

◎ *In the name of  
God*

◎ Sonographic finding for diagnosis of endometrioma and differentiation between malignancy

# *Endometrioma*

Endometrioma refers to the cyst that forms when ectopic endometrial glands and stroma in the ovary bleed. Typically, on ultrasound, it appears as a cystic lesion with “ground-glass” echogenicity with no papillary projection or solid areas. This cystic lesion is also known as “chocolate cyst” due to the cyst’s content. These cysts may be bilateral in up to 30-50% of patients

endometriomas typically have homogeneous low- to medium-level internal echoes (60% )also reported 73-82%.

Ultrasound characteristics of “  
“Typical” endometrioma is a cyst with 1 to 4  
locules mostly unilocular with a low-level  
echogenicity representing old blood in the cyst  
cavity (commonly termed ‘ground glass’) without  
any papillary proliferations...  
...with **no** internal flow at Color Doppler  
evaluation.

Septations with resulting multilocularity are common, occurring in 45% of endometriomas. In other report ALKAZAR Multilocularity has been reported in 18-24% of endometriomas However, very probably endometriomas are not septate lesions but single lesions one adjacent to other. Hyperechoic wall foci were observed in 35% of endometriomas and were found to be a useful feature for diagnosing Endometriomas.

Wall nodularity (occurs in approximately 20% of endometriomas and is problematic because this feature typically raises concern for a neoplasm).

In a study by Guerriero et al almost 50% of the endometriomas did not demonstrate typical features,

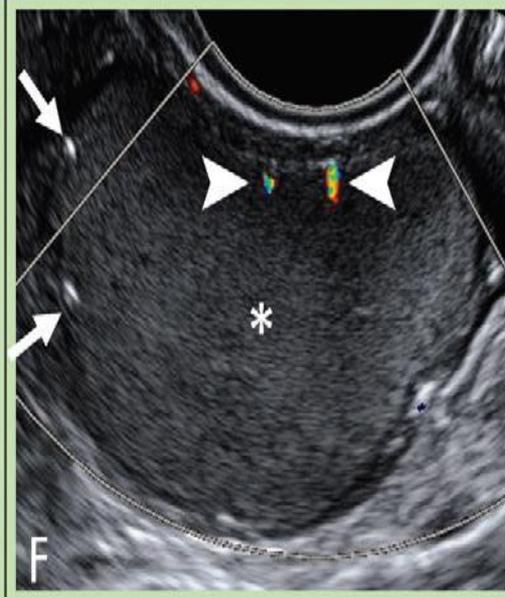
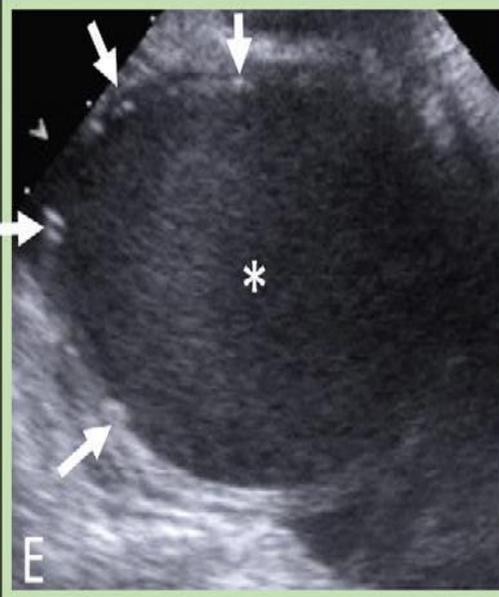
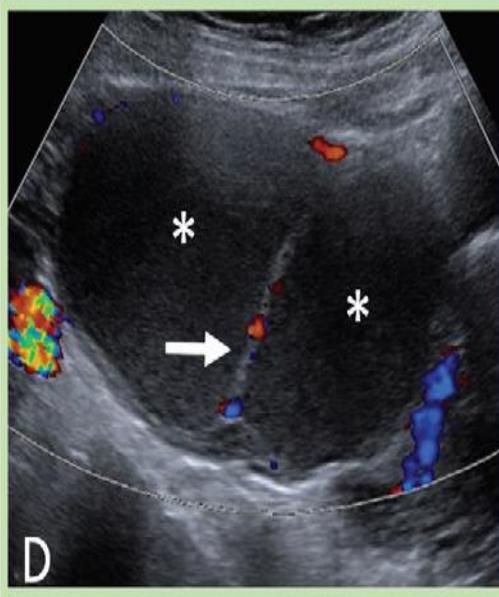
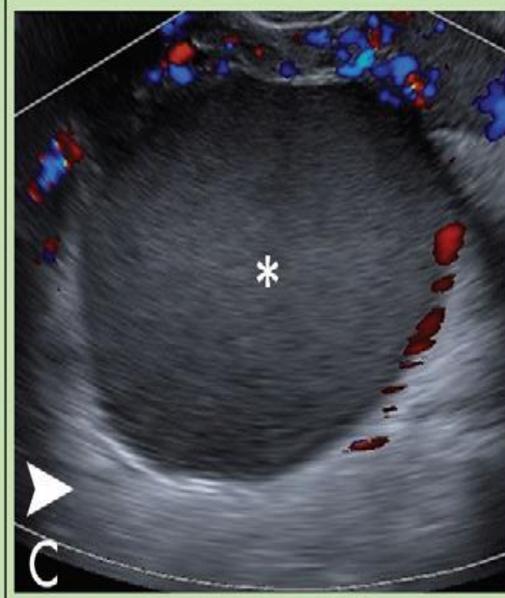
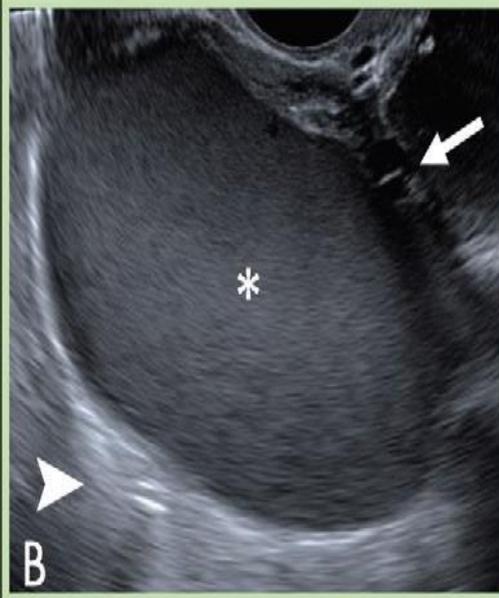
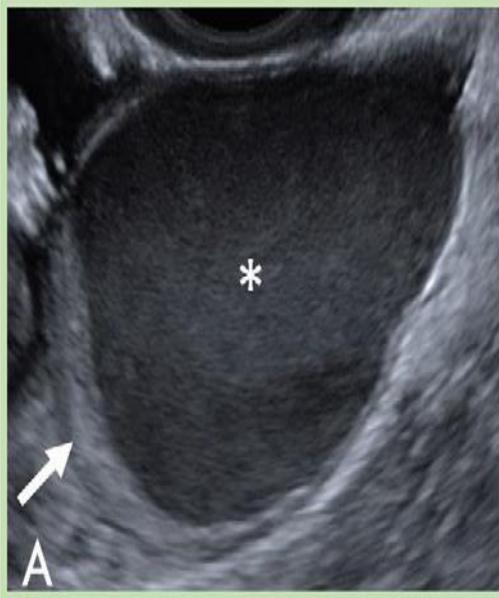
**they** so-called atypical endometriomas.

