Lexicon Descriptors and Definitions

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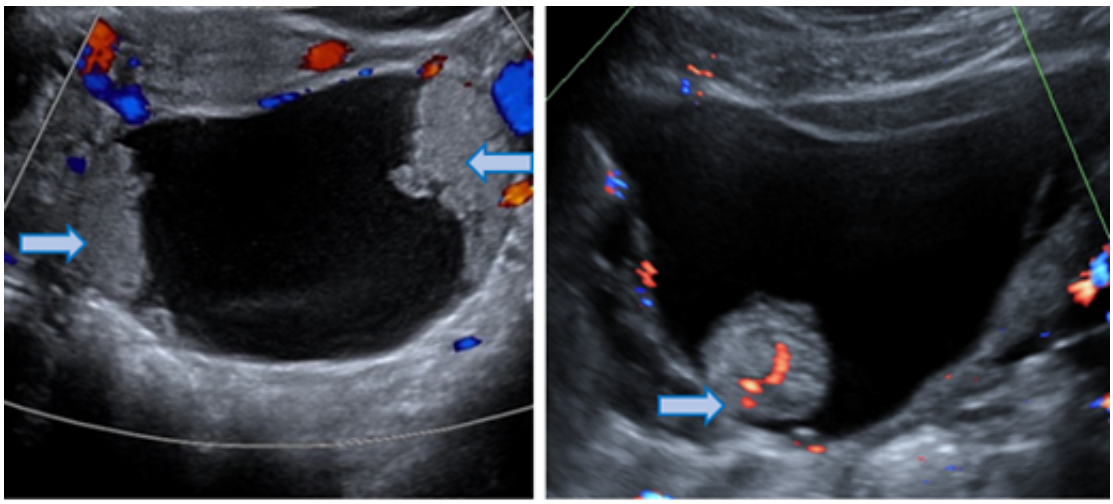
FAQ-209: What is the difference between a solid component and papillary projection? When do I need to differentiate these for risk stratification?

A solid component is any focal wall (mural) or septal irregularity that is ≥3 mm in height (as measured from its base). A papillary projection (pp) is a subtype of a solid component that is also ≥3 mm in height but is surrounded on 3 sides by fluid. Solid components that are not papillary projections are broad-based (sessile); whereas papillary projections protrude into the cyst cavity and have a shorter base of attachment (see below).



Solid components Papillary projection

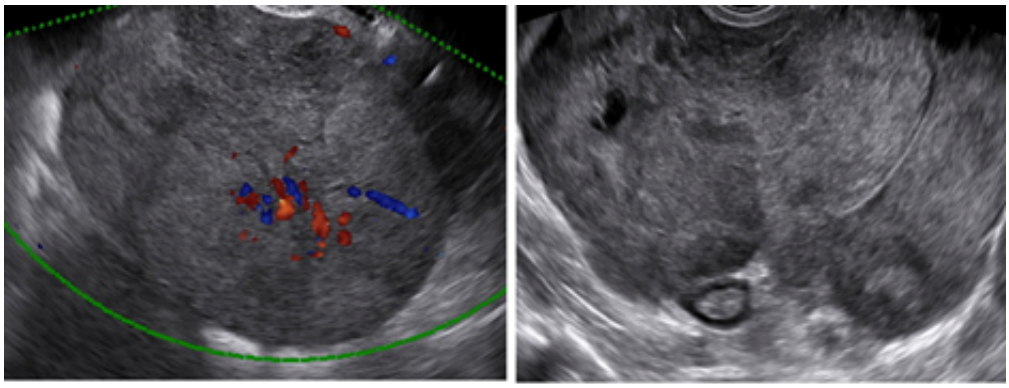
This distinction is only relevant for unilocular cystic lesions as listed in Category 4 (see below). For cysts with septations as well as solid components, it is not necessary to make this distinction; only the amount of internal vascularity is important for risk stratification (color score 1-2 = O-RADS US 4; color score 3-4 = O-RADS US 5).

