O-RADS MRI
HOW TO REPORT: ESSENTIAL COMPONENTS and LEXICON DESCRIPTORS
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OVERVIEW

The following document represents the essential components and lexicon terminology to be included in a pelvic MRI report utilizing O-RADS MRI. This does not represent a structured report template. For an example of a report template, please refer to the website under O-RADS MRI > Implementation Tools > Report Template Sample. Excerpts from sample reports are provided at the end of this document demonstrating various options of how one may incorporate O-RADS MRI in the "Findings" and "Impression" sections of a pelvic MRI report.

See the O-RADS MRI Lexicon Terms Table and Risk Stratification Table for additional information: https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS. Additional helpful resources include O-RADS MRI Calculator and O-RADS MRI: A Primer for Lesion Characterization (https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS/Primer).

ESSENTIAL COMPONENTS AND LEXICON TERMINOLOGY

I. **INDICATION FOR EXAM**:
   a. **Relevant clinical information and surgical history**
      i. Symptoms, high-risk status, infertility treatment, oncologic history etc.
      ii. Any relevant gynecologic surgeries/interventions
      iii. Known etiologies of ascites (when seen), such as cirrhosis, cardiac or renal failure, volume overload, etc.

   b. **Age and menopausal status**
      i. LMP (if known) or menopausal status (menopause = amenorrhea ≥1 year)
      ii. When uncertain or uterus is absent, manage as postmenopausal if age is older than 50 and premenopausal if age younger than 50.

II. **FINDINGS**:
   a. **Location**
      i. Laterality (right or left), midline or cul-de-sac, etc.

   b. **Lexicon Descriptors**
      i. **Physiologic observations:** Consistent with normal physiology in premenopausal women; may report observation by name or include a complete description (Table 1).

Table 1. Lexicon Descriptors for Physiologic Observations

Observation *(required)*	Lexicon Descriptors *(optional)*
Follicle	o Simple cyst ≤3 cm, T2WI hyperintense, T1WI hypointense and no enhancement on post-contrast T1WI
Corpus luteum	o Cyst ≤3 cm with enhancing crenulated wall on subtracted post-contrast T1WI, ± clot or hemorrhagic contents
Hemorrhagic cyst ≤3 cm	o Cyst ≤3 cm with clot or hemorrhagic contents

ii. **Lesions**: Not physiologic and should be reported using **both** the **lesion subcategory name** and **relevant lexicon descriptors** (Tables 2 and 3). For cystic lesions, report locularity and type of cystic fluid; if present, report type of solid tissue or components. For solid lesions, report appearance of outer contour.

Table 2. Lexicon Descriptors for Lesion Subcategory and Components
(closed bullets = required; open bullets = choices; square bullets = optional)

Lesion Subcategory	Lexicon Descriptors	Comments

• Cystic lesion with/without solid tissue	○ Unilocular
	○ Multilocular
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	Cystic fluid descriptors
	○ Simple fluid
	○ Hemorrhagic fluid
	○ Endometriotic fluid
	○ Proteinaceous or mucinous fluid
	○ Fat or lipid containing fluid
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	Additional fluid descriptor options)
	○ Fluid-fluid level
	○ Shading
	
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	Enhancing solid tissue
	○ Papillary projection
	○ Mural nodule(s)
	○ Irregular wall/septation
	○ Larger solid portion
	
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	Solid components **not considered solid tissue**
	○ Smooth wall/septation
	○ Clot, fibrin strands, debris
		▪ 1 locule (unilocular)
		▪ More than1 locule (multilocular)
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		▪ *Simple*: Follows CSF or urine on all sequences; T2 hyperintense and T1 hypointense
		▪ *Hemorrhagic*: Variable depending on age; Late subacute hemorrhage is T2 hyperintense and T1 hypointense
		▪ *Endometriotic*: T2 hypointense and T1 hyperintense
		▪ *Proteinaceous or mucinous*: Variable onT2WI and variably hypointense on T1WI
		▪ *Fat/lipid-containing:* T2 and T1 hyperintense; loses signal on fat saturated images
		  ➢ NOTE: Microscopic fat will drop signal on out-of-phase images and may not lose signal on fat saturated images
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		▪ *Fluid-fluid level:* Horizontal delineation of non-dependent and dependent fluid of different signal intensities
		▪ *Shading:* Cyst fluid that becomes hypointense on T2WI
		  ➢ NOTE: May be homogeneous, variable or graduated and dependent
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		▪ *Papillary projection* (pp): Branching architecture; arises from inner/outer wall or septation
		▪ *Mural nodule*: Nodular appearance measuring ≥3 mm in height arising from wall or septation
		▪ *Irregular wall:* Uneven margins
		▪ *Irregular septation*: Linear strand from one inner wall to contralateral side with an uneven margin
		▪ *Larger solid portion*: Component that does not fit into categories of pp, mural nodule, or irregular wall/septation(s)

