

## Ultrasound assessment of pelvic masses (interactive cases)

Alison Smith

Clinical Specialist Sonographer

Gynae-oncology



# Standardisation of terminology IOTA – how it started

*Ultrasound Obstet Gynecol* 2000; 16: 500–505.

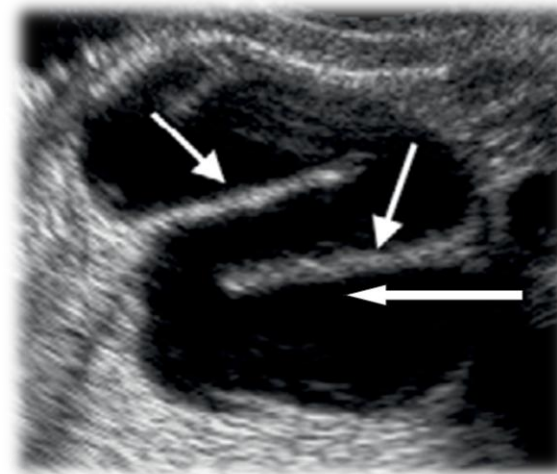
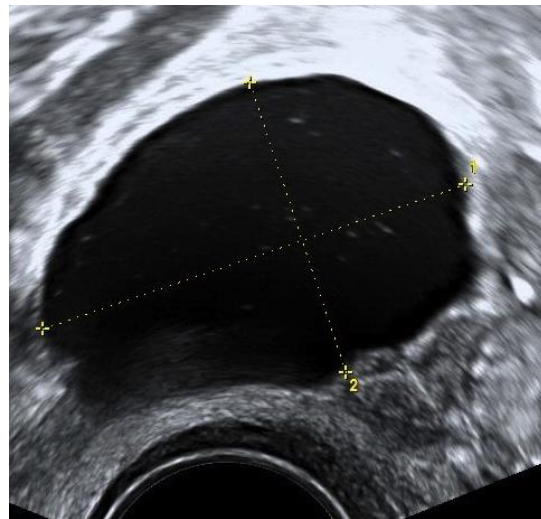
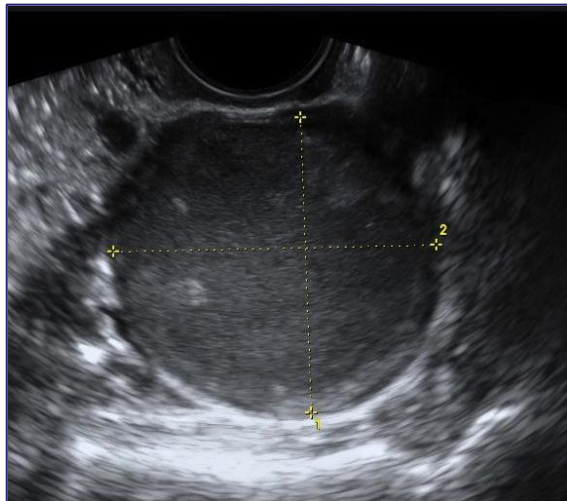
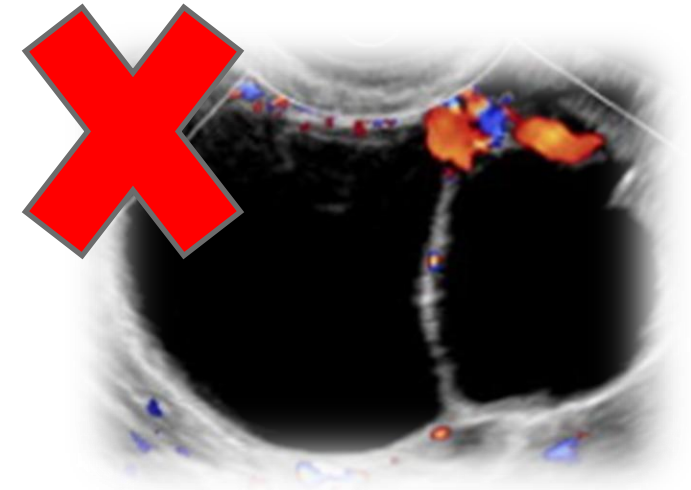
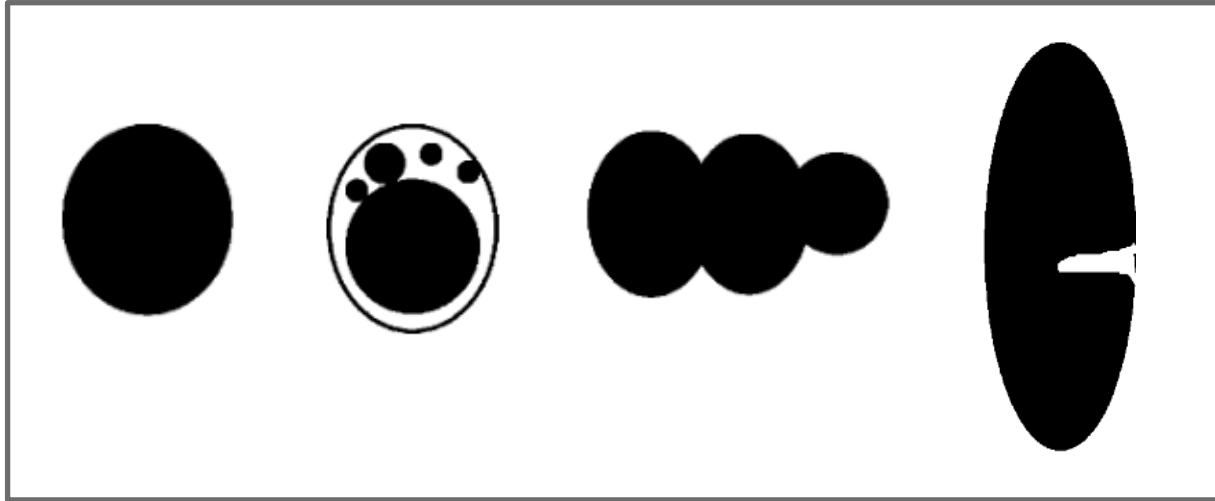
## **Terms, definitions and measurements to describe the sonographic features of adnexal tumors: a consensus opinion from the International Ovarian Tumor Analysis (IOTA) group**