4	**Intermediate Risk [10 – <50%]**	Bilocular cyst without solid component(s)	Irregular, any size, any CS	Imaging: Options include: • US specialist (if available) *or* • MRI (with O–RADS MRI score)*** *or* • Per gyn–oncologist protocol Clinical: Gynecologist with gyn–oncologist consultation *or* solely by gyn–oncologist
		Multilocular cyst without solid component(s)	Smooth, ≥10 cm, CS <4	
			Smooth, any size, CS 4	
			Irregular, any size, any CS	
		Unilocular cyst with solid component(s)	<4 pps or solid component(s) not considered a pp; any size	
		Bi- or multilocular cyst with solid component(s)	Any size, CS 1–2	
		Solid lesion, non-shadowing	Smooth, any size, CS 2–3	

Did you find FAQ-209 helpful? [Yes](https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=Yes&RADS=LI-RADS&FAQ=FAQ-209) [No](https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=No&RADS=LI-RADS&FAQ=FAQ-209)

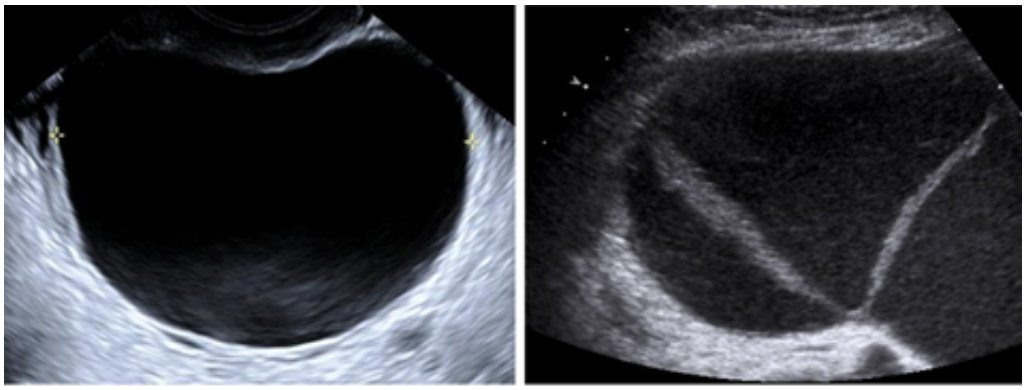
FAQ-210: The term “smooth” and “irregular” appear with both solid and cystic lesions. Does this refer to the outer contour for both?

The terms “smooth” and “irregular” refer to different features for solid and cystic lesions. **For solid lesions** (≥80% solid or solid-appearing), these terms refer to the **outer contour** (see below). An irregular outer contour (which includes lobular) is a suspicious feature and makes a solid lesion an automatic O-RADS US 5 (high risk) regardless of the color score or presence of shadowing. When smooth, features of shadowing and color score are relevant.



Smooth outer contour Irregular outer contour

For **cystic lesions**, “smooth” and “irregular” refer to the **inner walls and septations** (where present). Irregular wall or septal thickening appears as focal thickening measuring >3 mm in height into cyst cavity (see below); if ≥3 mm, this would be considered a solid component. “Irregular” is a worrisome feature (in contrast to “smooth”) and further categorization is based on other features such as solid components and septations. However, the outer contour of a solid component does not need to be characterized as smooth or irregular.



Smooth inner walls Irregular septations

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FAQ-211: Differentiating among types of characteristic cyst fluid (endometrioma, mucinous tumor, dermoid) can be challenging. Are there some tips that may be helpful to the user?

Typically, “homogeneous low-level” or “ground glass” echoes are evenly dispersed tiny echoes within a cyst which represent blood products in an endometrioma (Figure 1). Scattered echoes of variable size and echogenicity that are heterogeneously dispersed in cystic fluid are considered a type of “non-simple” cyst; these types of echoes are more representative of mucinous material. (Figure 2) Mucinous fluid has a relatively lower viscosity than blood products within an endometrioma. Therefore, the echoes within mucinous fluid are more likely to be mobile and show streaming artifact when either pressure is applied by the transducer or with color Doppler.

Another type of internal content within cystic fluid is the “hyperechoic line and dots” appearance representing coiled hair within the liquified component of a dermoid cyst (Figure 3). The key to this diagnosis is the more linear appearance of some of these foci.

While the difference between these internal echoes can be challenging, the assessment category is the same (O-RADS US 2) for an endometrioma, dermoid cyst and a non-simple unilocular cyst. Differences in management depend on size, menopausal status, and clinical factors.

