

O-RADS US Score: Bridging the Gap Between Ultrasound and Definitive Diagnosis of Adnexal Masses

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Abstract: Background: The Ovarian-Adnexal Reporting and Data System (O-RADS) has emerged as a valuable tool for risk stratification and management of adnexal masses detected on ultrasound. This study aimed to validate the diagnostic efficacy of O-RADS in stratifying the risk of malignancy in adnexal masses, substantiated by histopathological correlation.

Study Design: A prospective observational study involving 55 patients with ovarian/adnexal lesions was conducted, with lesions assessed using the O-RADS grading system and correlated with histopathological examination reports.

Results: The mean age of the study group was 42.6 years, with various O-RADS classifications observed. The most common benign finding was a simple ovarian cyst, while the most common malignant condition was serous cystadenocarcinoma. The diagnostic performance of O-RADS ultrasound classification showed good sensitivity, specificity, positive predictive value, negative predictive value, and accuracy. The risk of malignancy increased with higher O-RADS grades, with Grades 4 and 5 exhibiting a higher prevalence of malignancy.

Conclusion: The findings of our study underscore the efficacy of O-RADS in accurately distinguishing between benign and malignant adnexal lesions, guiding appropriate referrals, and optimizing patient management. Further studies are warranted to validate the system's reliability across different observers and settings.

Keywords: Ovarian-Adnexal Reporting and Data System (O-RADS), adnexal masses, ultrasound, risk stratification, malignancy, histopathological correlation.

Introduction

The American College of Radiology (ACR) first introduced the Ovarian-Adnexal Reporting and Data Systems (O-RADS) US risk stratification system in 2018, with an updated version released in 2022 to address initial deficiencies and improve the system's accuracy and usability. O-RADS categorizes adnexal masses into six distinct risk categories, ranging from 0 to 5, each associated with a specific likelihood of malignancy and corresponding management recommendations. This framework is designed to standardize the terminology used in ultrasound reports, thereby reducing ambiguity and enhancing the precision with which adnexal masses are described and assessed.

The system's standardized lexicon is crucial for the consistent characterization of adnexal masses, which aids in the accurate evaluation of their malignancy risk. By providing clear guidelines on how to report and interpret ultrasound findings, O-RADS helps radiologists make more informed decisions regarding patient management. This structured approach aims to facilitate better clinical outcomes by ensuring that patients with higher risk masses are appropriately triaged for further investigation or intervention, while those with lower risk masses can avoid unnecessary procedures.

This study aims to validate the diagnostic efficacy of the O-RADS classification system by assessing its accuracy in diagnosing and managing adnexal masses. Through this validation, the study seeks to confirm that the O-RADS system effectively differentiates between benign and malignant masses, thus proving its utility in clinical practice and potentially leading to improved patient care outcomes.

AIMS AND OBJECTIVES

This study aimed to assess the efficacy of the Ultrasound Ovarian–Adnexal Reporting and Data Systems (O-RADS) score in stratifying the risk of malignancy in adnexal masses, substantiated by histopathological correlation.

Materials and methods

Our study is a Cross-sectional observational study involving 55 patients with ovarian/adnexal lesions who were referred to the department of Radio-diagnosis for Ultrasonography of the abdomen and pelvis. The lesions were assessed using a Phillips affinity 70 HD Ultrasound machine with a curvilinear probe and reported based on the O-RADS Ultrasound scoring system and subsequently correlated with HPE reports wherever necessary.

Study Design: Cross-sectional observational study

Study Location: This was a tertiary care teaching hospital-based study done in the Department of Radio-diagnosis at Maharajah’s Institute of Medical Sciences, Vizianagaram.

Study Duration: May 2023 and December 2023

Sample size: 55

Results:

Table 1 : Age Distribution

YEARS	NUMBER
10 – 20	1
20 – 30	8
30 – 40	17
40 – 50	14
50 – 60	11
60 – 70	4

Table 2: Classification of cases into ORADS

Classification	No of cases	Percentage
ORADS 1	10	18.1%
ORADS 2	18	32.7%
ORADS 3	12	21.8%
ORADS 4	9	16.3%
ORADS 5	6	10.9%

Table 3: Benign vs Malignant

BENIGN	MAGLINANT

40	15
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Table 4: **BENIGN FINDINGS**

FNAC	FREQUENCY	PERCENTAGE
SIMPLE CYST	13	32.5%
HEMORRHAGIC CYST	6	15%
EMDOMETRIOMA	7	17.5%
MATURE CYSTIC TERATOMA	6	12.5%
SEROUS CYSTADENOMA	5	12.5%
MUCINOUS CYSTADENOMA	3	7.5%
TOTAL	40	100%

Table 5: **MALIGNANT FINDINGS**

FNAC	FREQUENCY	PERCENTAGE
SEROUS CYSTADENOCARCINOMA	7	46.6%
MUCINOUS CYSTADENOCARCINOMA	3	20%
ENDOMETRIOID CARCINOMA	4	26.6%
CLEAR CELL TUMOUR	1	6.6%
TOTAL	15	100%

Table 6: Risk of malignancy of ORADS

CLASSIFICATION	BENIGN	MALIGNANT	TOTAL	RISK OF MALIGNANCY (%)
ORADS 1	10	0	10	0 %
ORADS 2	18	0	18	0 %
ORADS 3	11	1	12	8.3 %
ORADS 4	3	6	9	66 %

ORADS 5	0	6	6	100 %
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Table:7 Diagnostic performance of ORADS

Sensitivity	91.21 %
Specificity	82.37 %
Positive predictive value	77.73%
Negative predictive value	84.11 %
Accuracy	89 %
Positive likelihood ratio	5.75
Negative likelihood ratio	0.18

Discussion

In our study, the mean age of the study group was 42.6 years. The classification of cases according to the O-RADS system included 10 cases as O-RADS 1, 18 cases as O-RADS 2, 12 cases as O-RADS 3, 9 cases as O-RADS 4, and 6 cases as O-RADS 5.

