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Original Article

Radiology Section

Diagnostic Performance of O-RADS MRI Scoring System for the Assessment of Adnexal Masses in Routine Clinical Radiology Practice- A Single Tertiary Centre Prospective Cohort Study

ANIRUDDHA BASU[1], MUKHESWAR PAME[2], RUPAK BHUYAN[3], DEEP KUMAR ROY[4], VIVEK MATHEW JAMES[5]

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ABSTRACT

Introduction: In 2019-20, the American College of Radiology (ACR) introduced Ovarian-Adnexal Reporting and Data System Magnetic Resonance Imaging (O-RADS MRI). Application of the O-RADS MRI in routine clinical practice can increase lesion characterisation accuracy, promote better interdisciplinary communication, and help in personalised patient management of adnexal masses.

Aim: To assess the diagnostic performance of the ACR O-RADS MRI scoring system for the predicting malignancy in adnexal mass in routine clinical radiology practice by using histology/imaging findings during a minimum 4 month follow-up as the reference standard.

Materials and Methods: This single-center prospective cohort study was conducted in Jorhat Medical College, Assam, on 42 patients with 46 adnexal masses who underwent MRI between April 2020 to June 2021 were assessed. The ACR O-RADS Magnetic Resonance (MR) scores were assigned using the MRI protocol with a dynamic study. Sensitivity, specificity, positive and negative predictive values along with the area under the Receiver Operating Characteristic (ROC) curve was calculated (cut-off score ≥4 was considered malignancy,). Histopathologic diagnosis or >4 months follow-up imaging findings were the reference standard used. Logistic regression analysis of MRI parameters used in identifying malignant masses were assessed. Statistical analysis was done using 95% Confidence Intervals (CI). The p-values <0.05 was considered statistically significant.

Results: The mean age of subjects in the study was 35.9 (range 10-75 years), and 39 (84.8%) of adnexal masses were premenopausal. Malignancy was more common in postmenopausal patients (57.1%). Of 46 lesions, 13 (28.3%) were malignant. The ACR O-RADS-MR scoring system, using a dynamic MRI protocol, showed 92.3% sensitivity and 87.8% specificity in malignancy prediction. The area under the Receiver Operator Characteristic (ROC) curve for predicting malignancy was 0.962. The positive and negative predictive values were 75% and 89.1%, respectively.

Conclusion: In a teaching hospital in Assam, the O-RADS MRI scoring system, based on a dynamic MRI protocol demonstrated good sensitivity, specificity and area under the ROC curve in identifying malignant adnexal masses. The ACR O-RADS MRI system enables standardised MRI reporting with uniform lexicon and interpretation guide on adnexal masses. This will help to improve communication between radiologists and referring physician and in patient management, particularly in indeterminate masses on ultrasound.

Keywords: American college of radiology, Adnexa, Gynaecologic malignancies, Magnetic resonance imaging, Ovarian neoplasms, Structured reporting

INTRODUCTION

The lesions of the ovary, fallopian tube, or surrounding connective tissues constitute the adnexal masses. Adnexal malignancy accounts for about 3.3% of all cancers in women worldwide and has low survival rates. In developed countries incidence is higher and is the gynaecological tumour with the greatest mortality rate [1]. According to report of National Cancer Registry Programme (NCRP) at Bangalore, India, it is the ovarian cancer which constitutes the third most common cancer among women of India, after breast and cervix cancer [2]. As per NCRP report 2020, Papumpare district (13.7) had the highest age-adjusted rate (AAR), followed by Kamrup urban (9.8). Five districts from north east are there in top 15 districts in the country as far as the AAR of ovarian cancer is concerned and the study happened in the Indian state of Assam [3].

Imaging plays an essential role in the clinical work up of this common gynaecological problem in characterisation of an adnexal mass. It helps in triage of a suspected ovarian cancers by reliable differentiation into a benign from a malignant adnexal mass and helps the clinician in the era of individualised medicine. The risk of cyst rupture which upstages the malignancy prevents the biopsy of an isolated suspicious ovarian mass [4].

The European Society of Gynaecological Oncology (ESGO), the International Society of Ultrasound in Obstetrics and Gynaecology (ISUOG), the International Ovarian Tumour Analysis (IOTA) group, and the European Society for Gynaecological Endoscopy (ESGE) Consensus Statement on preoperative diagnosis of ovarian tumors states that the first-line imaging investigation for adnexal pathology in clinical practice is transvaginal ultrasound examination [5]. Even though majority are benign, a substantial number remain indeterminate by ultrasound [18-31%]. Multiparametric- Magnetic Resonance Imaging (MRI) with the functional sequences- Dynamic Contrast-Enhanced (DCE) and Diffusion-Weighted Imaging (DWI) sequences increases the diagnostic accuracy in the differentiation of benign from malignant adnexal masses and is a second-line tool for adnexal masses that are indeterminate on Ultrasound (US) [5,6].