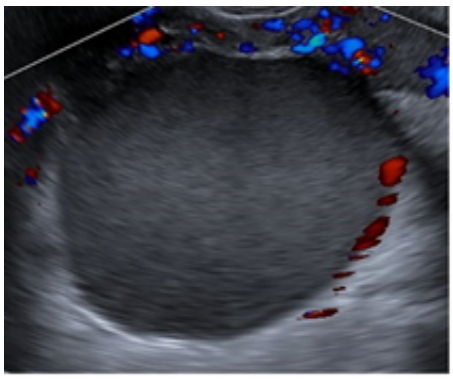


Figure 1: Endometrioma

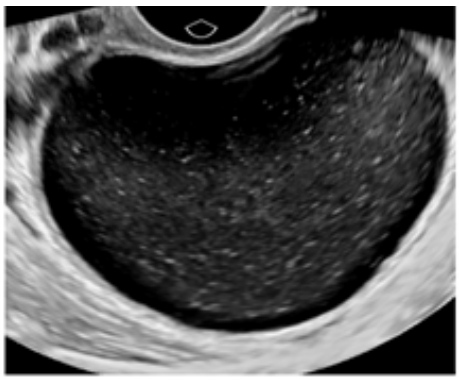


Figure 2: Mucinous Cystadenoma

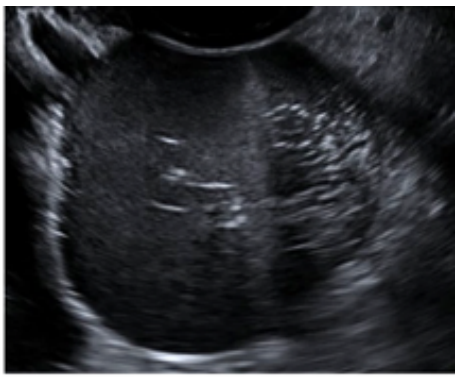


Figure 3: Dermoid Cyst

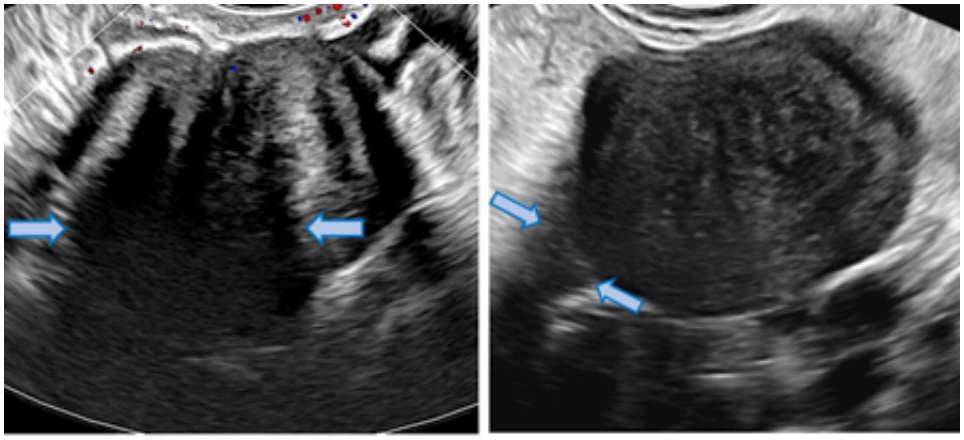
Did you find FAQ-211 helpful? [Yes](https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=Yes&RADS=LI-RADS&FAQ=FAQ-211) [No](https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=No&RADS=LI-RADS&FAQ=FAQ-211)

FAQ-212:Why has the term “shadowing” now been included in O-RADS US v2022 update for risk assessment of solid, smooth lesions?

The presence of “shadowing” from a solid smooth lesion may be seen with fibromatous lesions and has a high predictive value for benignity when present. At the time of publication of the original version of O-RADS US in 2019, available data was inconclusive to strongly support a difference in management. As such, and for the sake of simplicity, “shadowing” was initially omitted.

However, there have since been multiple validation studies supporting a risk reduction when shadowing is seen including an International Ovarian Tumor Analysis (IOTA) group retrospective study[1]. This study used 2-year interim data from IOTA phase 5 and found a lower risk of malignancy for some solid, smooth lesions with shadowing. With this evidence, shadowing was added to O-RADS US v2022 which allows some solid lesions previously scored as O-RADS US 4 (intermediate risk) to be downgraded to O-RADS US 3 (low risk).

Of note, the shadowing must be broad or diffuse to qualify and should not be mistaken for refractive artifact that occurs at the interface of components with different sound propagation characteristics. Refractive artifact is most commonly seen at the edge of a lesion (aka “edge” artifact) and when from within a lesion, is typically much thinner (see below).