D. TIMMERMAN, L. VALENTIN\*, T. H. BOURNE†, W. P. COLLINS‡, H. VERRELST§ and I. VERGOTE

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**KEYWORDS:** Ultrasonography, Color Doppler imaging, Ovary, Definitions, Standardization

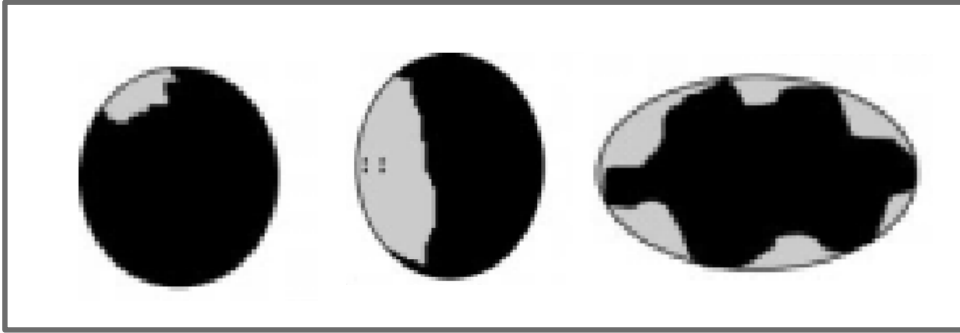
# 1) Unilocular



Incomplete septum v

Complete septum x

## 2) Unilocular solid



What is solid?

*High echogenicity in keeping with tissue*

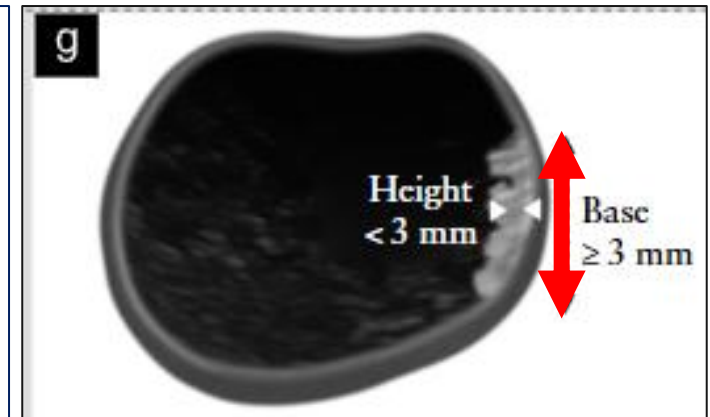
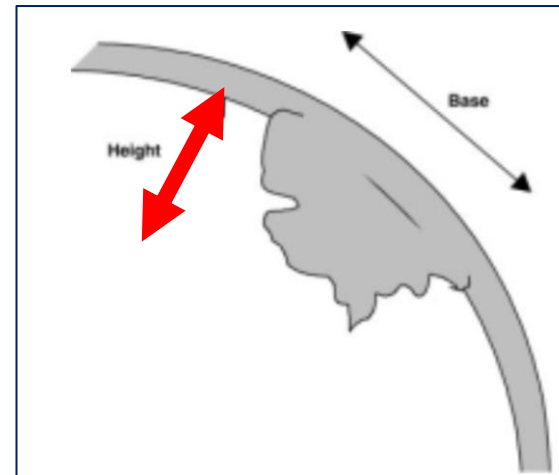
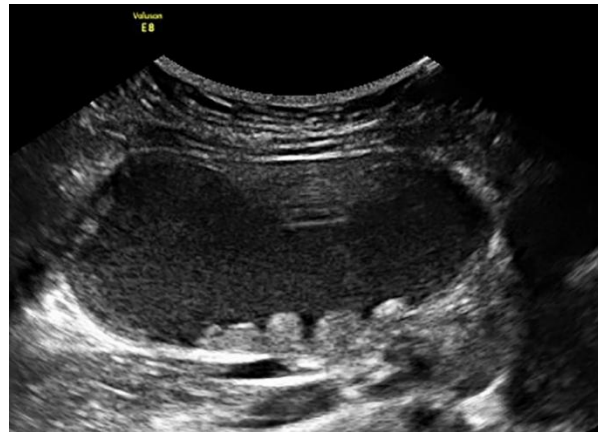
Blood clot x