Usually, this term is used in endometriomas that exhibit solid areas or papillary

projections. In one of the largest series of sonographic findings in ovarian endometriomas, this feature has been reported in 15% of all ovarian endometriomas purely solid appearance of ovarian endometriomas is a rare finding (<1% of the cases) (

Although this typical appearance has been reported in 73–82% of endometriomas, the sonographic spectrum is wide. Ovarian endometrioma may appear as unilocular anechoic cyst (5% of the cases) as a cyst with hemorrhagic content (2% of the cases) or as an unilocular cyst with homogeneous low-level echoes, but not “ground glass” (6% of the cases).

# Typical Endometriomas





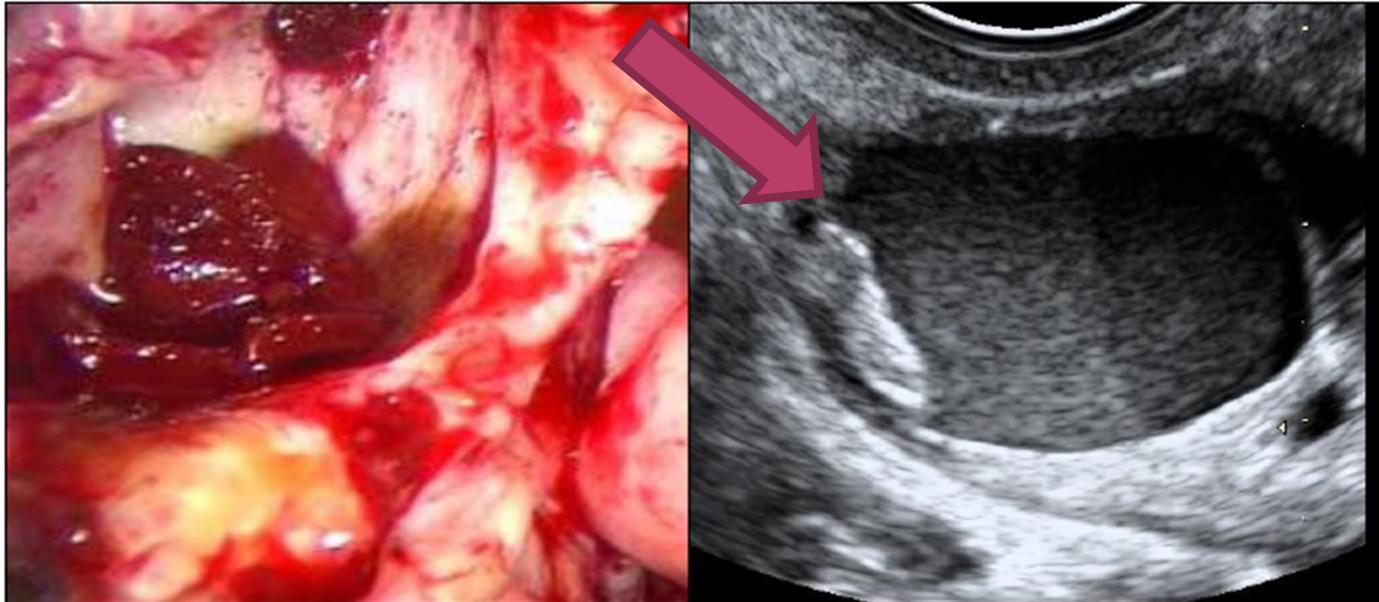


An ovarian endometrioma showing some echogenic bands within the cyst cavity mimicking hemorrhagic echogenicity



Ovarian endometrioma with apparent solid echogenicity

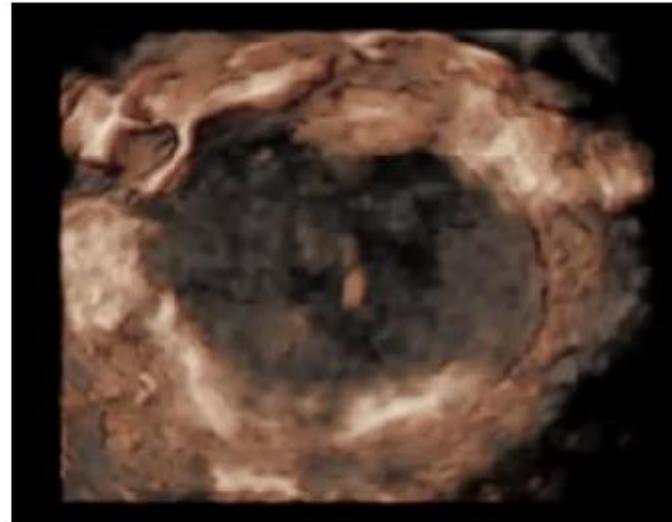
## Ultrasound characteristics of “atypical” endometrioma-1



Endometriomas may also have ‘atypical’ features (in a minority of reports): multilocular ground glass masses or cysts with heterogeneous echogenicity of the cyst content, with internal blood clots with fibrin or anechoic cysts...

Images by Testa A.C.

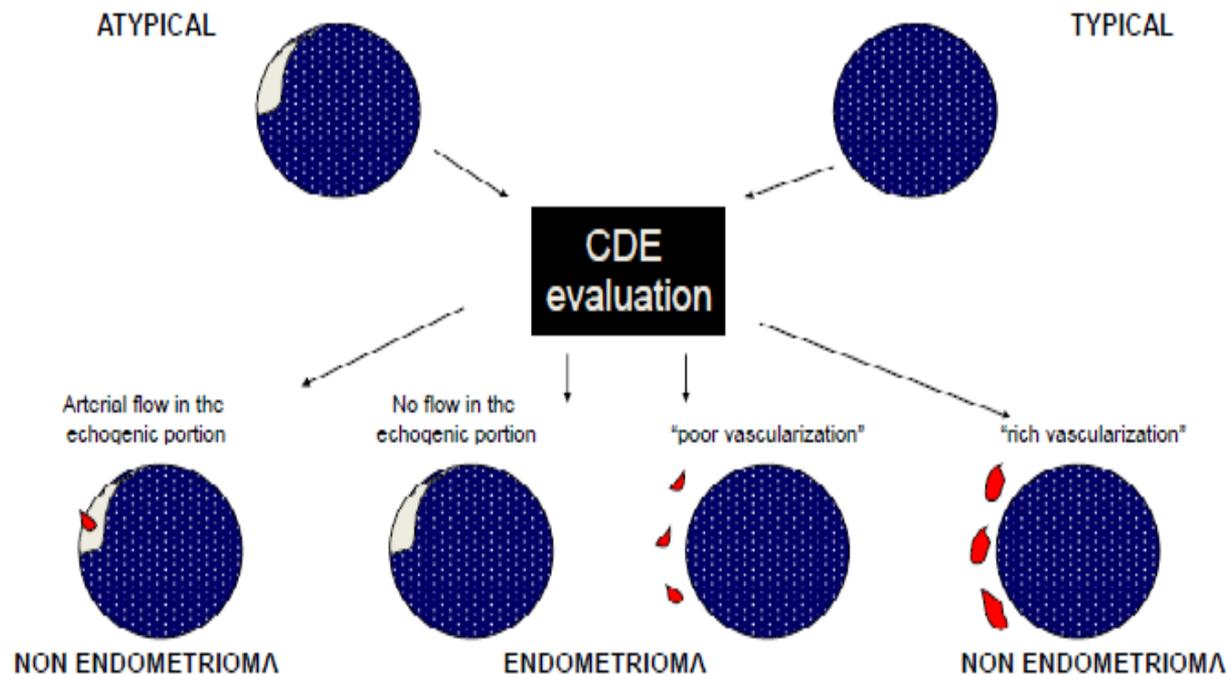
## Ultrasound characteristics of “atypical” endometrioma-2



...and frequently debris/ amorphous material (blood clots, fibrin, calcifications)  
may give the false impression of a solid component/ solid papillary projections.  
The lack of blood flow can help in the discrimination.