Thomassin-Naggara I et al., developed and validated the Adnexal lesions Magnetic Resonance imaging (ADNEX MRI) scoring system, an MRI scoring system, for characterising the adnexal masses that are indeterminate under US by systematic analysis of the pelvic MRI. The ADNEX MR system classified adnexal masses into five categories which proved to be highly reproducible, accurate and validated by multiple studies [6,7,8,9]. ADNEX MRI scoring system evolved into Ovarian-Adnexal Reporting and Data System Magnetic

Resonance Imaging (O-RADS MRI) which was published by international multidisciplinary committee sponsored by the American College of Radiology (ACR) in 2020 [10,11].

The ACR Ovarian-Adnexal Reporting and Data Systems (O-RADS) MRI Committee in 2020 published an evidence-based lexicon and risk stratification system for MRI evaluation of adnexal lesions. Risk stratification is shown in [Table/Fig-1] [10-15].

O-RADS MRI score	Definitions	Positive predictive value for malignancy
1	No ovarian mass	N/A
2	Benign mass: • Unilocular cyst of any type, with no wall enhancement • Unilocular simple cyst without solid tissue; wall may enhance • Unilocular endometrioma without solid tissue; wall may enhance • Unilocular/multilocular fat-containing cystic lesion without solid tissue; wall may enhance • Cyst with solid tissue where the solid tissue is homogenously low signal on T2-weighted images AND low signal on high B-value images, with mild or moderate enhancement (type 1 or 2 curve).	<0.5%
3	Probably benign mass: • Unilocular haemorrhagic/proteinaceous cyst with wall enhancement and without solid tissue • Multilocular cyst without solid tissue • Cyst with solid tissue which has intermediate T2 signal, is hyperintense on the high B-value DW image and has a type 1 enhancement curve	~5%
4	Indeterminate mass: • Cyst with solid tissue which has intermediate T2 signal, is hyperintense on the high B-value DW image and has a type 2 enhancement curve	~50%
5	Probably malignant mass: • Cyst with solid tissue which has intermediate T2 signal, is hyperintense on the high B-value DW image and has a type 3 enhancement curve • Peritoneal implants	~90%

[Table/Fig-1]: Ovarian-Adnexal Reporting and Data Systems (O-RADS) magnetic resonance imaging risk stratification system [adapted from 10,11,12,14,15].

Studies assessing the diagnostic accuracy of O-RADS MRI in Indian population is lacking, which is the lacunae authors identified on review of literature. Hence, the aim of this study was to assess the diagnostic performance of the American College of Radiology O-RADS MRI scoring system in routine clinical radiology practise by using histology/imaging findings during a minimum 4 month follow-up as the reference standard.

MATERIALS AND METHODS

This single-center, prospective cohort study was conducted in Department of Radiodiagnosis and Imaging Sciences, Jorhat Medical College (tertiary care hospital), Assam, India, from April 2020 to June 2021. Study included females between 10 years to 85 years of age who presented to Radiology Department for MRI with adnexal lesions were selected for study. The ethical approval was obtained from Institutional Ethics Committee (No. SMEJ/JMCH/MEU/841/Pt-1/2011/5507) and all subjects gave written informed consent.

Sample size calculation: The sensitivity by ADNEX MR scoring system is 94% [13] in identifying the malignant cases with a prevalence of 33.3%, assumed precision10% and with 90% confidence interval, the minimum required for sample size was calculated.

Sample size,

$$n \geq \frac{Z^2_{1-\alpha/2}\,Sens(1-Sens)}{d^2 \times Prev}$$

Where n is the sample size,

d is Precision and

Z is the confidence limit.

S is Sensitivity

Minimum sample size calculated for the study was 28 subjects.

Inclusion criteria

1. Female patients aged 10 years or above and received surgery or intervention or conservative management for adnexal masses in the Department of Gynaecology of Jorhat Medical College with known pathological results whenever possible.
2. Patients who did serum CA125 test.

Exclusion criteria

1. Incomplete baseline clinical data saved.
2. Patients who did not receive gynaecological sonography and MRI in Jorhat Medical College.

Procedure

By non probability type of sampling, 42 patients with 46 adnexal masses who underwent MRI between April 2020 to June 2021 were assessed. The number of masses on MRI per patient was recorded independently by a radiologist, with the reader having more than 10 years' experience in MRI. The definitions in the original O-RADS MRI paper were used for assessment of the MRI features. By O-RADS MRI system, adnexal masses were scored from 1 to 5 [11,12,14]:

- 1: no mass,
- 2: benign mass,
- 3: probably benign mass,
- 4: indeterminate mass,
- 5: probably malignant mass.

