



O-RADS MR Risk Score Governing Concepts:

1. O-RADS MRI assumes an average risk patient with no acute symptoms. Clinical management directed by the treating physician would supersede management recommendations based on imaging alone.
2. Categorize patient as pre- or postmenopausal (defined as ≥ 1 year amenorrhea).
3. In case of multiple or bilateral lesions, each lesion should be separately characterized, and management will be driven by lesion with highest score.
4. Benign mature teratomas (dermoids): Characteristic benign mature teratoma (cystic lesions that contain macroscopic fat) may be scored as O-RADS MRI 2, due to the very low risk of malignancy. Characteristic benign mature teratomas may contain septations or minimal enhancement of Rokitansky nodules and 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 Score 4 due to risk of immature teratoma or other malignant tissue.
5. Some characteristic lesions can be confidently diagnosed on MRI regardless of the O-RADS MRI Score category. In these cases, the final radiological diagnosis can be reported (e.g. dysgerminoma, granulosa cell tumor, lymphoma, papillary serous tumors, peritoneal pseudocyst, etc.).
6. Dynamic contrast enhancement (DCE) with perfusion time intensity curves are preferred over non-dynamic DCE post-contrast imaging for risk assessment. DCE time resolution should be of 15 seconds or less.
7. Abbreviated schematic below provides guidance for initial assessment of adnexal lesions. If the lesion does not fit this schema, refer to the expanded O-RADS MR risk stratification table.

Table 1. Abbreviated schematic for initial assessment for O-RADS MRI scores 1 (no adnexal lesion), 2 (almost certainly benign adnexal lesion) and 5 (high risk for malignant adnexal lesion)

| | |
|---------------------|---|
| O-RADS MRI 1 | No tubo-ovarian lesion. |
| | Physiologic follicle, corpus luteum or hemorrhagic cyst ≤ 3 cm in pre-menopausal woman. |
| O-RADS MRI 2 | Unilocular cyst with no enhancing wall and no solid tissue. |
| | Characteristic simple hydrosalpinx, peritoneal inclusion cyst, endometrioma, or mature teratoma with no solid tissue. |
| | Solid tissue with very low homogenous signal on T2WI <u>and</u> DWI. |
| O-RADS MRI 5 | Adnexal lesion with solid tissue with a high risk time intensity curve on DCE MRI. |
| | Adnexal lesion with solid tissue enhancing $>$ myometrium at 30-40 seconds on the non-DCE MRI. |
| | Definite peritoneal or omental thickening or nodules. |

T2WI = T2 weighted image

DWI = Diffusion weighted image

DCE MRI = Dynamic contrast enhancement magnetic resonance imaging



O-RADS MR Risk Stratification System

| O-RADS MRI Score | Risk Category | Positive Predictive Value for Malignancy [^] | Lexicon Description |
|------------------|-------------------------|---|---|
| 0 | Incomplete Evaluation | N/A | N/A |
| 1 | Normal Ovaries | N/A | No ovarian lesion Follicle defined as simple cyst ≤ 3 cm in a premenopausal woman Hemorrhagic cyst ≤ 3 cm in a premenopausal woman Corpus luteum +/- hemorrhage ≤ 3 cm in a premenopausal woman |
| 2 | Almost Certainly Benign | $<0.5\%^{^}$ | Cyst: Unilocular- any type of fluid content <ul style="list-style-type: none"> No wall enhancement No enhancing solid tissue* Cyst: Unilocular – simple or endometriotic fluid content <ul style="list-style-type: none"> Smooth enhancing wall No enhancing solid tissue Lesion with lipid content** <ul style="list-style-type: none"> No enhancing solid tissue Lesion with “dark T2/dark DWI” solid tissue <ul style="list-style-type: none"> Homogeneously hypointense on T2 and DWI Dilated fallopian tube - simple fluid content <ul style="list-style-type: none"> Thin, smooth wall/endosalpingeal folds with enhancement No enhancing solid tissue Para-ovarian cyst – any type of fluid <ul style="list-style-type: none"> Thin, smooth wall +/- enhancement No enhancing solid tissue |
| 3 | Low Risk | $\sim 5\%^{^}$ | Cyst: Unilocular – proteinaceous, hemorrhagic or mucinous fluid content*** <ul style="list-style-type: none"> Smooth enhancing wall No enhancing solid tissue Cyst: Multilocular - Any type of fluid, no lipid content <ul style="list-style-type: none"> Smooth septae and wall with enhancement No enhancing solid tissue Lesion with solid tissue (excluding T2 dark/DWI dark) <ul style="list-style-type: none"> Low risk time intensity curve on DCE MRI Dilated fallopian tube – <ul style="list-style-type: none"> Non-simple fluid: Thin wall /folds Simple fluid: Thick, smooth wall/ folds No enhancing solid tissue |
| 4 | Intermediate Risk | $\sim 50\%^{^}$ | Lesion with solid tissue (excluding T2 dark/DWI dark) <ul style="list-style-type: none"> Intermediate risk time intensity curve on DCE MRI If DCE MRI is not feasible, score 4 is any lesion with solid tissue (excluding T2 dark/DWI dark) that is enhancing \leq myometrium at 30-40s on non-DCE MRI Lesion with lipid content <ul style="list-style-type: none"> Large volume enhancing solid tissue |
| 5 | High Risk | $\sim 90\%^{^}$ | Lesion with solid tissue (excluding T2 dark/DWI dark) <ul style="list-style-type: none"> High risk time intensity curve on DCE MRI If DCE MRI is not feasible, score 5 is any lesion with solid tissue (excluding T2 dark/DWI dark) that is enhancing $>$ myometrium at 30-40s on non-DCE MRI Peritoneal, mesenteric or omental nodularity or irregular thickening with or without ascites |

[^]Approximate PPV based on data from Thomassin-Naggara, et al. O-RADS MRI Score for Risk Stratification of Sonographically Indeterminate Adnexal Masses. JAMA Network Open. 2020;3(1):e1919896. Please note that the PPV provided applies to the score category overall and not to individual characteristics. Definitive PPV are not currently available for individual characteristics. The PPV values for malignancy include both borderline tumors and invasive cancers.

* Solid tissue is defined as a lesion component that enhances and conforms to one of these morphologies: papillary projection, mural nodule, irregular septation/wall or other larger solid portions.

** Minimal enhancement of Rokitsansky nodules in lesion containing lipid does not change to O-RADS MRI 4.

*** Hemorrhagic cyst ≤ 3 cm in pre-menopausal woman is O-RADS MRI 2.

DCE = dynamic contrast enhancement with a time resolution of 15 seconds or less

DWI = diffusion weighted images

MRI = magnetic resonance imaging