The most common benign finding was a simple ovarian cyst, followed by a hemorrhagic cyst, together accounting for 48% of all benign conditions observed. Among the malignant conditions, serous cystadenocarcinoma was the most prevalent, representing 30% of all malignancies detected.

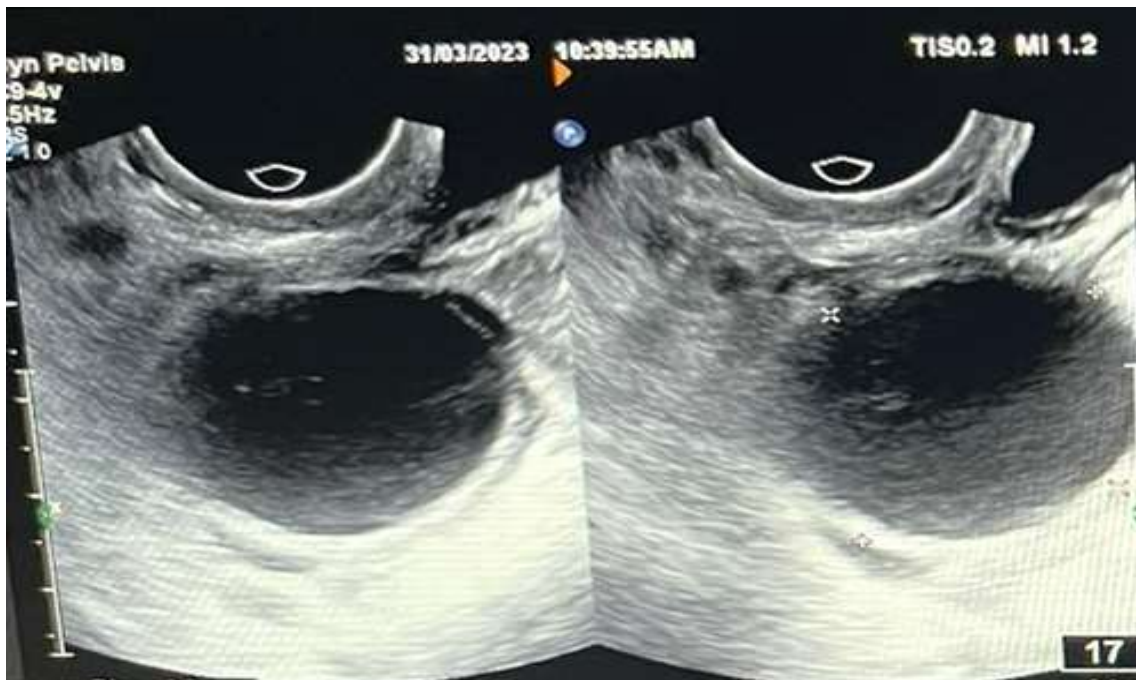
The diagnostic performance of the O-RADS ultrasound classification in our study demonstrated a sensitivity of 91.21%, specificity of 82.37%, positive predictive value of 77.73%, negative predictive value of 84.11%, and an overall accuracy of 89%. These findings are consistent with those reported by Yanyun Shi and Huan Li et al., confirming the robust diagnostic capability of the O-RADS system.

Our results indicated that the risk of malignancy for each O-RADS grade was 0% for O-RADS 1, 0% for O-RADS 2, 16% for O-RADS 3, 77% for O-RADS 4, and 100% for O-RADS 5. These findings align closely with those of Hack et al., who reported malignancy proportions of 0% for O-RADS 2, 3% for O-RADS 3, 35% for O-RADS 4, and 78% for O-RADS 5.

These results highlight the efficacy of the O-RADS ultrasound classification system in accurately distinguishing between benign and malignant adnexal masses. The high sensitivity and specificity indicate its reliability in ruling out and detecting malignancy, respectively. Consequently, the O-RADS system serves as a valuable tool for guiding clinical decision-making and ensuring appropriate patient management.



Dermoid cyst



Endometriotic cyst



Endometrioid carcinoma



Clear cell carcinoma

Conclusion

In conclusion, our study highlights the enhanced diagnostic performance of the Ovarian-Adnexal Reporting and Data System (O-RADS) US risk stratification and management system, particularly its sensitivity and specificity in detecting adnexal malignancies. The study findings consistently showed that O-RADS Grades 1, 2, and 3 were associated with benign lesions, while Grades 4 and 5 exhibited a significantly higher prevalence of malignancy. These results underscore the efficacy of the O-RADS system in distinguishing between benign and malignant ovarian and adnexal lesions with a high degree of accuracy. The system proves to be a valuable tool not only for initial risk

stratification but also for guiding clinical decisions regarding referrals to oncological gynecologists when malignancy is suspected. This ensures that patients receive timely and appropriate specialist care, potentially improving outcomes.

However, it is imperative to conduct more extensive research on interobserver variability to further validate the reliability of the O-RADS system among radiologists with varying levels of experience. Establishing a consensus in the characterization of adnexal lesions is critical for ensuring consistent and robust risk stratification. This, in turn, would enhance the overall effectiveness of patient management, leading to better diagnostic precision and optimized treatment pathways.

Moreover, future studies should also explore the integration of the O-RADS system into routine clinical practice and its impact on patient outcomes over time. By continuing to refine and validate the O-RADS system, we can improve its utility and reliability, ultimately benefiting patient care and management in the field of gynecological oncology.

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