When a patient had bilateral adnexal masses, each mass was evaluated separately, and score was recorded for each mass with its laterality recorded [11,12,14]. Assessment started with a detailed history (presenting complaint), menopausal status and followed by ultrasound examination using both transvaginal and transabdominal approaches wherever suitable and Dynamic Contrast Enhanced-Magnetic Resonance Imaging (DCE-MRI) pelvis. This was done prior to biopsy, and therefore without knowledge of a histological diagnosis. In keeping with the literature, women who were aged ≥50 years and had a hysterectomy was defined as postmenopausal. Examination was limited to transabdominal sonography in virgins and where it was not possible to completely visualise the mass entirely by a transvaginal probe.

Patients had to fast for 3 hours before pelvic MRI exam. The MRI was performed with a 1.5 tesla device (GE SignaHDxt®; General Electric) using a 12-channel pelvic phased-array coil. Axial and sagittal T2-weighted fast spin-echo sequences and axial T1-weighted sequences with and without fat saturation was done. Axial diffusion-weighted images at b-value of 500 and 1000 was acquired. The 3D acquisition with precontrast and postcontrast MULTIPHASE LAVA® SEQUENCE was performed. After intravenous (administered manually, followed by 10 mL normal saline) gadopentetate dimeglumine (10 mL, Magnilek), the 5 postcontrast phases dynamic study was performed with a temporal resolution of 15 seconds. In the postprocessing of images, Regions of Interest (ROI) were selected as proposed by Thomassin-Naggara I et al., [6], avoiding areas of necrosis. The post processing of the LAVA dynamic sequence was done to generate the absolute signal and the relative enhancement to generate the time-signal intensity dynamic curves [6,13].

Standard of reference: Histopathologic diagnosis was the reference standard. The World Health Organisation's (WHO) International Classification of Ovarian Tumors Guidelines [16] was followed for histological diagnosis. For statistical analysis borderline ovarian neoplasms were considered as malignant pathology. In case of adnexal masses that did not undergo histopathologic examination, follow-up was done. The criteria for benign pathology on follow-up were based on clinical and imaging findings at minimum 4 months follow-up, as per clinical care protocols [6]. On 4 months (atleast) follow-up, those with no signs of progression of disease, both clinically and on ultrasonography were considered as benign.

STATISTICAL ANALYSIS

Sensitivity, specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV), and accuracy of O-RADS MRI scoring system for identifying malignant adnexal masses were calculated. Receiver Operating Characteristic (ROC) analysis for the diagnosis of malignancy by O-RADS MRI system was done. Logistic regression analysis of MRI parameters used in identifying malignant masses were assessed. Statistical analysis was done using 95% Confidence Intervals (CIs). The p-value <0.05 was considered statistically significant.

RESULTS

Total 42 patients were recruited for study based on inclusion and exclusion criteria. Four patients had bilateral adnexal masses. So, a total of 46 adnexal masses were assessed in the study. Seven patients were stable on follow-up at 4 months. Out of total, 35 patients underwent histopathological examination. The mean age of subjects in the study was 35.9 (range 10-75 years), and 39 (84.8%) of adnexal masses were premenopausal. Malignancy was more common in postmenopausal patients (57.1%).

The results showed a 11.1%, 25% and 91.7% malignancy rate for O-RADS MRI scores 3, 4, and 5, respectively as showed in [Table/Fig-2].

O-RADS MRI score	Histopathology				
	Benign		Malignant		Total
	Frequency	%	Frequency	%	Frequency
0	1	100	0	0	1
1	1	100	0	0	1
2	19	100	0	0	19
3	8	88.9	1	11.1	9
4	3	75	1	25	4
5	1	8.3	11	91.7	12
Total	33	71.7	13	28.3	46

[Table/Fig-2]: Malignancy rate of O-RADS Score.

Final diagnosis based on Histopathology (HP) or follow-up was as following as shown in [Table/Fig-3]. [Table/Fig-4] and [Table/Fig-5] show the performance indicators for the O-RADS MRI scoring system. The originally proposed cut-off of ≥4 for malignant disease [6,13] showed 92.3% sensitivity and 87.8% specificity for identifying malignant adnexal lesions, with accuracy of 89.1%. The negative and positive predictive values were 89.1% and 75%, respectively. Receiver Operator Characteristic (ROC) curve was drawn to analyse the sensitivity and specificity of the O-RADS MRI score and is shown in [Table/Fig-6]. The Area Under the Curve (AUC) for O-RADS MRI score for identifying malignant adnexal pathology was found to be 0.962. MRI parameters evaluated were subjected to logistic regression and results are shown in [Table/Fig-7]. In the analysis wall enhancement, T2 signal intensity of tissue, type 3 curve was seen as statistically significant imaging parameters that correlated with malignancy. Representative images of subjects are shown in [Table/Fig-8-16].