Septum, thickened lesion walls x

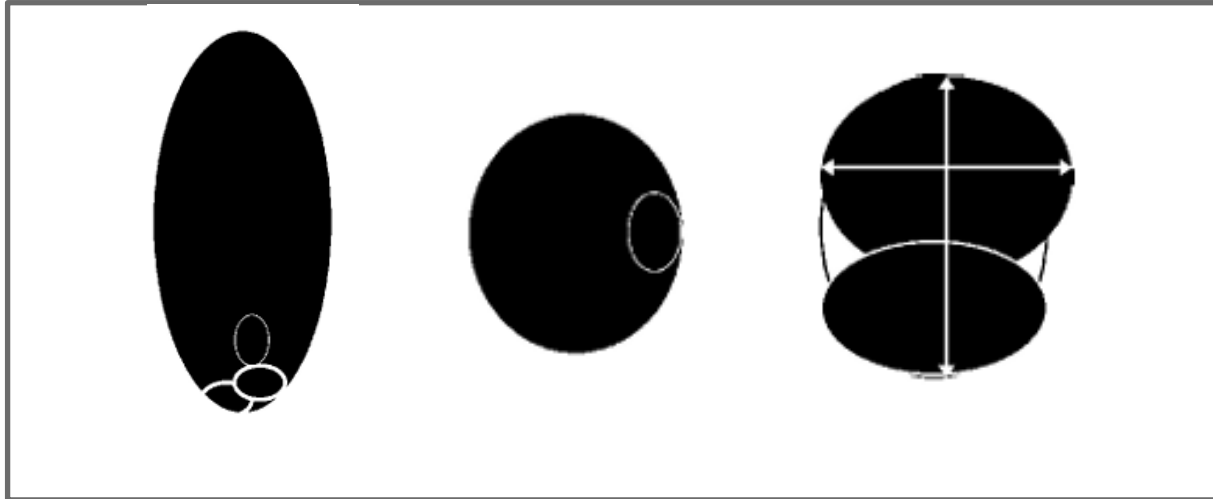
'White ball' in a dermoid x

Papillary projections  $\geq 3\text{mm}$  v

*Protrusion  $< 3\text{mm}$ , base  $\geq 3\text{mm}$  v*

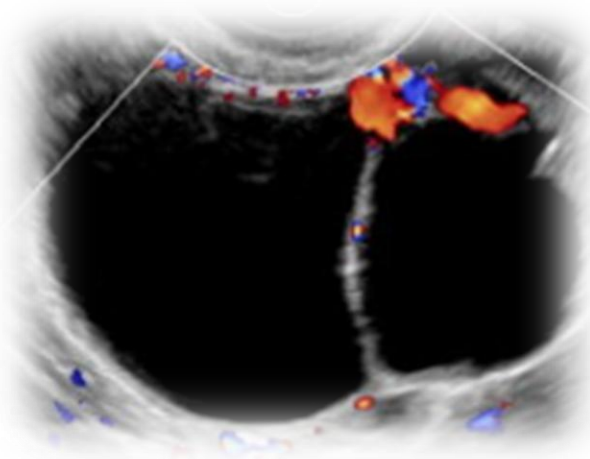


### 3) Multilocular



At least one septum

No measurable solid component or papillary projection



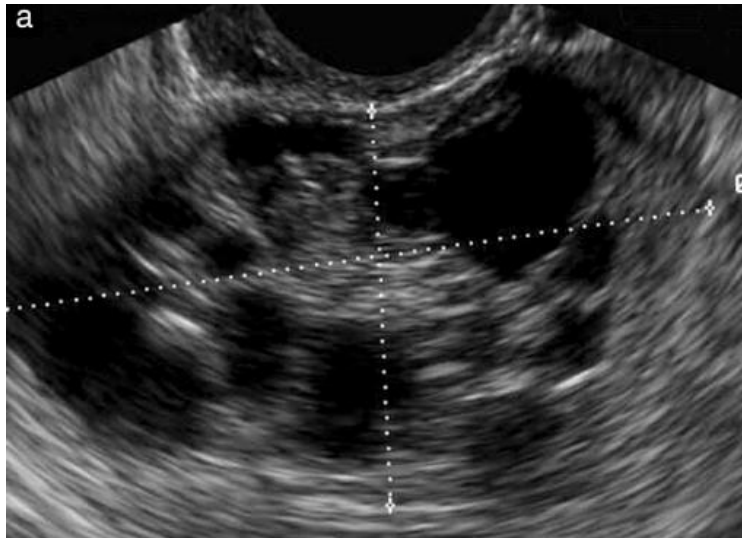
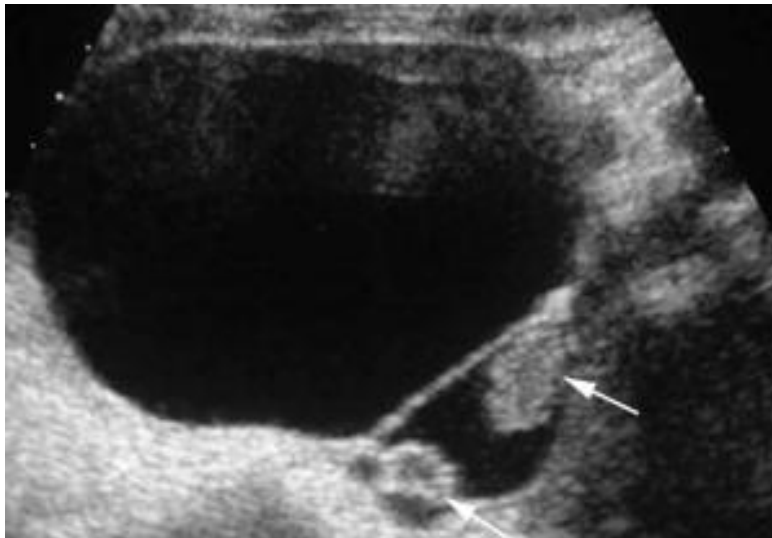
## 4) Multilocular solid