Broad shadowing Refractive artifact

REFERENCE:

[1] Timmerman S, Valentin L, Ceusters J, et al. External Validation of the Ovarian-Adnexal Reporting and Data System (O-RADS) Lexicon and the International Ovarian Tumor Analysis 2-Step Strategy to Stratify Ovarian Tumors Into O-RADS Risk Groups. JAMA Oncol. 2022; doi: 10.1001/jamaoncol.2022.5969 (https://jamanetwork.com/journals/jamaoncology/fullarticle/2799493). (https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-Rads)

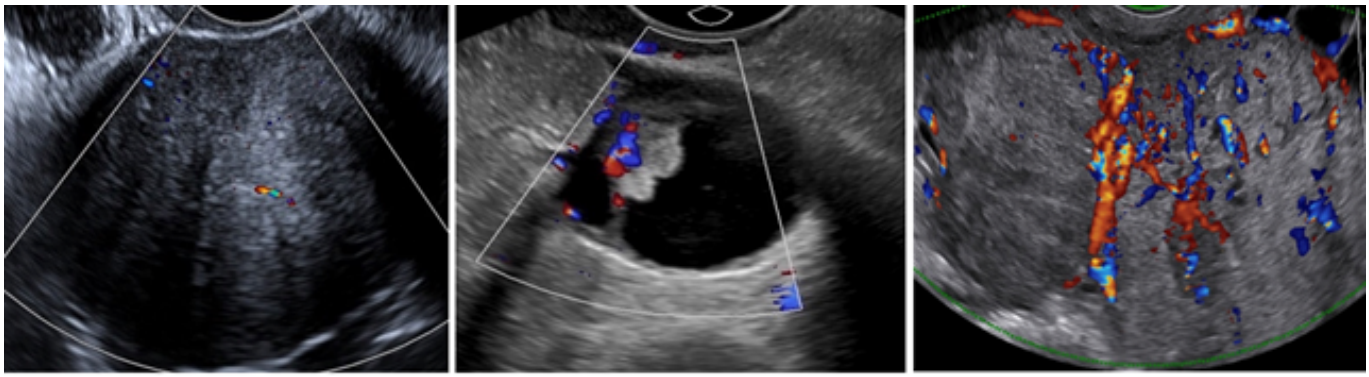
Did you find FAQ-212 helpful? Yes (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=Yes&RADS=LI-RADS&FAQ=FAQ-212) No (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=No&RADS=LI-RADS&FAQ=FAQ-212)

FAQ-213: Since color score is a subjective evaluation, how do I distinguish between degrees of flow? Does spectral Doppler play any role?

Color score (CS) is an overall subjective assessment of internal vascularity seen on color Doppler imaging and ranges from 1-4 corresponding with no, minimal, moderate, and very strong flow. Some vendors offer automated “low flow” settings, while others require selective adjustments of parameters including color Doppler gain, scale (≤4cm/sec), pulse repetition frequency and wall filters. Additional operator selections to maximize flow detection include the use of power Doppler and decreasing the size of the Doppler box to the region of interest. While optimizing for low flow states is important, care should be taken to not over-adjust resulting in excessive flash artifact which is an equally limiting factor.

With color Doppler settings optimized, flow that is barely perceptible should be considered color score 2 (minimal flow). In contrast, when color Doppler flow is robust and easily obtained throughout the solid components, walls or septations of a lesion, this would be considered color score 4 (very strong flow). Anything in between would be considered color score 3 (moderate flow). Note, the assessment of flow is limited to the lesion and any flow in adjacent normal ovarian parenchyma does not contribute to color score.

Spectral Doppler is useful as an adjunct tool to distinguish vascularity from artifact when vessels are not clearly delineated with color Doppler. However, spectral plays no role in determining the color score and risk assessment.