# Color Doppler evaluation in the discrimination between endometriosis and other adnexal masses



Overall subjective assessment of color Doppler flow within the entire lesion (wall and/or internal component)

Color Score = 1  
No flow



Color Score = 2  
Minimal Flow

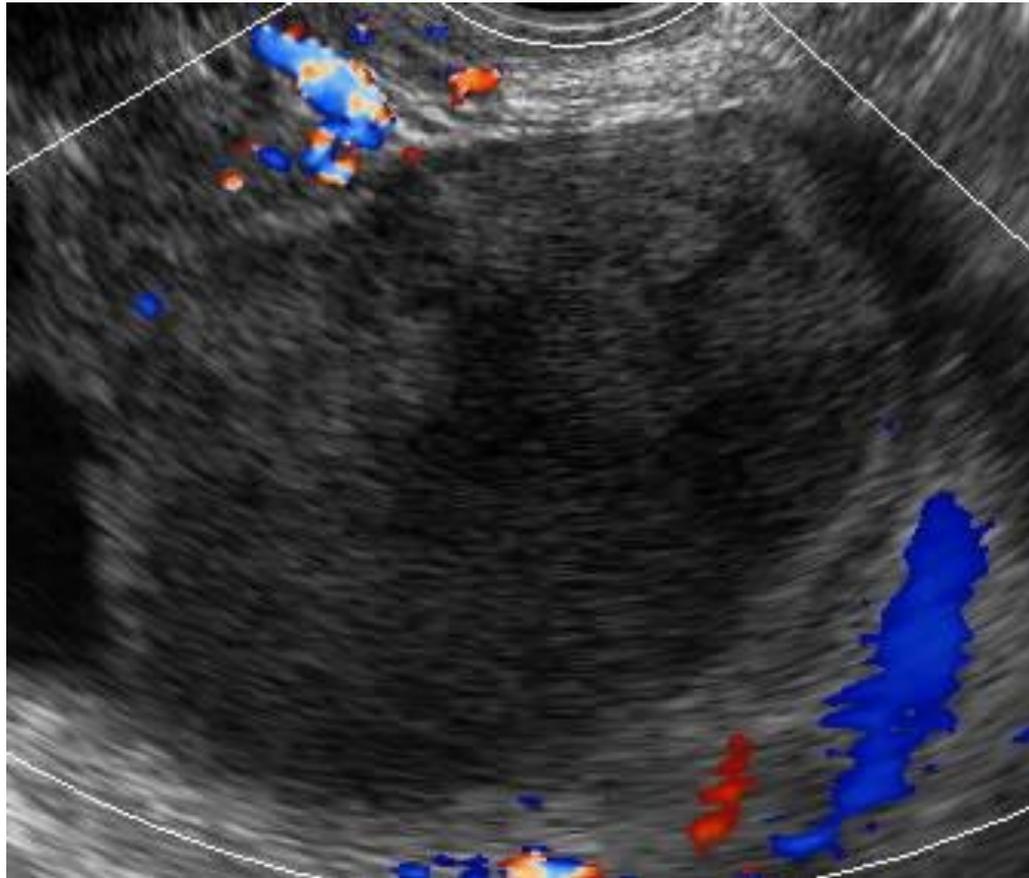


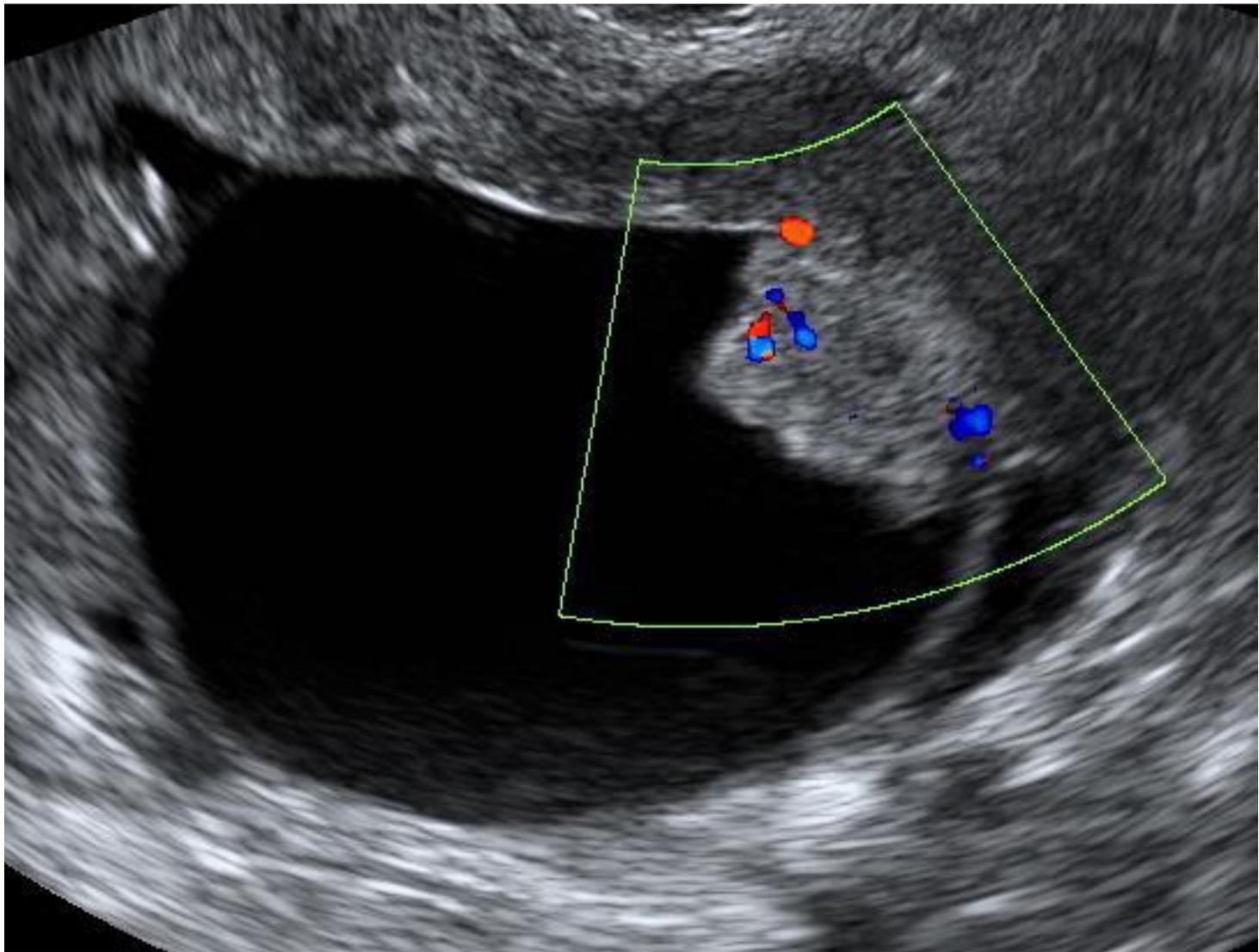