		Smooth wall/septation: Even margin **Clot/fibrin strands/debris**: Solid-appearing material that **does not enhance** **Fat**: Lipid-containing material **that does not enhance**
	o Fat, hair, calcification or Rokitansky nodule	
Solid lesion	o Enhancing solid tissue	• ≥80% solid tissue (≤20% cystic volume)

     iii.   **Signal Intensity:** Signal characteristics of an adnexal lesion on T1WI, T2WI and diffusion-weighted images (DWI) of solid tissue should be reported. (Table 3)

Table 3. Lexicon Descriptors for Signal Intensity of Adnexal Lesion Solid Tissue on MRI

Lexicon Descriptors	Comments
Homogeneous	Uniform signal appearance
Heterogeneous	Non-uniform or variable signal appearance
T2 hypointense	Signal intensity lower or equal to iliopsoas muscle
T2 intermediate	Signal intensity higher than iliopsoas and lower than CSF
T2 hyperintense	Signal intensity equal or higher to CSF
T1 hypointense	Signal intensity lower than or equal to the iliopsoas muscle
T1 intermediate	Signal intensity higher to iliopsoas and lower than fat
T1 hyperintense	Signal intensity equal or higher to fat
DWI High B-value Low signal	Signal similar to urine or CSF
DWI High B-value High signal	Signal clearly higher than urine or CSF

     iv.   **Enhancement:** Report the enhancement pattern of solid tissue within an adnexal lesion on T1WI post-contrast sequence(s) using lexicon descriptors for dynamic time intensity curves or degree of enhancement relative to myometrium at 30-40 seconds post-injection for non-dynamic enhancement sequences. (Table 4)

Table 4. Lexicon Descriptors for Enhancement of Adnexal Lesions on T1W1 Post-contrast Sequence

Lexicon Descriptors	Comments
Dynamic contrast enhancement with time intensity curves	
Low-risk curve	Minimal and gradual increase in signal over time and no well-defined shoulder or plateau
Intermediate-risk curve	Initial slope less than myometrium and moderate increase in signal intensity with a plateau
High-risk curve	Initial slope greater than myometrium and marked increase in signal intensity with a plateau
Non-dynamic contrast enhancement at 30-40 seconds post-injection	
Less than or equal to myometrium	Enhancement equal to or hypoenhancing to the outer myometrium at 30-40 seconds post-contrast injection.
Greater than myometrium	Enhancement greater than the outer myometrium at 30-40 seconds post-contrast injection.

   c. **Size:** At a minimum, report the largest diameter of the entire lesion in any imaging plane.

d. General and Extra-ovarian Findings: When observed, peritoneal fluid, thickening and nodules should be reported. A **dilated fallopian tube, peritoneal inclusion cyst and ovarian torsion** should be **reported by name and observed descriptors**. (Table 5).

Table 5. Lexicon Descriptors for Extra-Ovarian and Other Findings
(closed bullet = required; open bullet = choices; square bullets = optional)

Observation	Lexicon Descriptors

Peritoneal fluid, thickening or nodules	• Physiologic fluid
	   o Small amount of fluid inside the pouch of Douglas or cul-de-sac or between the uterus and bladder
	• Ascites
	   o Fluid outside the pouch of Douglas or cul-de-sac or fluid extending beyond the space between the uterus and bladder
	• Peritoneal thickening
	   o Smooth (uniform thickening, without focal nodularity
	   o Irregular (non-uniform thickening or focal areas of nodularity
	• Peritoneal nodules

Dilated fallopian tube	• Tubular
	• Contents
	   o Simple fluid with thin smooth walls/folds and no enhancing solid tissue
	   o Simple fluid with thick smooth walls/folds and no enhancing solid tissue
	   o Non-simple fluid
	• ± Endosalpingeal folds
	   o Incomplete septations or short round projections, orthogonal to the long axis of the tube

Peritoneal inclusion cyst	• Cystic lesion following the contour of adjacent pelvic organs • Normal ovary at the edge of/or surrounded by a cystic lesion