Final diagnosis on HP/Follow-up	Frequency
Benign serous cyst adenofibroma	1
Cyst with necrotic material	1
Dermoid cyst -Stable on 4 month follow-up	1
Dysgerminoma	1
Ectopic pregnancy	2
Endometrioma (Stable on 4 month follow-up)	5
Fibroid	1
Haemorrhagic cyst resolved on follow-up	1
Invasive well-differentiated SCC in mature teratoma	1
Mature teratoma	9
Metastatic adenocarcinoma	4
Mucinous cyst adenocarcinoma	3
Mucinous cystadenoma.	3
Para ovarian cyst- stable on follow-up	1
Peritoneal Inclusion cyst	1
Serous cyst adenocarcinoma	2
Serous cystadenoma	3
Small round cell sarcoma of pod	1
Torsion of ovary	1
Tubo-ovarian abscess	2
Uterine fibroid with degeneration	1
Yolk Sac tumor	1
Total	46

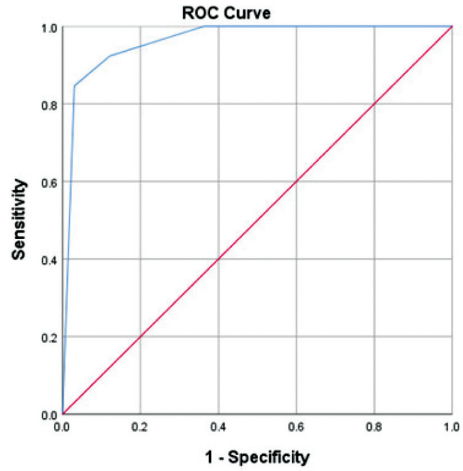
[Table/Fig-3]: Distribution of pathological diagnosis of the adnexal masses.

O-RADS MR score	Histopathology	
	Benign	Malignant
Benign	29	1
Malignant	4	12

[Table/Fig-4]: Comparison of results of O-RADS MRI Score with histopathological findings.

Characteristic	Value
Sensitivity	92.3%
Specificity	87.8%
Positive predictive values	75.0%
Negative predictive values	96.7%
Accuracy	89.1%

[Table/Fig-5]: Diagnostic accuracy of O-RADS MRI for identifying malignancy.



[Table/Fig-6]: ROC curve of O-RADS MRI and the Area Under the Curve (AUC) of the O-RADS MRI score for malignant disease was 0.962.

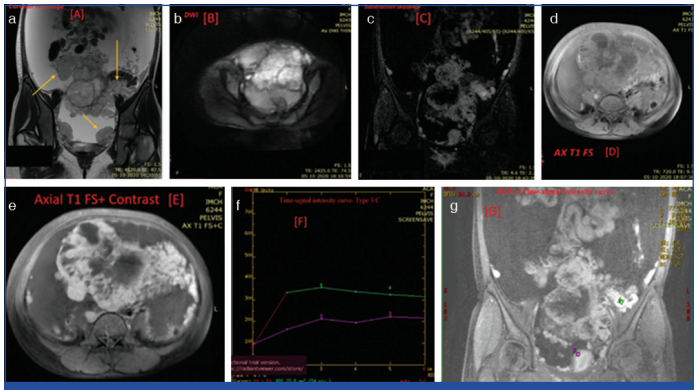
DISCUSSION

Multidisciplinary international committee of ACR in 2020 proposed O-RADS MRI scoring system for pelvic MRI assessment. O-RADS MRI work group proposed standardised MRI lexicon for assessment and description of adnexal lesions and risk stratification of adnexal lesions according to risk of malignancy. No follow-up and management guidelines were proposed for O-RADS MRI unlike O-RADS-US. The goals of O-RADS MR is to improve consistency in reporting and communications regarding the adnexal lesions amongst radiologists themselves and clinicians. In doing so, O-RADS MR scoring system aims to minimise unnecessary imaging and intervention for affected patients, thereby improving the patient care [11,12,14,17].

The results of the present study showed that the O-RADS MRI scoring system developed by ACR in 2020 has excellent diagnostic