Color Score = 3  
Moderate flow



Color Score = 4  
Very Strong Flow



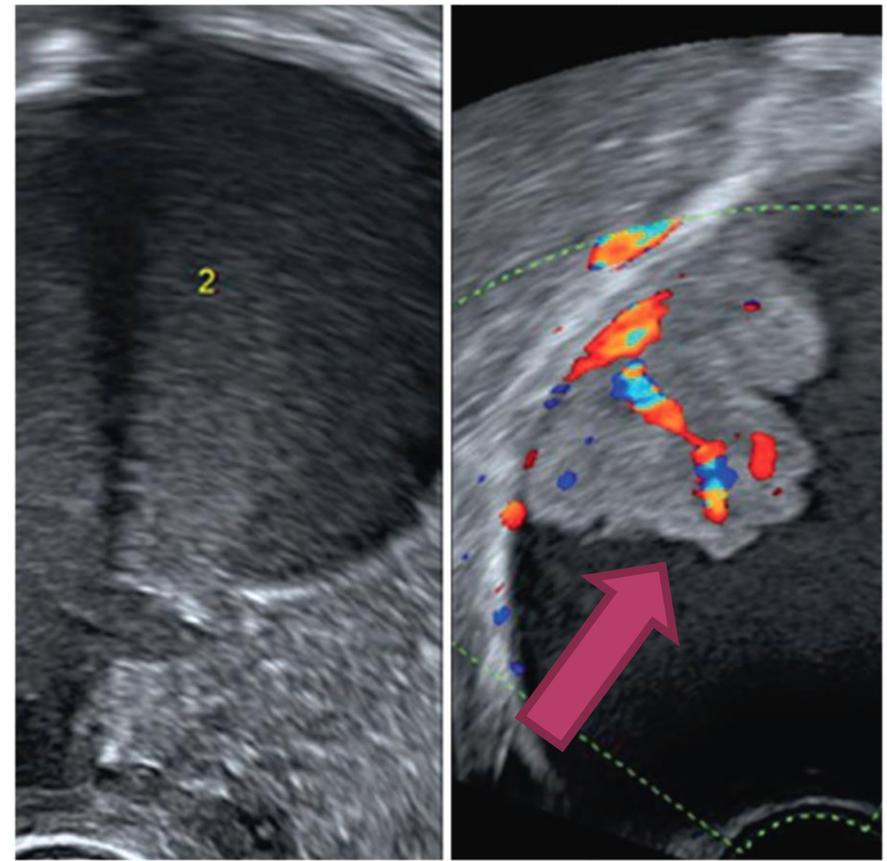




# Ultrasound in Gynecology

An Atlas and Guide

 Springer

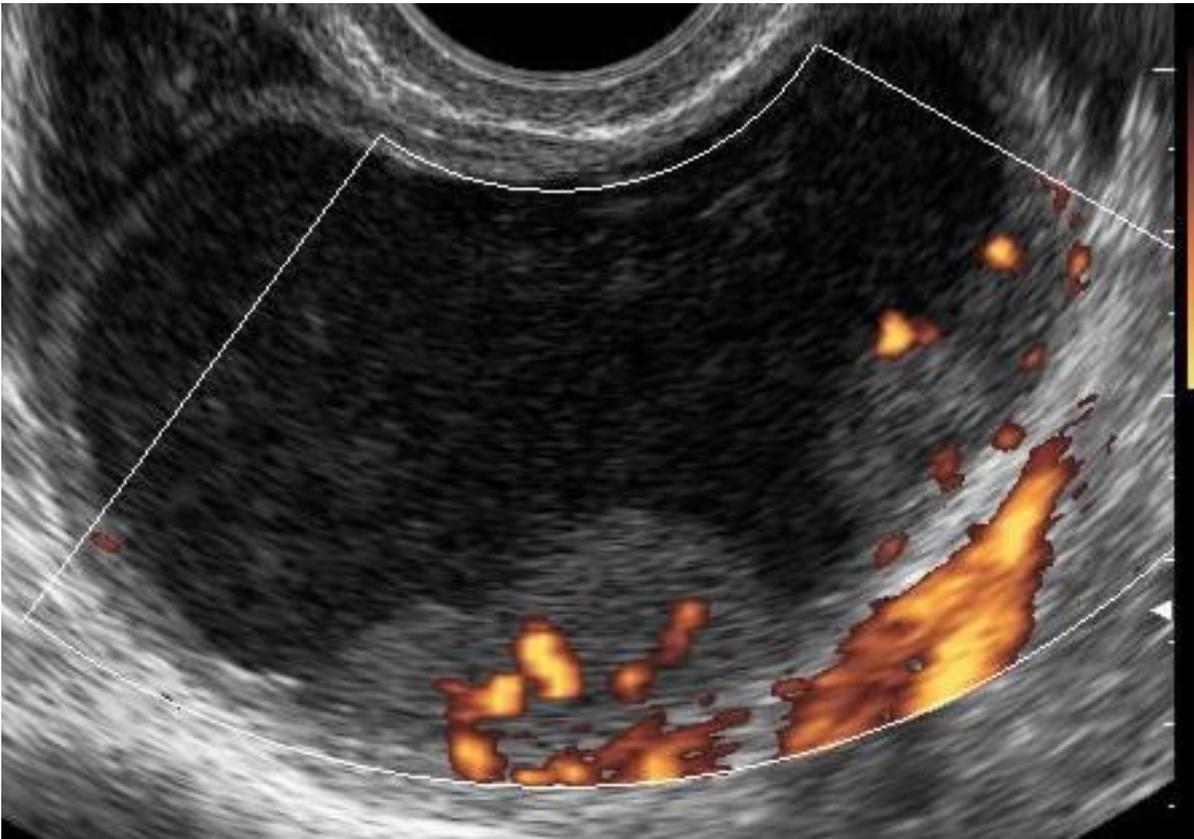


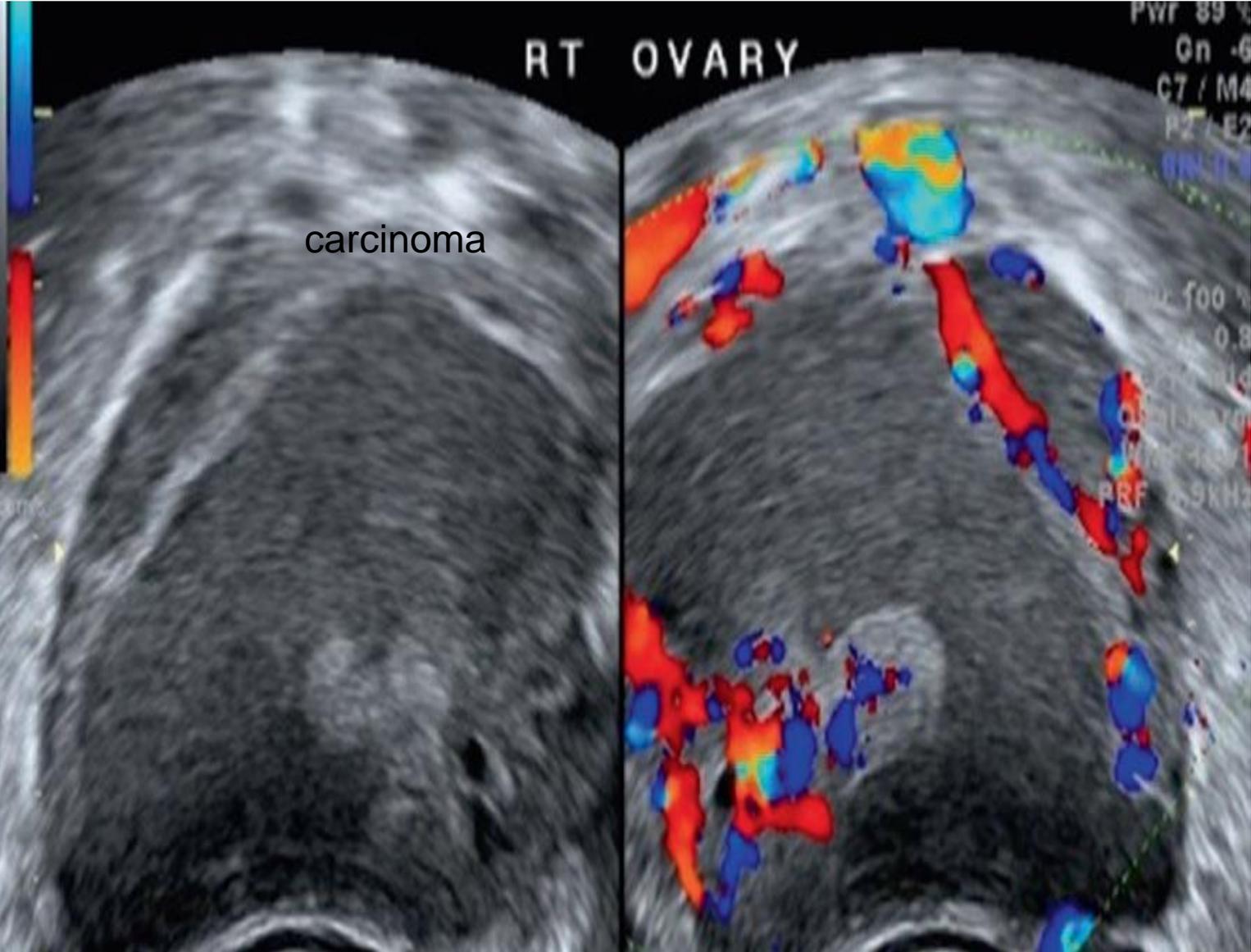
endometrioid carcinoma (Grade 2) arising in the background of endometriosis