At least one septum

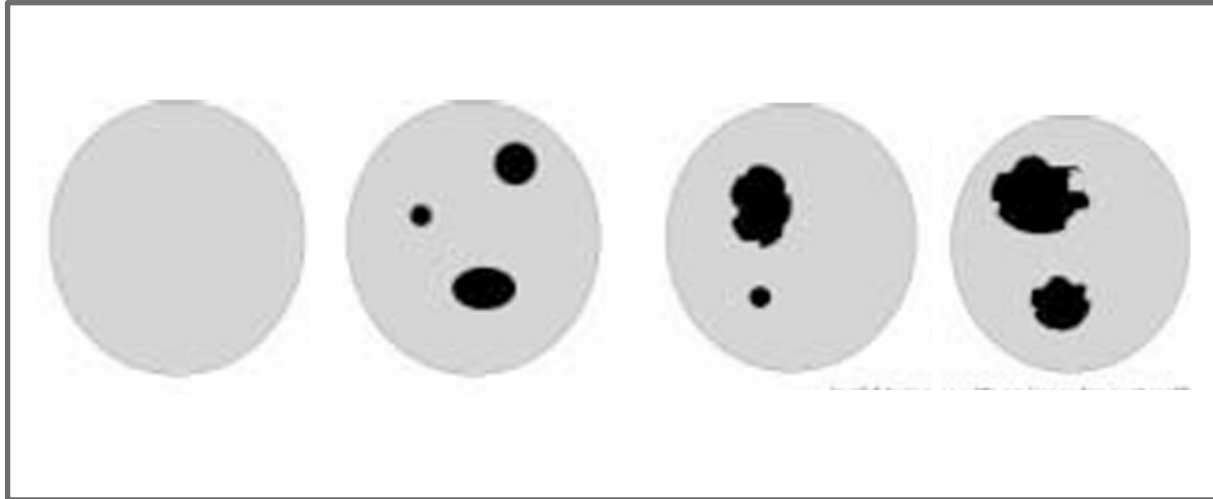
Solid tissue

Papillary projections  $\geq 3\text{mm}$   $\vee$

Protrusion  $< 3\text{mm}$ , base  $\geq 3\text{mm}$   $\vee$

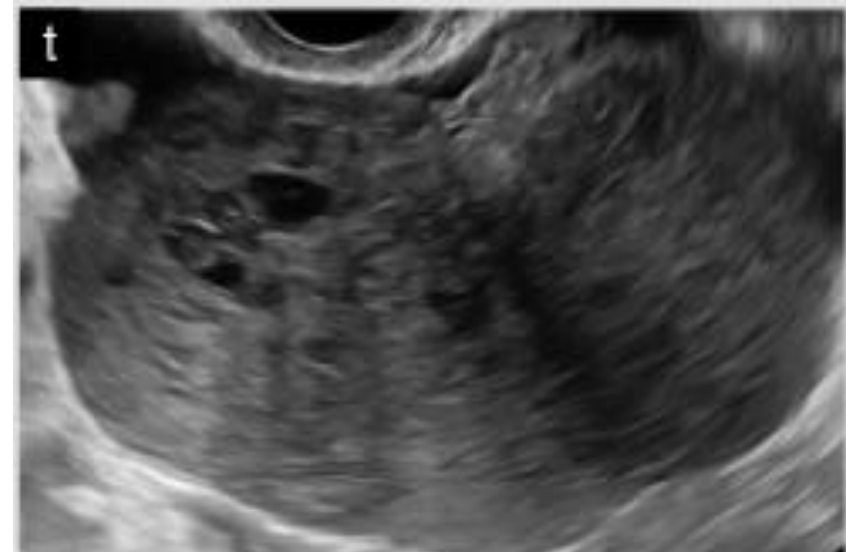


## 5) Solid



80% solid

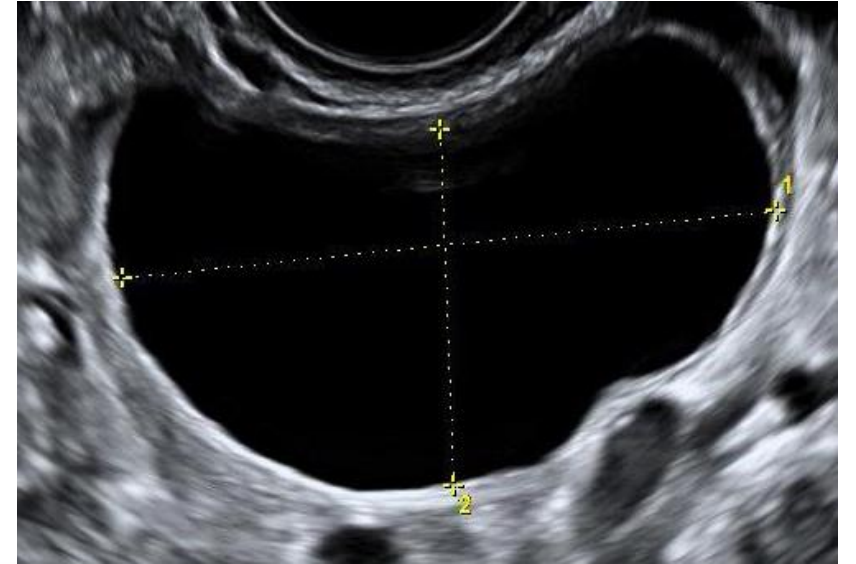
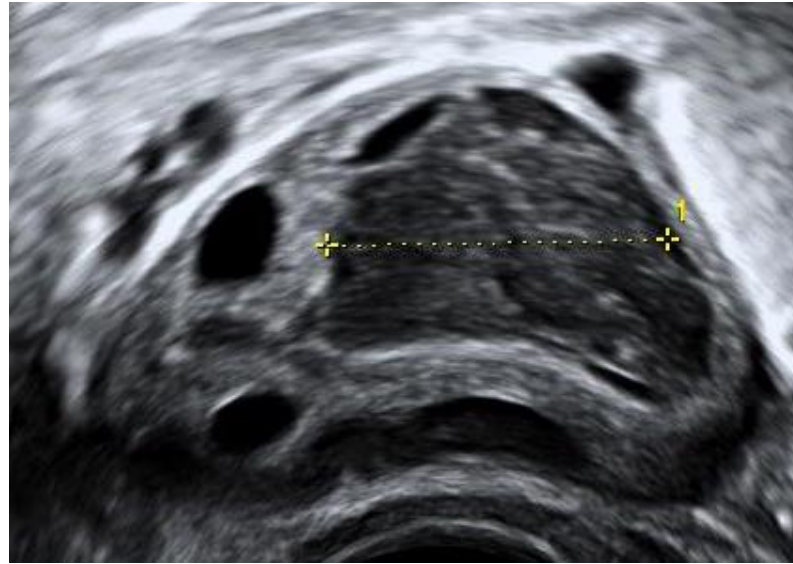
Subjective assessment in  
2D real-time