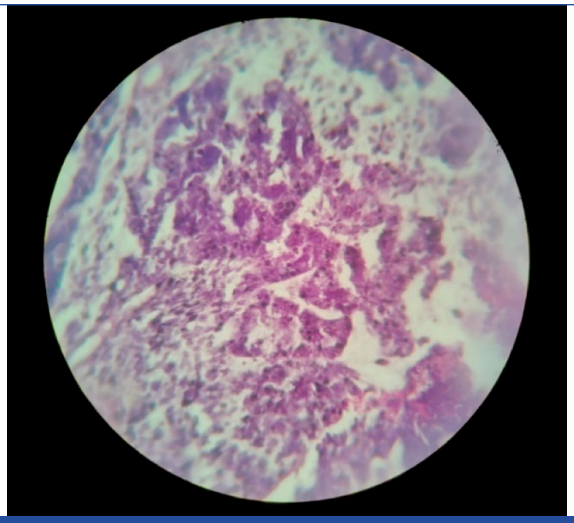
Variables	p-value	Odds ratio	95% CI	
			Lower	Upper
Age category (years)				
<20	0.472	0.333	0.017	6.654
≥20 to <40	0.147	0.152	0.012	1.940
≥40 to ≤60	0.224	0.167	0.009	2.984
Menopausal status				
Postmenopausal	0.080	0.225	0.042	1.198
MRI size	0.083	1.010	0.999	1.021
Septum				
Single	0.999	0.001	0.000	NA
Two or more	0.999	NA	NA	NA
Septum thickness				
Thin	0.999	0.024	0.000	Null
Thick	0.269	0.171	0.007	3.913
T2-weighted signal intensity within solid tissue				
Low	0.999	NA	0.000	NA
Medium/High	<0.0001	0.006	0.000	0.070
b=1000 s/mm^2-weighted signal intensity within solid tissue				
Low	0.999	NA	0.000	NA
Medium/High	<0.0001	0.009	0.001	0.095
Wall enhancement				
Yes	0.012	0.167	0.041	0.679
Time-signal intensity curve within solid tissue				
Type 1	-	-	-	-
Type 2	0.001	0.006	0.000	0.121
Type 3	0.002	1.786	0.456	2.785
Ascites				
Yes	0.012	0.168	0.042	0.679
Peritoneal implants				
Yes	0.999	0.000	0.000	NA
Metastasis (Constant)	0.004	0.00	0.00	NA

[Table/Fig-7]: Logistic regression results of MRI parameters of benign and malignant masses with Odds ratio and p-value.
[NA- Not applicable, since lower limit is zero upper limit can't be calculated]; p-value <0.05 considered significant

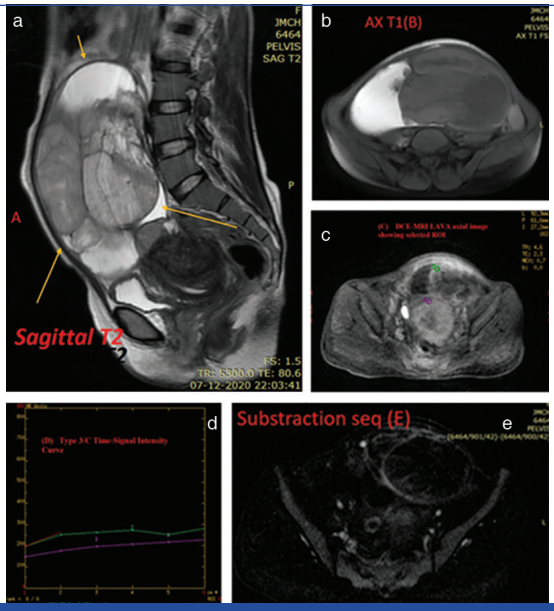


[Table/Fig-8]: MRI images with O-RADS MRI interpretations of subject 23. A 60-year-old female presented with abdominal distension. a) Coronal T2 MR images shows T2 intermediate intensity left adnexal mass with peritoneal nodules [Yellow arrow]. Gross ascites also noted. b) DWI images show diffusion restriction; c and d) Subtraction sequence of dynamic MR and Precontrast and Postcontrast axial T1 images; e): shows enhancement of the adnexal lesion with enhancing peritoneal nodules; f and g): Dynamic contrast enhanced- magnetic resonance imaging with ROIs shows type 3/C time-signal intensity curve- O-RADS MR Score 5.

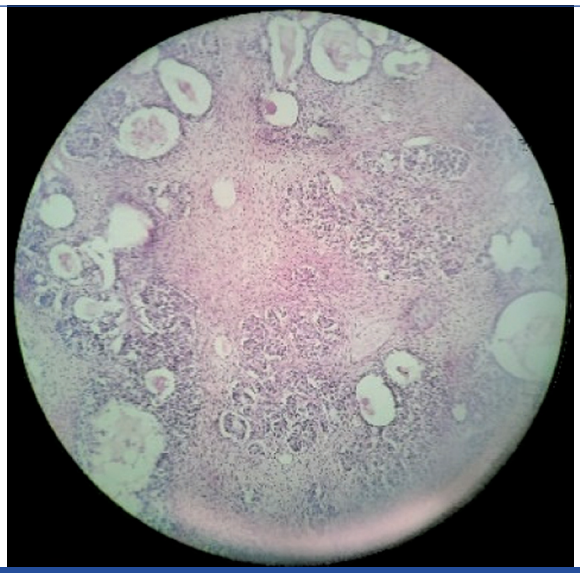
performance in characterisation of adnexal masses and differentiating benign and malignant adnexal masses in routine clinical radiology practise. The study was able to demonstrate combinations of optimum MRI parameters in the characterisation adnexal masses in females and for evaluation of malignancy probability in those lesions. In the current study with 46 adnexal masses, O-RADS MRI scoring