34-year-old lady

*There are two clinical entities that deserve particular mention: decidualization of an endometrioma and ovarian cancer arising from an endometrioma.*

Endometrioma decidualization is a phenomenon characterized by the thickening of the ectopic endometrium due to the effect of progesterone during pregnancy. When decidualization occurs, endometriomas may mimic an ovarian cancer during ultrasound evaluation. *Typical findings are the presence of one to several vascularized solid papillary projections arising from the internal surface of the cyst's wall* The knowledge of past history of endometriosis observing the “suspicious” lesion in the same ovary where endometrioma had been diagnosed prior to pregnancy may give clues for considering decidualization. *Another important tip is paying attention to the surface of the papillary projection. In decidualized endometriomas surface uses to be smooth whereas in malignancy surface uses to be irregular.* Serial evaluation during pregnancy can be advised in cases of suspected decidualized endometriomas





Associated malignancy is seen in about 0.5–1.0 % of endometriomas. It can also occur in endometriotic tissues elsewhere including foci of deep infiltrating endometriosis.

As a result, the lifetime risk for ovarian cancer is believed to be higher in women with endometriosis. **The common malignancies in endometriomas are clear cell carcinoma and endometrioid carcinoma.**

Features that suggest possible malignant transformation/•

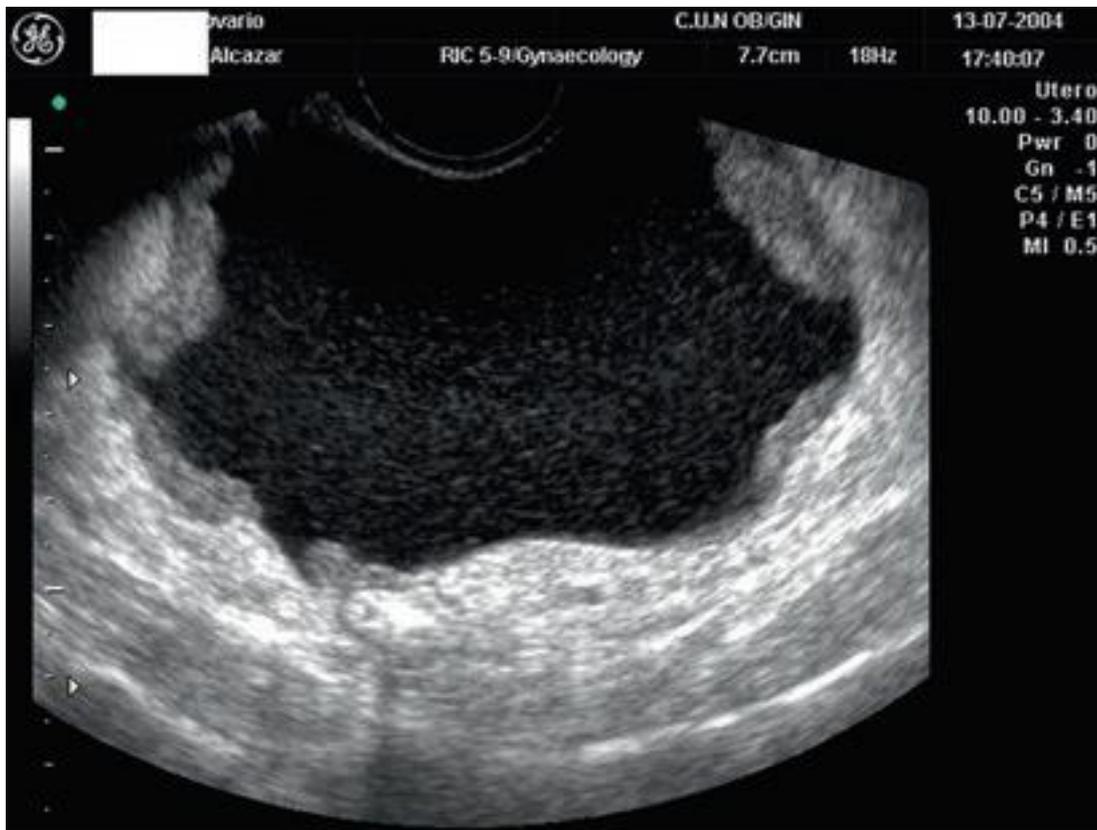
Rapidly enlarging mass or morphology change, abundant blood flow in any endometriotic focus.

• High levels or rapid rise in CA 125 levels. (A baseline CA 125 may therefore be ideal in women with endometriosis.)

Malignancy is more common in women with large cysts (more than 9 cm), cases with severe and long-standing endometriosis, women over 45 years and those with a history of infertility.

Keeping in mind the possibility of associated malignancy and potential for malignant transformation, it is important to followup cases diagnosed with endometriosis. It is also

important to report any suspicion of malignancy on ultrasound for proper surgical decision and so that the pathologist evaluates these suspected areas carefully



Transvaginal sonography depicting a unilocular cyst with irregular walls. Histopathology revealed an endometrioid carcinoma arising from an endometrioma

# O-RADS US Risk Stratification and Management System: A Consensus Guideline from the ACR Ovarian-Adnexal Reporting and Data System Committee

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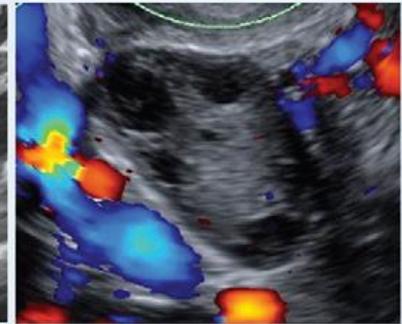
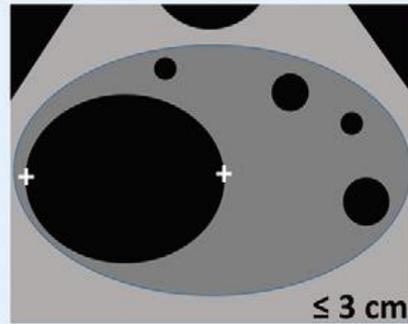
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Supported by the American College of Radiology.