# Cyst contents

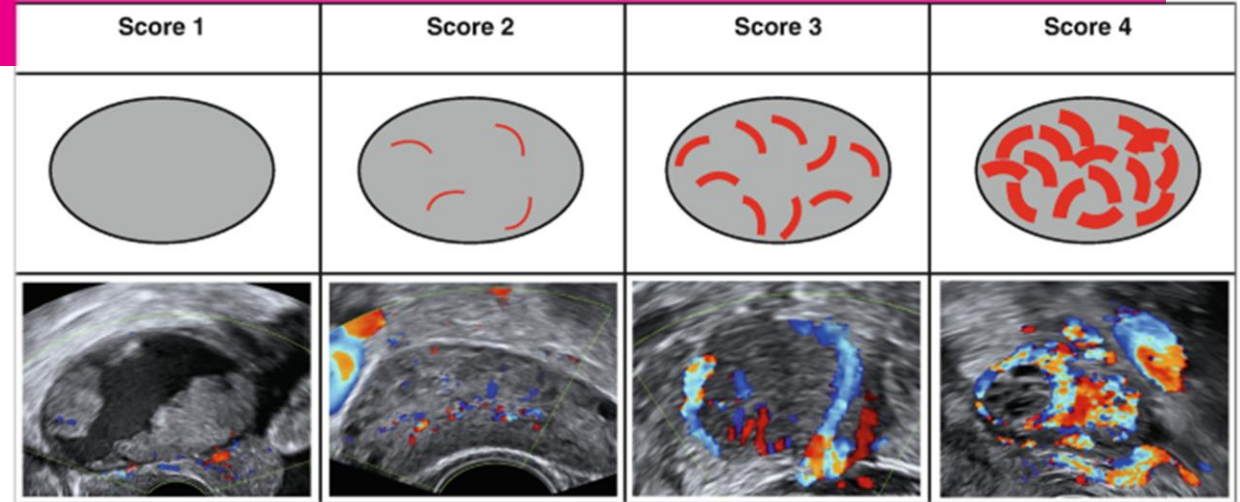
- Anechoic
- Low level echoes
- Ground glass
- Haemorrhagic
- Mixed echogenic
- Solid

(Acoustic shadowing)

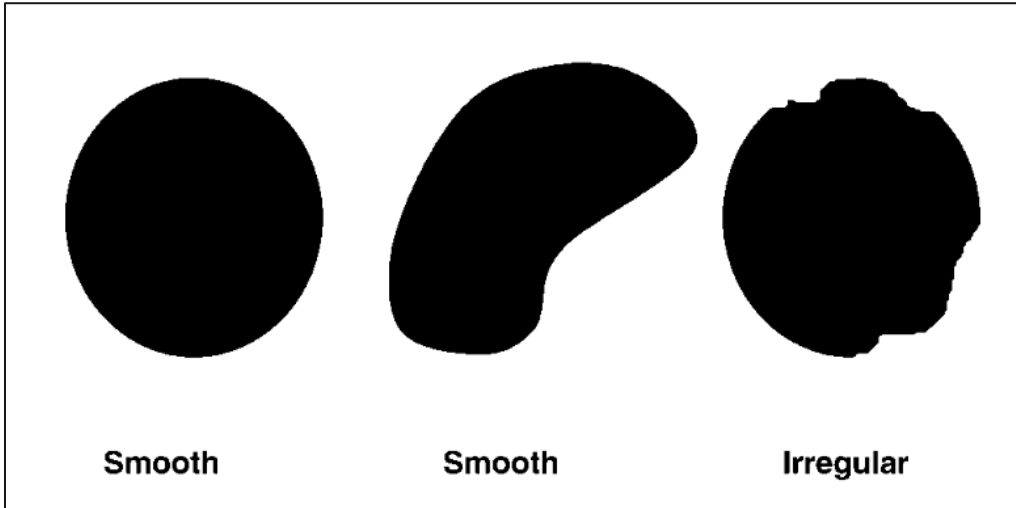


# Other features

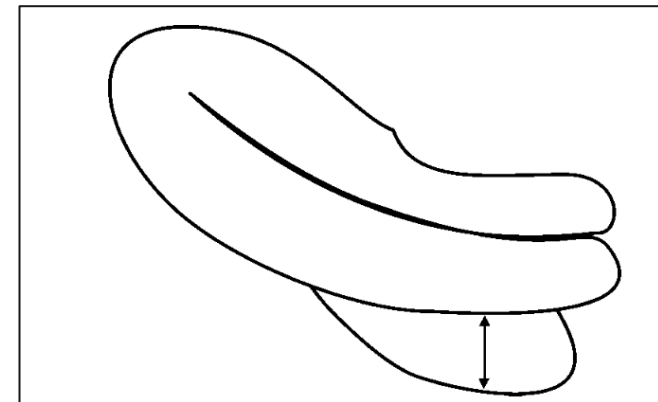
Vascular pattern



Smooth or irregular cyst wall



Ascites



# Updated consensus opinion IOTA

*Ultrasound Obstet Gynecol* 2026

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## Terms, definitions and measurements to describe the sonographic features of adnexal tumors: updated consensus opinion from the International Ovarian Tumor Analysis (IOTA) Group

D. TIMMERMAN<sup>1,2#</sup>, L. VALENTIN<sup>3,4#</sup>, A. C. TESTA<sup>5,6</sup>, W. FROYMAN<sup>1,2</sup>,  
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T. BOURNE<sup>1,7,8</sup> and Collaborators<sup>†</sup>

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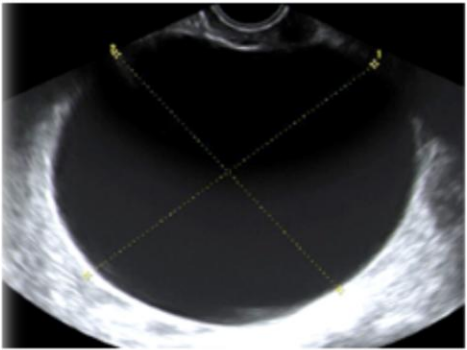
**KEYWORDS:** consensus; Doppler ultrasonography; gynecology; ovarian cyst; ovarian neoplasm; ultrasonography

# Pattern recognition – what is it?

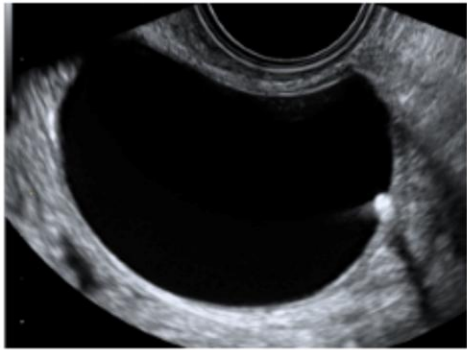


# Simple rules

B1 Unilocular



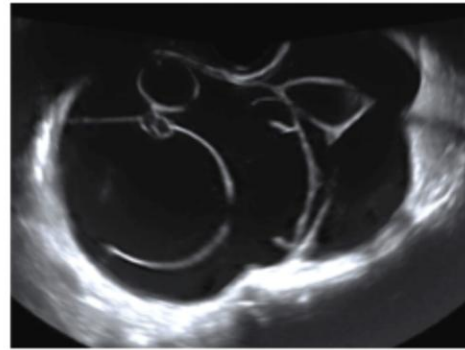
B2 Presence of solid components with largest diameter < 7 mm