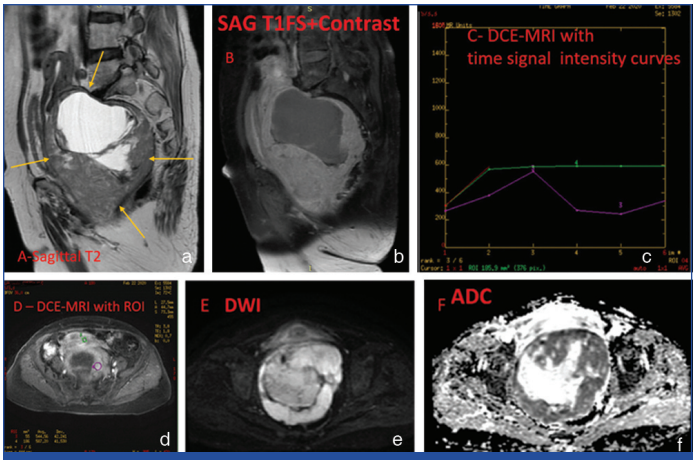
[Table/Fig-9]: Haematoxylin and eosin staining (10X) of the US guided peritoneal nodule biopsy from subject 23 in low power magnification show high grade serous cells suggestive of serous cystadenocarinoma.



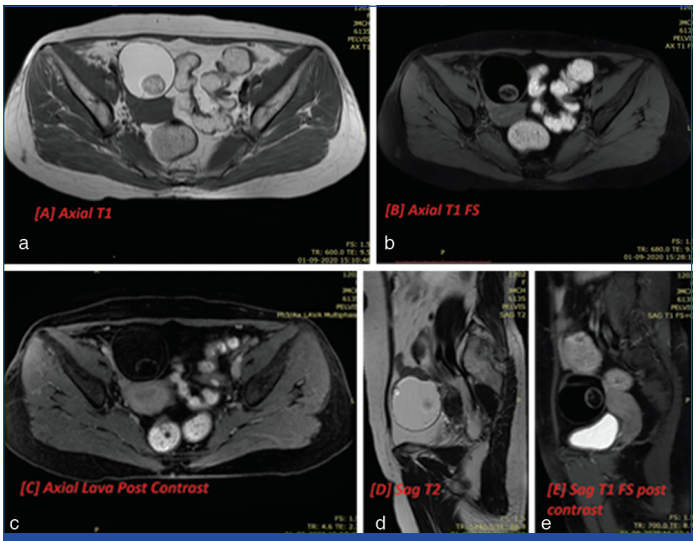
[Table/Fig-10]: MRI images with its O-RADS MR interpretations of subject 28. A 20-year-old female presented with abdominal swelling. a): Sagittal T2 image; b): Axial T1 images shows multilocular cystic lesion with T2 intermediate intense solid tissue; c-e): DCE-MRI of the patient shows Type 3/C time intensity curve (ROI in green on solid tissue and pink on outer myometrium and show time-signal intensity curve) in solid tissue with enhancing papillary solid components (Histopathology revealed yolk sac tumour).



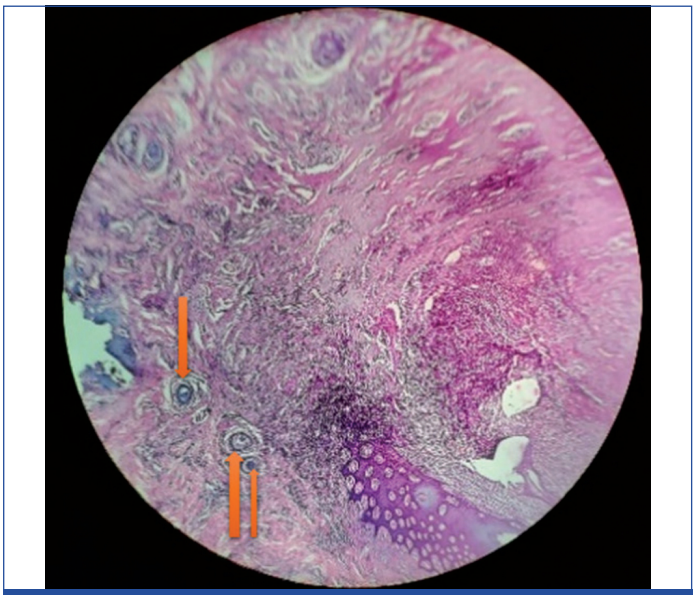
[Table/Fig-11]: Haematoxylin and eosin staining (10X) of the postoperative biopsy from subject 28 in low power magnification show both microcystic as well as macro-cystic pattern suggestive of yolk sac tumour.