Ovarian torsion	• Twisted pedicle
	   o Swirled appearance of the broad ligament or ovarian pedicle
	• Massive ovarian edema
	   o Enlarged ovary with edematous central stroma
	• Ovarian infarction
	   o Lack of enhancement of the ovary on T1WI post-contrast

Paraovarian cyst	• Cyst of any fluid type separate from the ovary

III. IMPRESSION:
   a. A **brief summary** of each reported observation should be included from most to least concerning, with corresponding **assessment category score**. (Table 6)**.**
      i. NOTE: Some characteristic lesions can be confidently diagnosed on MRI regardless of the O-RADS MRI assessment category (e.g., dysgerminoma, granulosa cell tumor, lymphoma, papillary serous tumors, peritoneal pseudocyst, etc.). Specifically, a

characteristic benign mature teratoma (dermoid cyst) may be scored as O-RADS MRI 2, due to the very low risk of malignancy. As benign dermoid cysts may contain septations or minimal enhancement of Rokitansky nodules, these findings **do not** upgrade the lesion to O-RADS MRI Score 4. However, fatty adnexal lesions that contain a large amount of enhancing soft tissue are classified as O-RADS MRI 4, due to a risk of immature teratoma or other malignant tissue.

b. For clarity, it is optional to report the assessment category as a numeric score (0-5) with associated terminology versus either alone with a glossary/legend at the end of the report.

c. **OPTIONAL:**
   i. **Positive predictive value (PPV)** for malignancy percentage: Optional to include and may depend upon the O-RADS category and patient access to their reports.
   ii. **Reference link**: Optional to include the URL to the ACR O-RADS website (https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS)

Table 6. O-RADS MRI Assessment Categories and PPV for Malignancy

O-RADS MRI score	Risk category	PPV for Malignancy
0	Incomplete Evaluation	N/A
1	Normal Ovary	N/A
2	Almost Certainly Benign	<0.5%
3	Low Risk	~5%
4	Intermediate Risk	~50%
5	High Risk	~90%

SAMPLE REPORTS

The following are excerpts of sample wording that may be used within the "Findings" and "Impression" sections of a pelvic MRI exam report utilizing O-RADS MRI. Examples for normal ovaries, single and multiple lesions are presented.

Sample 1 (normal ovaries)

Findings:
Right adnexa: Ovary: 3.0 x 2.1 x 2.8 cm. No ovarian or adnexal lesion.
Left adnexa: Ovary: 2.2 x 2.6 x 2.9 cm. Physiologic observation: 3 cm follicle.

Ascites: None

Peritoneum: No peritoneal, mesenteric, or omental nodularity.

Impression:
Normal bilateral ovaries and adnexa, O-RADS MRI 1.

Reference: https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS

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Sample 2 (hemorrhagic cyst)

Findings:
Left Adnexa: Ovary: 3.0 x 2.1 x 2.8 cm. Lesion as follows:
      Size: 5 cm
      Lesion type: Cyst without enhancing solid tissue
      Cystic component:
            Locularity: Unilocular
            Wall enhancement: Absent
            Fluid content: Hemorrhagic
      O-RADS MRI: 2

Right Adnexa: Ovary: 4.0 x 3.1 x 2.2 cm. No ovarian or adnexal lesion.

Ascites: None

Peritoneum: No peritoneal, mesenteric, or omental nodularity or irregular thickening.

Impression:
Left ovarian 5 cm hemorrhagic cyst. O-RADS MRI 2, almost certainly benign.

O-RADS MRI 0: Incomplete evaluation due to technical factors
O-RADS MRI 1: Normal ovary
O-RADS MRI 2: Almost certainly benign
O-RADS MRI 3: Low risk
O-RADS MRI 4: Intermediate risk
O-RADS MRI 5: High risk
Reference: https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS

Sample 3 (dermoid cyst)

Findings:
Left Adnexa: Ovary: 4.0 x 3.1 x 2.2 cm. No ovarian or adnexal lesion.
Right Adnexa: Ovary: 5.6 x 4.2 x 3.5 cm. Lesion as follows:
      Size: 5 cm
      Lesion type: Lesion with lipid content and no enhancing solid tissue
      O-RADS MRI: 2

Ascites: Physiologic

Peritoneum: No peritoneal, mesenteric, or omental nodularity or irregular thickening.

Impression:
Right ovarian 5 cm dermoid. O-RADS MRI 2, almost certainly benign.