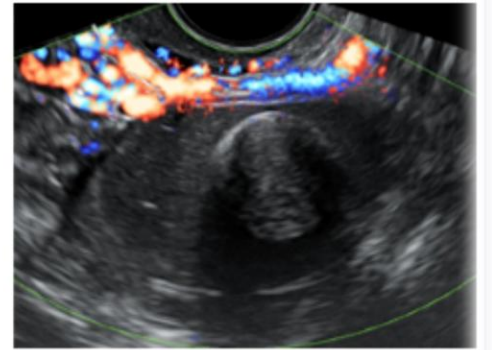
B3 Presence of acoustic shadows



B4 Smooth multilocular tumor with largest diameter < 100 mm



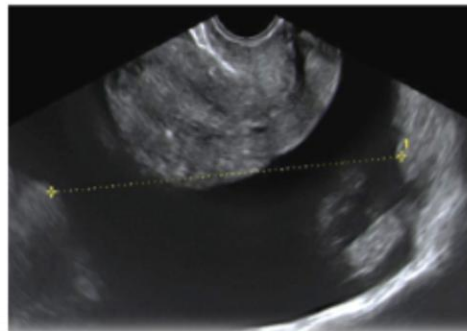
B5 No blood flow (color score 1)



M1 Irregular solid tumor



M2 Presence of ascites



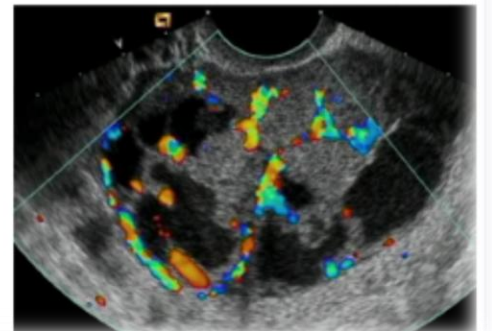
M3 At least 4 papillary structures



M4 Irregular multilocular-solid tumor with largest diameter ≥ 100 mm



M5 Very strong blood flow (color score 4)



# Case 1

- 27 yr old
- G2P1
- LAP & PVB
- 6+ wks pregnant
- Attended early pregnancy unit

## USS

Right tubal ectopic pregnancy

Normal uterus & left ovary

Right adnexal mass



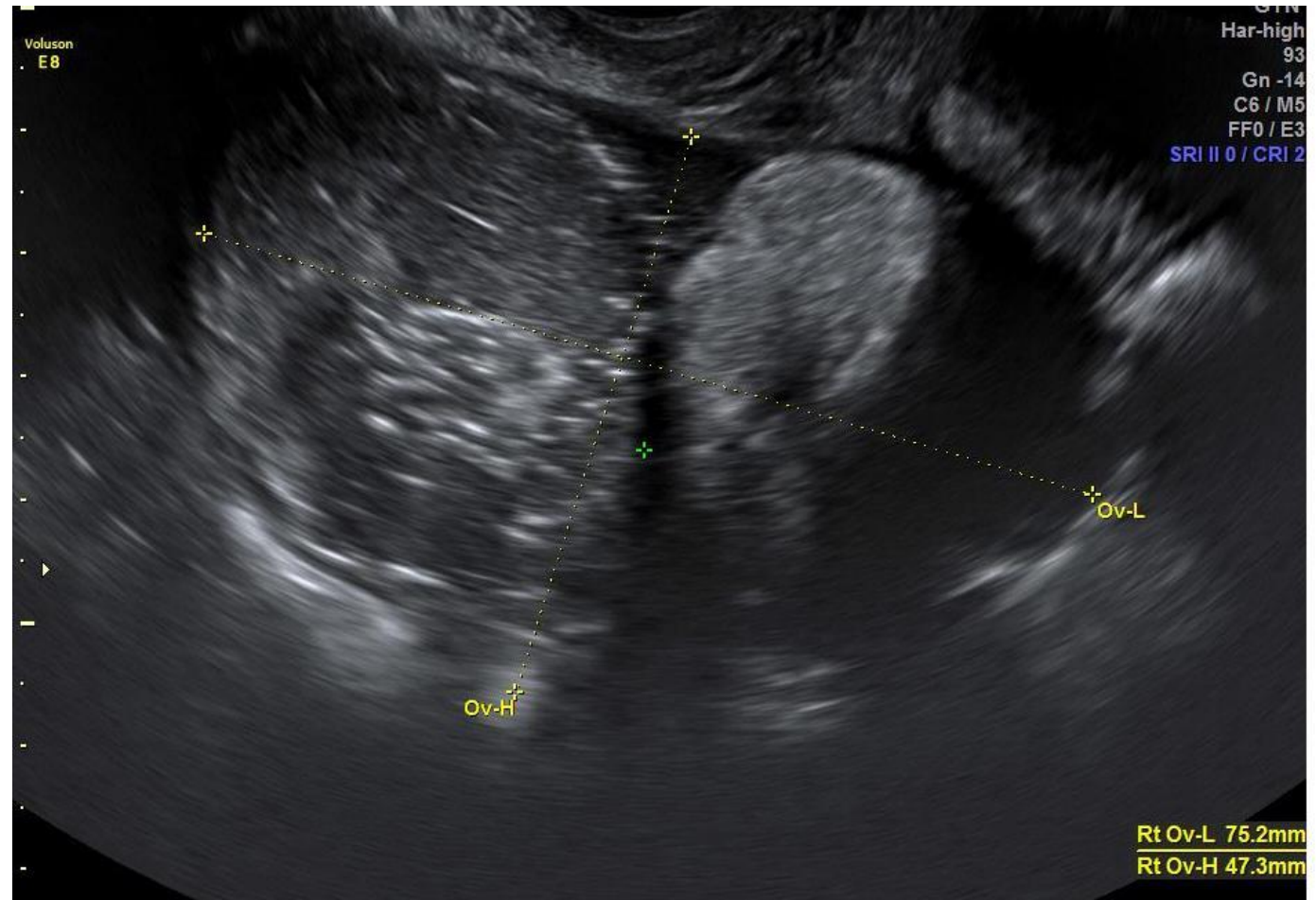
# Case 1

## Right adnexal mass

75x56x47mm

Avascular

No ascites





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Case 1: How to describe the cyst contents?