# O-RADS 1 – Normal Ovary (0% likelihood of malignancy)\*

## Follicle

Unilocular, anechoic cyst,  
 $\leq 3$  cm

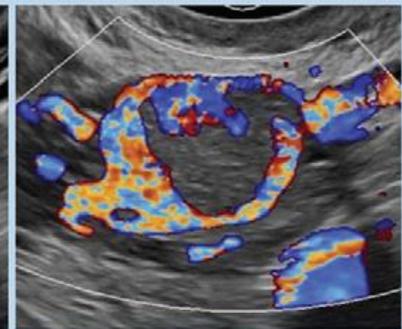
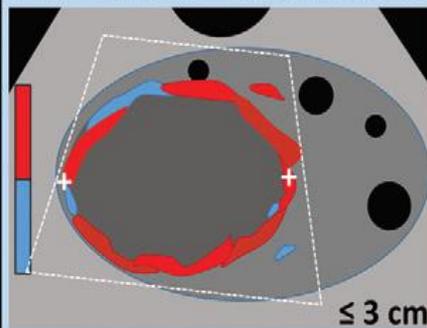
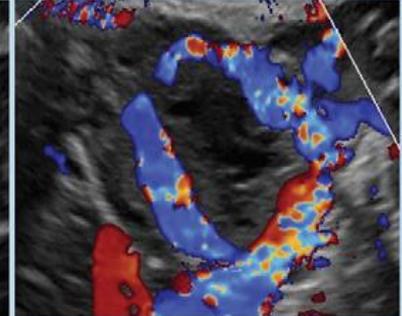
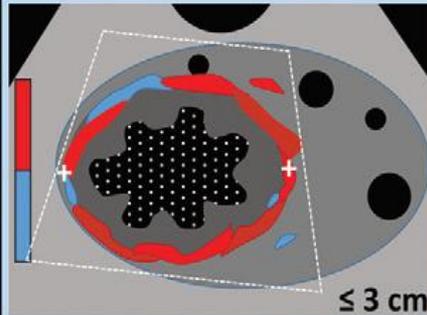


## Corpus Luteum

Thick-walled cyst  $\leq 3$  cm  $\pm$   
crenulated inner margin,  
internal echoes, peripheral  
flow

OR

Hypoechoic region with  
peripheral flow but without  
characteristic cystic  
component

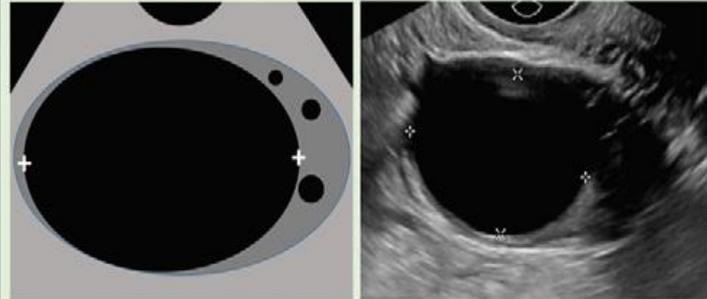


\*only applies in pre-menopausal women

## O-RADS 2 – Almost Certainly Benign (<1% likelihood of malignancy)

### Simple Cyst

> 3 - < 10 cm in premenopausal women  
< 10 cm in postmenopausal women

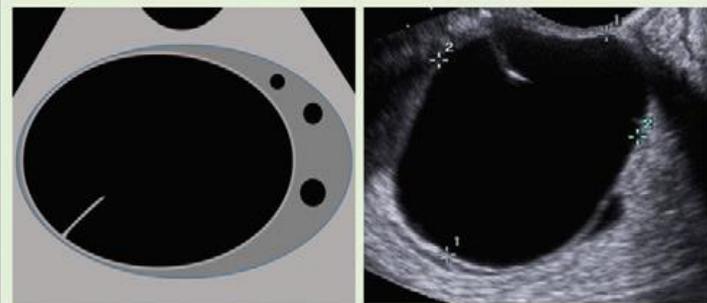
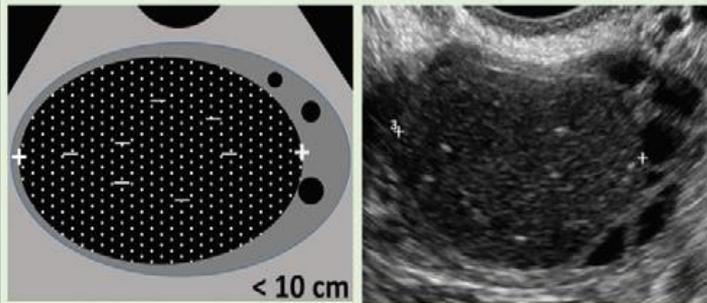


### Classic Benign Lesions

See Figure 9:  
“O-RADS 2 – Classic Benign Lesions  
and Associated Descriptors”

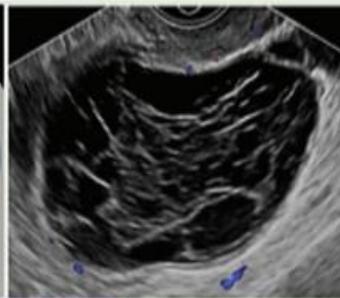
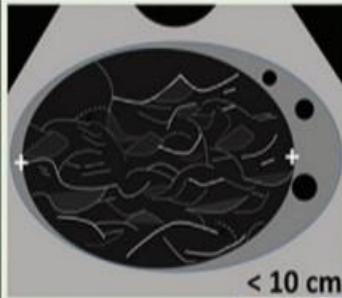
### Non-simple\*, unilocular cyst with smooth inner margin, < 10 cm

\* “Non-simple” applies when internal echoes or incomplete septa are present. Note, an incomplete septum is not considered wall irregularity if the inner margin is otherwise smooth.

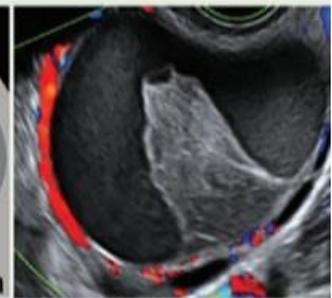
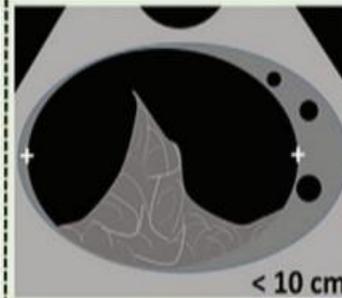


## O-RADS 2 - Classic Benign Lesions and Associated Descriptors

Typical Hemorrhagic Cyst, < 10 cm

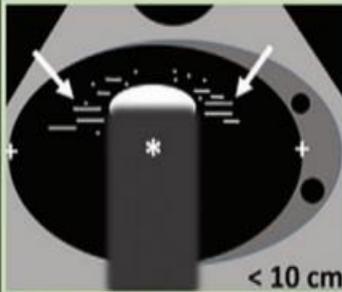


Reticular pattern

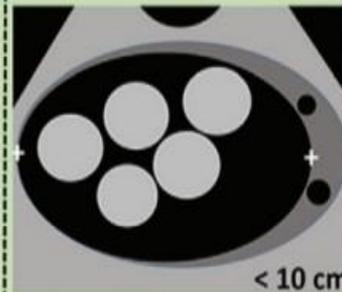


Retracting clot

Typical Dermoid Cyst, < 10 cm

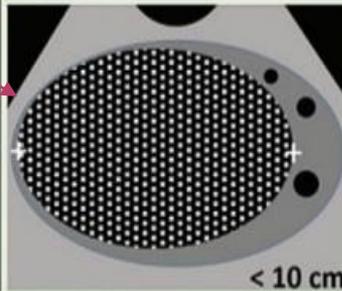


Hyperechoic component with shadowing (\*)  
Hyperechoic lines and dots (→)