Color Score 2 (minimal flow) Color Score 3 (Moderate flow) Color Score 4 (Very strong flow)

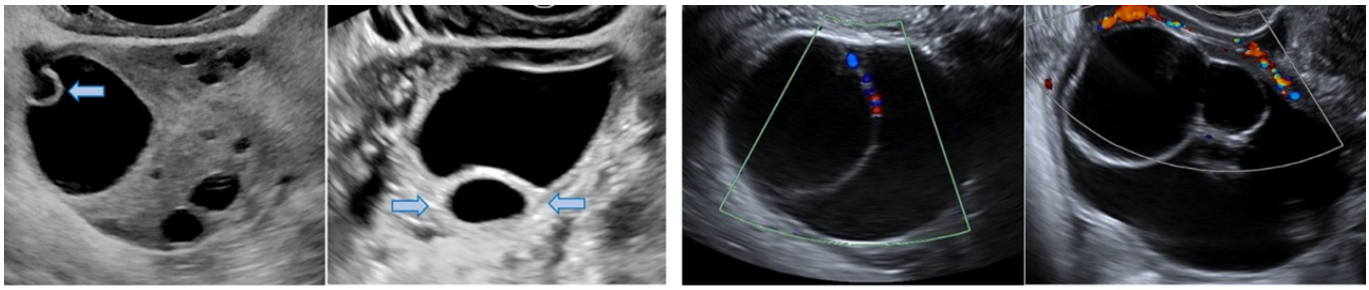
FAQ-214: How do you differentiate between a “daughter cyst” or “cyst within cyst” appearance and a loculated cyst? Is this the same as a “bilocular” cyst?

The “daughter cyst” or “cyst within cyst” appearance has been used to describe partial volume averaging of a smaller support follicle adjacent to a larger simple cyst or dominant follicle that appears to project within it. This may be used to help confirm an adnexal cyst is ovarian in etiology when surrounding ovarian parenchyma is not definitively seen and can be particularly helpful in prenatal ultrasounds when abdominal or pelvic cysts are seen in female fetuses. These terms have also been used to describe a dominant follicle with a cumulus oophorus at the margin just prior to ovulation. Cine clips or real-time imaging may be helpful to appreciate that the smaller support follicle is peripherally located in the surrounding ovarian parenchyma or within the larger cyst/follicle. If uncertain, one may obtain a short interval follow-up to assess for resolution as physiologic findings evolve in a timely manner. Correlating with menopausal status is always prudent, as physiologic support follicles are only seen in premenopausal patients and less commonly in patients in early postmenopause (<5 years of menopause).

A loculated cyst has at least one complete septation . When a septation is somewhat circular, it may mimic a “cyst within cyst” appearance. If the location of the smaller cyst does not appear to be within the surrounding ovarian parenchyma, it should be assessed as a loculated cyst, with the term “bilocular” applied if there is one septation (2 locules) and “multilocular” used for ≥2 septations (≥3 locules).

In the original version of O-RADS US, there was no distinction between a “bilocular” and “multilocular” cyst. However, as many apparently “bilocular” cysts may indeed represent adjacent follicles/cysts, and to better align with the SRU Consensus on Adnexal Cysts which recommends a simple cyst with a single smooth thin septation be managed as a simple cyst, “bilocular” was added to the lexicon in version 2022. This is supported by newer IOTA 5 data that showed a cyst <10 cm with a single smooth septation has a <1% risk of malignancy belonging in the O-RADS US 2 (almost certainly benign) category[1].

Previously any cyst with ≥1 septation was considered multilocular and was categorized as O-RADS US 3 (low risk); multilocular has thus been redefined as ≥2 septations (≥3 locules) to allow higher specificity and more appropriate management of loculated cysts.



Cumulus oophorus | Partial volume averaging | Bilocular cyst | Multilocular cyst

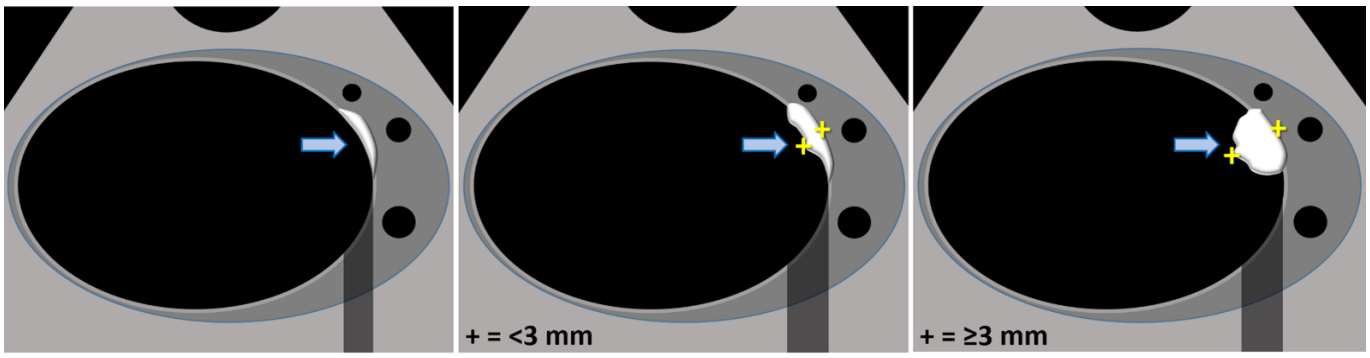
REFERENCE:

[1] Timmerman S, Valentin L, Ceusters J, et al. External Validation of the Ovarian-Adnexal Reporting and Data System (O-RADS) Lexicon and the International Ovarian Tumor Analysis 2-Step Strategy to Stratify Ovarian Tumors Into O-RADS Risk Groups. JAMA Oncol. 2022; doi: 10.1001/jamaoncol.2022.5969. (https://jamanetwork.com/journals/jamaoncology/fullarticle/2799493) (https://www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/O-Rads)

Did you find FAQ-214 helpful? Yes (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=Yes&RADS=LI-RADS&FAQ=FAQ-214) No (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=No&RADS=LI-RADS&FAQ=FAQ-214)

FAQ-215: How do wall or septal calcifications fit into the risk stratification system?

Calcifications appear as hyperechoic shadowing structures and may be seen with dermoid cysts. When additional features of a typical dermoid cyst are not seen, calcification(s) in the wall or septation of a cystic lesion should be evaluated by their extent of protrusion into the cyst cavity. If the calcification is flat and does not protrude within the cavity, the wall or septum would be considered “smooth”. When the calcification protrudes into the cyst cavity but measures <3 mm in height, the wall or septum would be considered “irregular”. However, if the protrusion is ≥3 mm, it would be considered a solid component (papillary projection if surrounded by fluid on 3 sides). If using the ADNEX model for a more specific risk of malignancy, the term “shadowing” can be applied.



Smooth inner wall | Irregular inner wall | Papillary projection

Did you find FAQ-215 helpful? Yes (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=Yes&RADS=LI-RADS&FAQ=FAQ-215) No (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=No&RADS=LI-RADS&FAQ=FAQ-215)

FAQ-216: What is considered "ascites"? Do echoes within the fluid matter?

For the purposes of risk stratification, ascites is defined as fluid extending beyond the cul-de-sac superior to the uterine fundus if the uterus is anteverted or anteflexed, or fluid anterior and superior to the uterus if the uterus retroverted or retroflexed. When ascites is seen in conjunction with an adnexal lesion assessed as O-RADS US 3 (low risk) or 4 (intermediate risk), an upgrade to O-RADS US 5 (high risk) is warranted when there are no other etiologies of ascites present, such as cirrhosis or third-spacing.

Echoes within fluid are nonspecific and do not play a role in risk assessment. While echoes may indicate cells in the setting of malignant ascites, blood or pus may have a similar appearance and the clinical scenario must therefore always be considered.

Did you find FAQ-216 helpful? Yes (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=Yes&RADS=LI-RADS&FAQ=FAQ-216) No

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FAQ-217:Who is an “ultrasound specialist”? How can I get certified?

An ultrasound specialist is anyone whose practice includes a focus in ultrasound imaging of the adnexa with sufficient experience and familiarity with both benign and malignant adnexal processes to improve the likelihood of correct diagnoses. For example, this is the person other radiologists would ask for a second opinion when faced with a challenging ovarian/adnexal lesion on US. While many US specialists may have completed fellowship training which includes pelvic imaging, there are no specific requirements nor certification processes for this designation. Typically, an US specialist will be involved in quality assurance activities and this practice is strongly encouraged by anyone interested in improving their performance.

The rationale for including the ultrasound specialist as a management option in the higher risk categories is supported by evidence that demonstrate a higher accuracy in evaluation of adnexal malignancy by those considered to be “experts”. This expertise, if available, should be relied upon to guide the judicious and limited use of MRI instead of necessitating MRI for every lesion that is not clearly benign.

Did you find FAQ-217 helpful? Yes (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=Yes&RADS=LI-RADS&FAQ=FAQ-217) No (https://app.smartsheet.com/b/form/7737e609386c415d9929772d8505023b?Did%20you%20find%20this%20FAQ%20helpful?=No&RADS=LI-RADS&FAQ=FAQ-217)