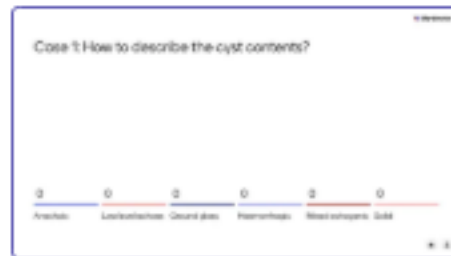
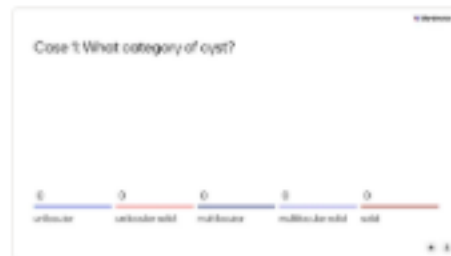


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Case 1 Is it benign, malignant or unclassified?



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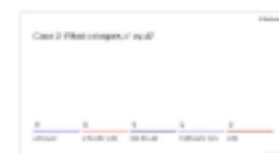
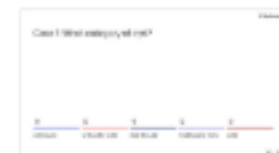
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# Case 1

75x56x47mm

**Unilocular**

Mixed echoes