O-RADS MRI 0: Incomplete evaluation due to technical factors
O-RADS MRI 1: Normal ovary
O-RADS MRI 2: Almost certainly benign

O-RADS MRI 3: Low risk
O-RADS MRI 4: Intermediate risk
O-RADS MRI 5: High risk

Reference: https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS

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Sample 4 (low-risk cystic lesion with solid tissue)

Findings:
Left Adnexa: Lesion as follows:
      Size: 5 cm
       Lesion type: Cyst with enhancing solid tissue
            Solid tissue type: Papillary projection
            Solid tissue signal intensity on T2 signal and high B-value DWI: Some or all solid tissue is intermediate or high signal on either T2 or high b-value DWI
            Enhancement: Low-risk dynamic time intensity curve
      O-RADS MRI: 3
Right Adnexa: Ovary: 4.0 x 3.1 x 2.2 cm. No lesion.

Ascites: none

Peritoneum: No peritoneal, mesenteric, or omental nodularity or irregular thickening.

Impression:
1. Left adnexal 5 cm unilocular cyst with a papillary projection and low-risk time intensity curve. O-RADS MRI 3: Low risk (~ 5% PPV for malignancy).
2. Normal right ovary and adnexa, O-RADS MRI 1.

O-RADS MRI 0: Incomplete evaluation due to technical factors
O-RADS MRI 1: Normal ovary
O-RADS MRI 2: Almost certainly benign (< 0.5% PPV for malignancy)
O-RADS MRI 3: Low risk (~ 5% PPV for malignancy)
O-RADS MRI 4: Intermediate risk (~ 50% PPV for malignancy)
O-RADS MRI 5: High risk (~ 90% PPV for malignancy)

Reference: https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS

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Sample 5 (multilocular cyst without enhancing solid tissue)

Findings:
Left Adnexa: Lesion as follows:
      Size: 11.2 cm
      Lesion type: Cyst without enhancing solid tissue
      Cystic component:

Locularity: Multilocular
Wall enhancement: Present
Fluid content: Hemorrhagic and simple
O-RADS MRI: 3

Right Adnexa: Ovary: 4.0 x 3.1 x 2.2 cm. No ovarian or adnexal lesion.

Ascites: None

Peritoneum: No peritoneal, mesenteric, or omental nodularity or irregular thickening.

Impression:

Left adnexal 11.5 cm multilocular cyst without enhancing solid tissue. O-RADS MRI 3: Low risk (~ 5% PPV for malignancy).

O-RADS MRI 0: Incomplete evaluation due to technical factors
O-RADS MRI 1: Normal ovary
O-RADS MRI 2: Almost certainly benign (< 0.5% PPV for malignancy)
O-RADS MRI 3: Low risk (~ 5% PPV for malignancy)
O-RADS MRI 4: Intermediate risk (~ 50% PPV for malignancy)
O-RADS MRI 5: High risk (~ 90% PPV for malignancy)

Reference: https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS

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Sample 6 (two ipsilateral adnexal lesions; fibrous lesion; dilated fallopian tube)

Findings:
Left Adnexa: Two lesions seen as follows:
Observation #1:
Size: 4.3 cm
Solid tissue:
Type: Solid lesion
Solid tissue signal intensity on T2 signal and high B-value DWI: All solid tissue homogeneously dark on both T2 and DWI
O-RADS MRI: 2

Observation #2:
Size: 6.5 x 1.5 x 1.0 cm
Lesion type: Dilated fallopian tube with simple fluid, thick smooth walls, no enhancing solid tissue
O-RADS MRI: 2

Right Adnexa: Ovary: 4.0 x 3.1 x 2.2 cm. No lesion.

Ascites: None

Peritoneum: No peritoneal, mesenteric, or omental nodularity or irregular thickening.

Impression:

1. Left ovarian 4.3 cm fibrous lesion, likely fibroma (#1). O-RADS MRI 2, almost certainly benign.
2. Left adnexal simple hydrosalpinx (#2). O-RADS MRI 2, almost certainly benign.
3. Normal right ovary. O-RADS MRI 1.

O-RADS MRI 0: Incomplete evaluation due to technical factors
O-RADS MRI 1: Normal ovary
O-RADS MRI 2: Almost certainly benign
O-RADS MRI 3: Low risk
O-RADS MRI 4: Intermediate risk
O-RADS MRI 5: High risk

Reference: https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-RADS