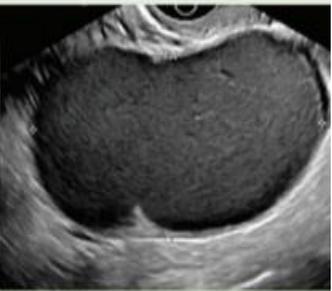
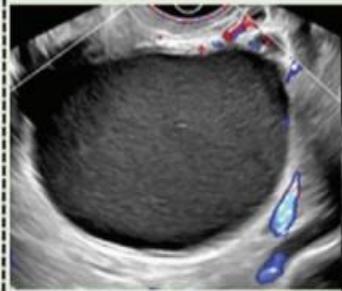


Floating echogenic spherical structures

Typical Endometrioma, < 10 cm



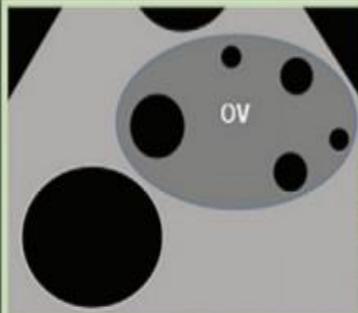
Ground glass/homogenous low-level echoes



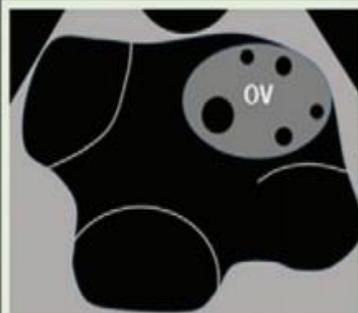
< 10 cm

Ground glass/homogenous low-level echoes

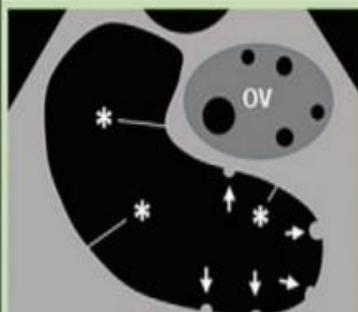
Simple  
Paraovarian  
Cyst (any size)



Typical  
Peritoneal  
Inclusion Cyst  
(any size)



Typical  
Hydrosalpinx  
(any size)



Incomplete septation (\*)

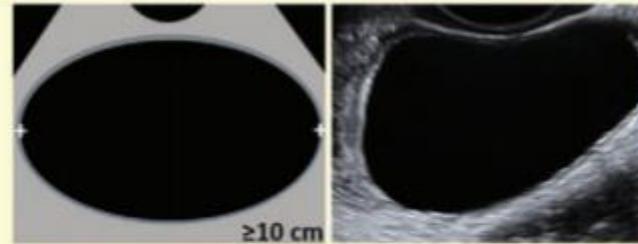
Tubular

Endosalpinx fo

## O-RADS 3 – Low Risk (1 - < 10% likelihood of malignancy)

Unilocular cyst\*,  $\geq 10$  cm

\*Simple or non-simple



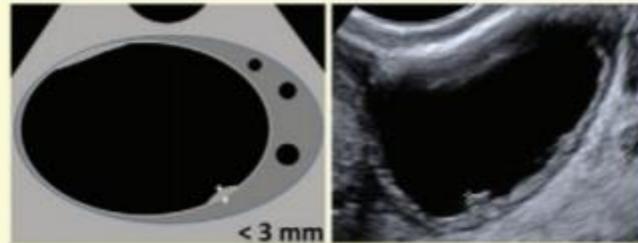
Typical hemorrhagic cyst, dermoid cyst, endometrioma,  $\geq 10$  cm

See Figure 9:

“O-RADS 2 - Classic Benign Lesions and Associated Descriptors”

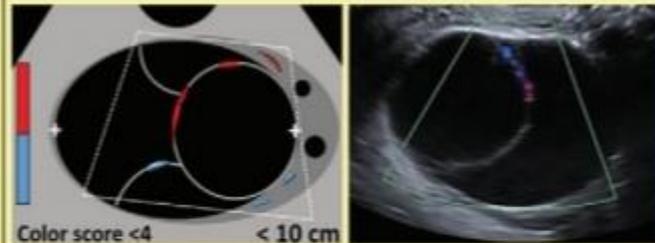
Unilocular cyst with irregular inner wall\*, any size

\* $< 3$  mm height



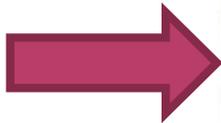
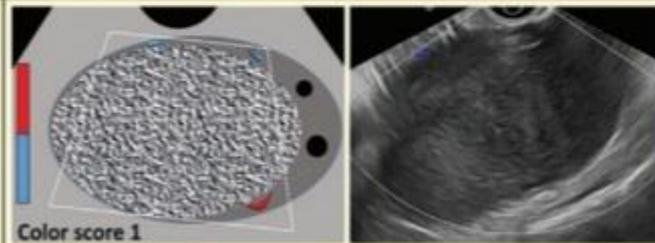
Multilocular cyst with smooth inner wall,  $< 10$  cm, color score 1-3\*

\*Color score 1-3: No to moderate flow



Solid or solid-appearing ( $\geq 80\%$ ) with smooth contour, any size, color score 1\*

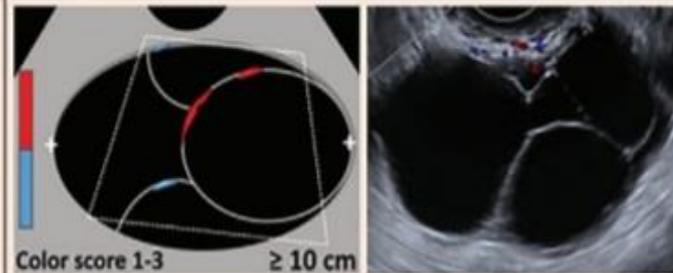
\*Color score 1: No flow



## O-RADS 4 – Intermediate Risk (10 - < 50% likelihood of malignancy)

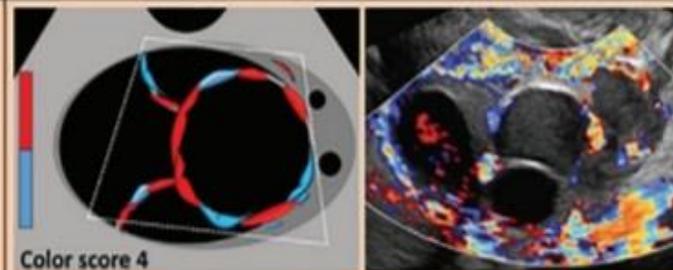
**Multilocular cyst with smooth inner wall,  $\geq 10$  cm, color score 1-3\***

