RADS 3, 24% for O-RADS 4, 27% for O-RADS 5, and 26% for O-RADS 5. There were 261 lesions (99%) that were classified correctly by both readers (k = 0.99; 95% CI: 0.98, 1; P =.98). Classic benign dermoid (O-RADS 2) vs. multilocular lesion without solid component was the only area of disagreement in O-RADS classification (O-RADS 3). The lesion was classified as O-RADS 3 by consensus [(8)].

During our study, we made a comparison between patients had benign and patients had malignant lesions in demographic characters, history, and ultrasound examination. There were a statistically significant increase in mean age and frequency of post menopause among females who had malignant lesions compared to females who had benign lesions. There was a statistically significant increase in the frequency of transvaginal US among benign females who had benign lesions patients. There was a statistically significant increase in the wall thickness, ascites, central Doppler blood flow and lesion size among malignant lesions compared to benign lesions.

Analysis of ultrasound and color Doppler data from 15 pre-menopausal and 35 post-menopausal women using Ahmed's (10) US-ORADS classification system revealed that 13 lesions met benign criteria with a US O-RADS score of 3, while 37 lesions scored US O-RADS 4-5, considered to be likely of malignant etiology, were the most common pathology in elderly post-menopausal women [(10)].

Furthermore, **Zhang *et al.*** [(12)] based on US GI-RADS analysis, 86 of the 263 masses were classified as benign neoplasm (GI-RADS 3), 101 were classified as GI-RADS 4, and 28 were classified as GI-RADS 5. Patients with cancer were older than those with benign tumors. Women with malignant lesions were

significantly older than those with benign lesions, and they had post-menopause at a higher rate.

Regarding the O-RADS score among our patients, all patients with O-RADS 2 had benign lesions. The most frequent benign lesion among patients who had O-RADS 2 or 3 was a hemorrhagic cyst. Only 2 patients with O-RADS 5 had benign lesions (mucinous cystadenoma and serous cystadenoma), while 5 patients had malignant lesions.

Concerning solely O-RADS 5 adnexal masses, the O-RADS had a sensitivity of 62.5%, specificity of 92.5%, positive predictive value (PPV) of 71.4%, negative predictive value (NPV) of 88.5%, and accuracy of 84.8% for predicting malignancy of adnexal masses. The sensitivity, specificity, PPV, NPV, and accuracy of determining whether or not adnexal masses are malignant using a combination of O-RADS 4 and 5 were 87.5%, 72%, 50%, 94.7%, and 75.8%, respectively.

With an AUC of 0.87 (95% CI= 0.71 - 0.96, P 0.0001), the optimal threshold for the diagnosis of malignant adnexal masses was found to be O-RADS3, according to the ROC analyses evaluating the validity of O-RADS ultrasonography for the diagnosis of adnexal masses among our patients. After using this cutoff, the sensitivity was 87.5% (95 percent CI= 47.4 to 99.7), the specificity was 72.0% (95 percent CI= 50.6% to 88.7%), and the likelihood ratio was 3.12 (95% CI= 1.9 to 27.5%).

Regarding the results of **Jha *et al.*** [13] with a sensitivity of 90.6%, specificity of 81.9%, positive predictive value (PPV) of 31.4%, and negative predictive value (NPV) of 99.0%, the RACS US 4 cutoff was the best for making a cancer diagnosis.

With O-RADS US 4 and 5 as the malignant categories, the ROC analysis showed a sensitivity and specificity of 96.6% and 92.8%, respectively in **Basha *et al.*** [14] and 98.7% and 83.2% in **Cao *et al.*** [15]**.**

Hack *et al.* [8] conducted retrospective research on 262 cases with ovarian and adnexal abnormalities The area under the receiver operating characteristics (AUC) curve for O-RADS US in determining whether a lesion was benign or malignant was 0.91. Adding acoustic shadowing to O-RADS US increased the area under the curve (AUC) to 0.94, which is on par with the performance of assessing several neoplasia in the adnexa model (AUC = 0.95, P =.35).

The results of the same study using the final histopathology/clinical diagnosis as a reference, the US O-RADS score classification system found 11 false negatives, 32 positives, 5 false positives, and 2 false negative lesions, for a sensitivity of 94.12%, specificity of 68.75%, accuracy of 86.49%, positive predictive value of 84.62%, and negative predictive value of 84.62% [8]**.**

CONCLUSION

It could be concluded that the U/S O-RADS classification system is a great noninvasive diagnostic tool for suspected ovarian masses with high sensitivity in differentiating between benign and malignant neoplastic tumors.

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Conflict of interest: Nil.

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