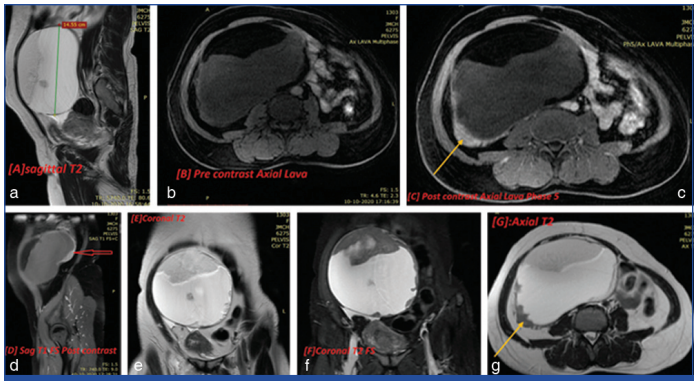
[Table/Fig-12]: MRI images with its O-RADS MR interpretations of subject 4. A 62-year-old female patient with urinary retention, a and b): MRI Sagittal T1 and post contrast T1-shows a multilocular cystic mass with solid component in the pouch of Douglas pushing uterus upwards (Yellow arrow); c and d) DCE MRI shows (green -ROI on outer myometrium and pink ROI on solid tissue) solid enhancing components with Type 2/B time intensity curve with solid tissue showing diffusion restriction in DWI; e) and f): images -O-RADS MR Score-4 (Histopathology of the biopsy was reported as atypical spindle cell neoplasm).



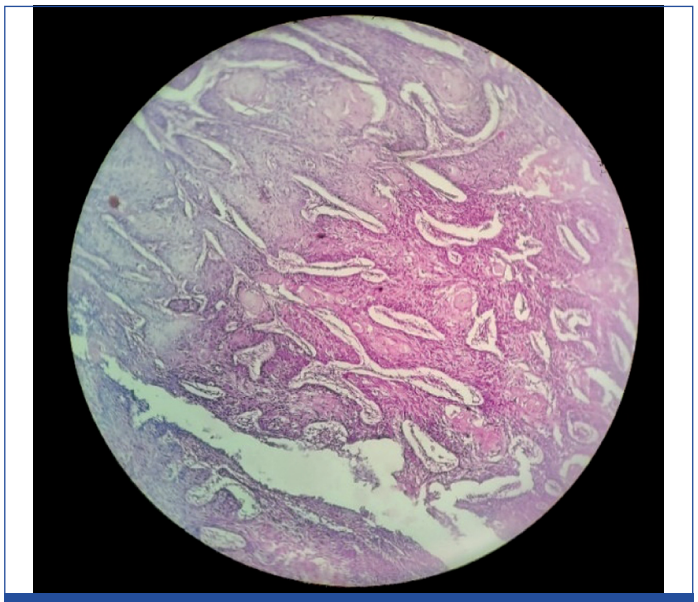
[Table/Fig-13]: MRI images with its O-RADS MR interpretations of subject 22. A 50-year-old female with menstrual irregularity. a and b): MR images reveal well defined fat containing mass (as in axial T1 non Fat Saturated images) with signal suppression in axial T1 fat saturated images. c): Post contrast image -axial LAVA post contrast- image shows non enhancing fat containing mass. d): Sagittal T2 image- reveals well defined lesion with no mural or septal nodule. e): Sagittal T1 post contrast image shows non enhancing fat containing mass (O-RADS MR Score- 2).



[Table/Fig-14]: Haematoxylin and eosin staining (10X) of the postoperative biopsy from subject 22 in low power magnification show squamous epithelium lining the cyst wall with hair follicle formation (orange arrow) suggestive of dermoid cyst.



[Table/Fig-15]: MRI Images of Subject 25 (false negative Case). A 35-year-old female presented with abdominal pain. US (not shown) done reported a dermoid cyst. MRI was requested by clinician and it was reported as O-RADS MR score-2 right adnexal mass. a): Sagittal T2 images show a unilocular cystic lesion. b-d): Precontrast and postcontrast axial LAVA images and post contrast Sagittal T2 images show Irregular enhancing wall /papillary projections in the right superolateral aspect of the unilocular mass (Yellow and red arrows). e and f): Coronal T2 non-fat saturated and Coronal T2 Fat saturated images show fat content in the unilocular mass. g): Axial T2 images shows T2 isointense to hyperintense wall irregularity/ papillary projections which showed enhancement in post contrast images (c and d). Type 3/C time intensity curve was noted on post processing of the LAVA sequences images [not shown].