\*Color score 1-3: No to moderate flow

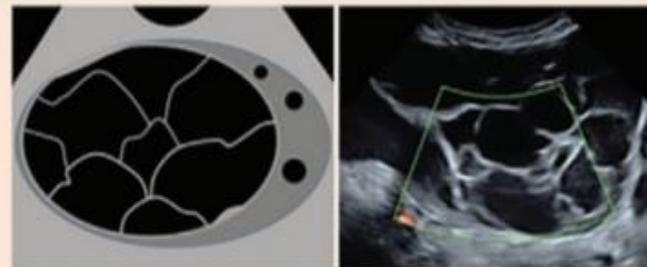


**Multilocular cyst with smooth inner wall, any size, color score 4\***

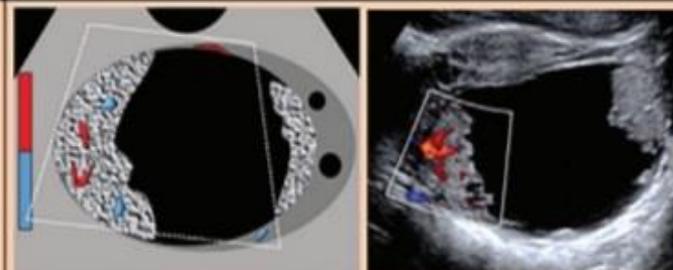
\*Color score 4: Very strong flow



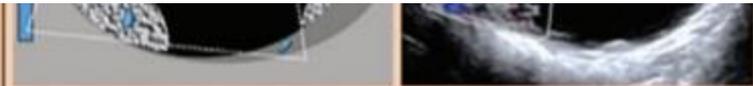
**Multilocular cyst with irregular inner wall and/or irregular septation, any size, any color score**



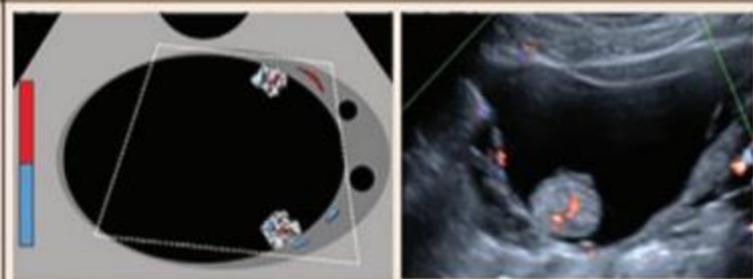
**Unilocular cyst with solid/solid appearing component, no papillary projections, any size, any color score**



projections, any size, any color score

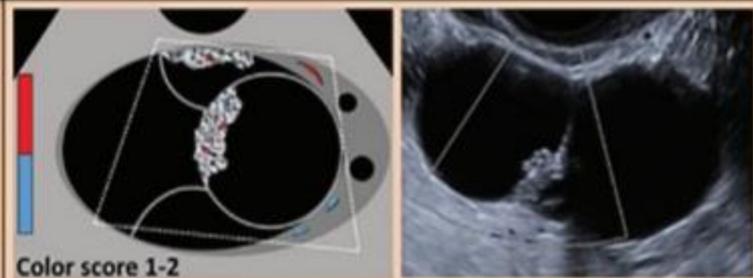


**Unilocular cyst with 1-3 papillary projections, any size, any color score**



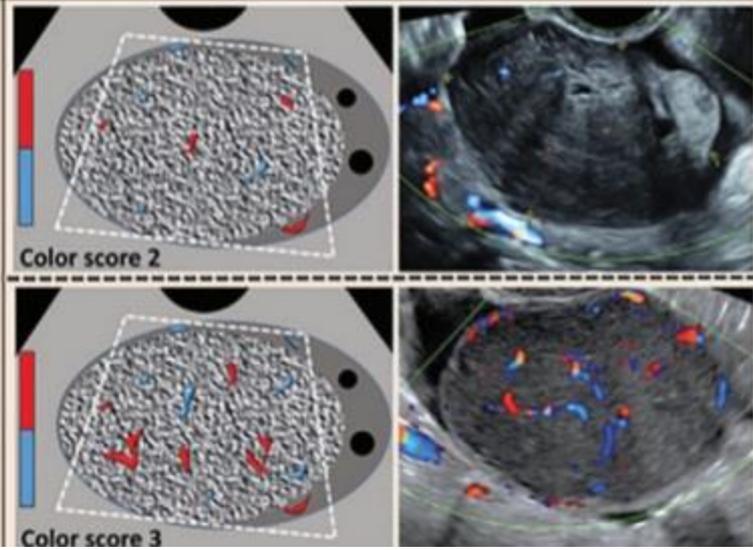
**Multilocular cyst with solid/solid-appearing component, any size, color score 1-2\***

\*Color score 1-2: No to mild flow



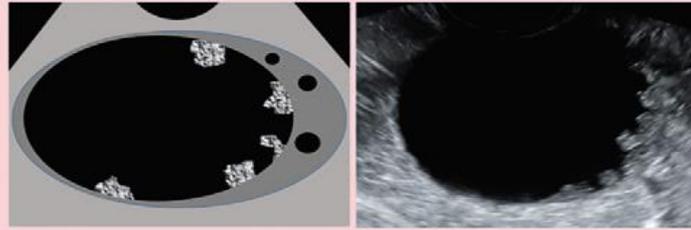
**Solid (≥ 80%) with smooth contour, any size, color score 2-3\***

\*Color score 2-3: Mild to moderate flow



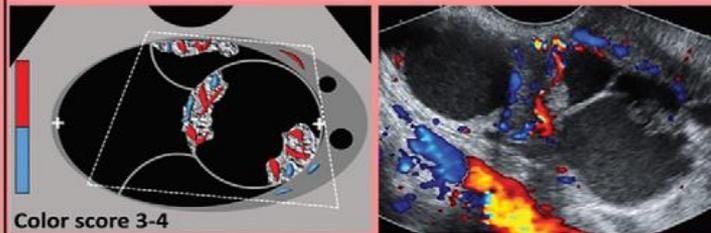
## O-RADS 5 – High Risk ( $\geq 50\%$ likelihood of malignancy)

**Unilocular cyst with  $\geq 4$  papillary projections, any size, any color score**



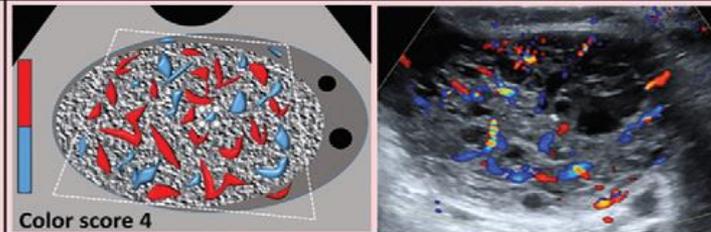
**Multilocular cyst with solid component, any size, color score 3-4\***

\*Color score 3-4: Moderate to very strong flow

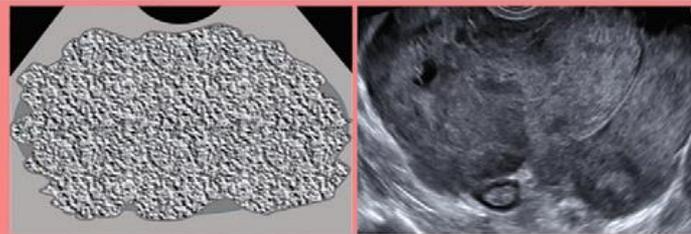


**Solid ( $\geq 80\%$ ) with smooth contour, any size, color score 4\***

\*Color score 4: Very strong flow



**Solid or solid-appearing ( $\geq 80\%$ ) with irregular contour, any size, any color score**



**Ascites and/or peritoneal nodules**



**Thanks for your attention**