[Table/Fig-16]: Haematoxylin and eosin staining (10X) of the postoperative biopsy from subject 25 in low power magnification show malignant squamous cells suggestive of invasive well differentiated squamous cell carcinoma in mature teratoma.

system had high performance indicators with a sensitivity of 92.3% and specificity of 87.8%. The study demonstrated the feasibility of use of a DCE curve in MRI pelvis for adnexal masses in clinical practice, which can easily be acquired with all modern machines using dynamic sequences used in other studies like MRI liver. Three types of signal intensity curves as proposed by O-RADS MRI helps in characterisation of the adnexal masses. Logistic regression of MRI parameters in the present study showed type 3 and 2 curves to be statistically significant. None of the patients in the present study population had type 1 curve.

Other studies which have used O-RADS MRI are listed in [Table/Fig-17] [10,18]. The table shows the type of study and the sensitivity and specificity obtained in those studies and results of the present study. Findings in the current study is consistent with those studies.

In the present study (8.6%, 4/46) adnexal lesions got categorised as O-RADS MR score 4 adnexal lesions out of which one proved malignant and rest were benign on histopathology. This high false positivity rate of O-RADS MR score 4 should be subjected to future studies to identify additional imaging markers and sub-classifications so as to define new MR imaging features which will decrease the false positivity of O-RADS MR score 4, thereby improve the performance of the scoring system in identifying malignant adnexal pathology.

Authors	Type of study	Number of participants	Sensitivity	Specificity	Area under curve
Thomassin- Naggara I et al., (2020) [10]	Multicentre cohort study using O-RADS MRI	1194 evaluable women	0.93	0.91	-
Aslan S and Tosun SA (2021) [18]	Single tertiary center retrospective study	332 women	96.3%	95.2%	0.983
Current study (2022)	Single tertiary center prospective study	42 patients with 46 adnexal masses	92.3%	87.8%	0.962

[Table/Fig-17]: Sensitivity, specificity of O-RADS MRI in some studies from literature compared to the current study.

Even though O-RADS MR is tested with clinical and pathologic data of small limited set of 42 patients in the current study, this study demonstrates the strengths of the O-RADS MR system in evaluating the risk of malignancy of adnexal masses. With the use of the dynamic contrast-enhanced protocol in routine clinical practice, authors were able to obtain adequate enhancement curves with the routine software and technology for the acquisition and postprocessing a 1.5 tesla machine. The total MRI acquisition time was about 25-35 minutes.

The high sensitivity, specificity and area under ROC curve demonstrates that the risk stratification using O-RADS MR scoring system would improve overall cost-benefit optimisation avoiding unnecessary surgery in low-risk patients (with scores ≤3), and specialised gynaecological-oncology referral in high-risk patients (with scores ≥4). Clinical impact of O-RADS MR system should be further studied. A well-planned prospective study with a longer duration and larger sample size involving multiple centres with special emphasis on indeterminate adnexal lesions, specifically to assess the diagnostic accuracy of O-RADS MR is suggested.

Limitation(s)

The study is a single centre study in a single institution in Assam, India.The academic setting of the study site may not be generalised to other institutions of the country. The results of the study need validation with a larger sample size and in multiple centres across the country. The 46 assessed adnexal masses included an extremely limited number of borderline ovarian tumours evaluation and assessment of which is most challenging. The subjects who did not undergo surgery and were followed for atleast 4 months with no signs of progression of disease was considered as benign. The 4 month interval is extremely short for some ovarian borderline tumour diseases where the natural history of evolution is slow.

CONCLUSION(S)

The O-RADS-MR scoring system has high sensitivity and specificity of 92.3% and 87.8% with an area under the ROC curve of 0.962, respectively in this study to differentiate benign and malignant adnexal pathology in routine clinical radiology practice. This single-center prospective study validates the O-RADS MRI score as an effective tool in characterisation of adnexal masses in routine clinical radiology practice.

Acknowledgement

The Haematoxylin and eosin staining images of the biopsy specimen were provided by the Department of Pathology. Image courtesy: Dr. Rajashree Khoud, Junior Resident, Department of Pathology at Jorhat Medical College, Assam, India.

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PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Radiodiagnosis and Imaging Sciences, Jorhat Medical College, Jorhat, Assam, India.
2. Assistant Professor, Department of Radiodiagnosis and Imaging Sciences, Jorhat Medical College, Jorhat, Assam, India.
3. Associate Professor, Department of Radiodiagnosis and Imaging Sciences, Jorhat Medical College, Jorhat, Assam, India.
4. Professor, Department of Radiodiagnosis and Imaging Sciences, Jorhat Medical College, Jorhat, Assam, India.
5. Postgraduate, Department of Radiodiagnosis and Imaging Sciences, Jorhat Medical College, Jorhat, Assam, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Vivek Mathew James,
Postgraduate, Department of Radiodiagnosis and Imaging Sciences,
Jorhat Medical College, Jorhat, Assam, India.
E-mail: vivimj.vivek@gmail.com

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