**Acoustic shadowing**

**Avascular**

Smooth wall

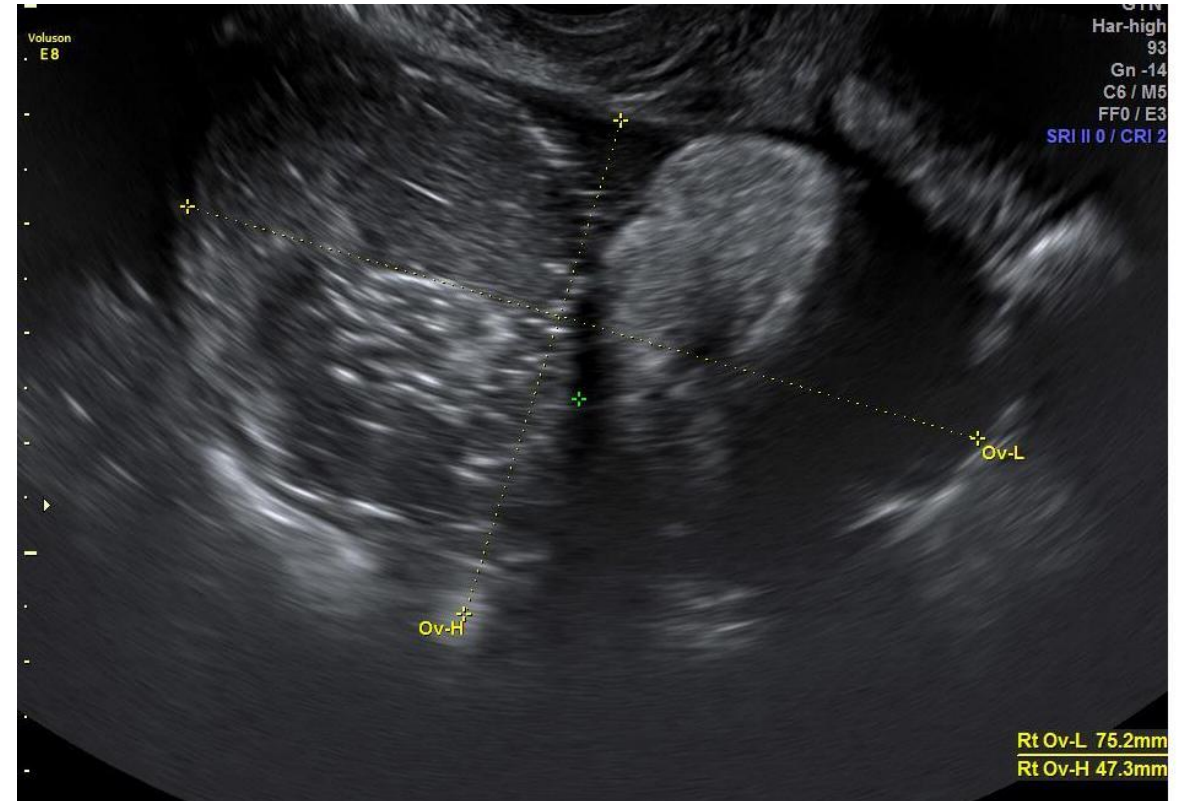
No ascites

No malignant features therefore benign

*Pattern recognition?*

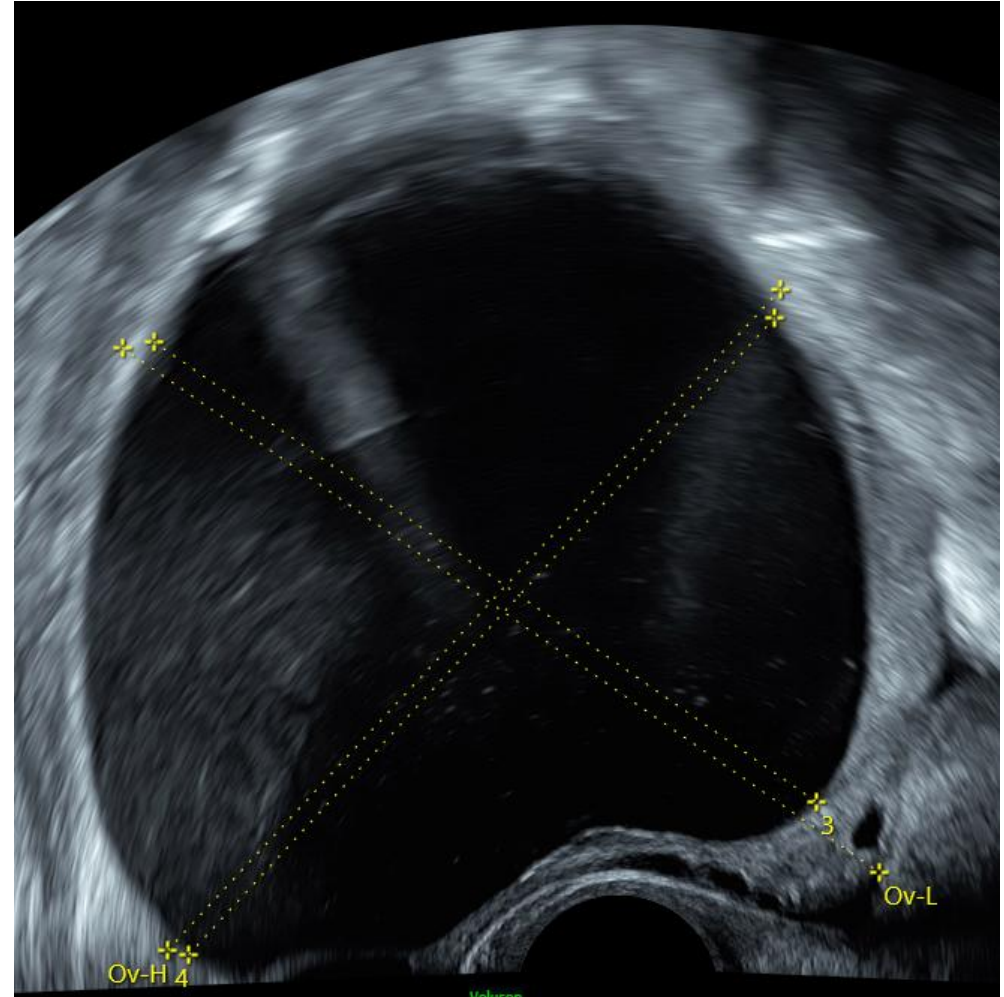
Histology – op 1 year later

Benign mature teratoma  
(dermoid)



# Case 2

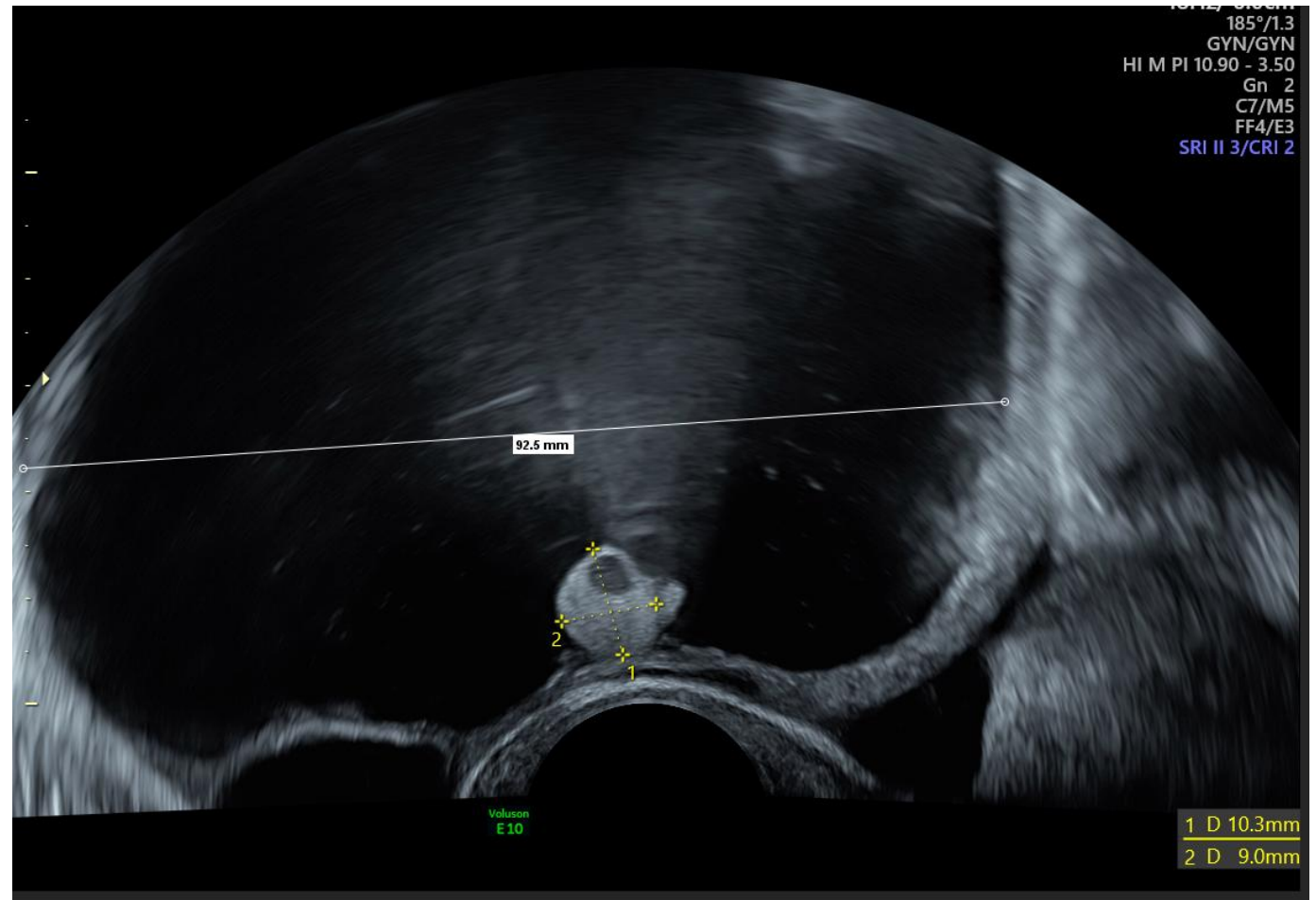
- 26 years old
- Attended acute gynae unit with on-going pain
- Otherwise well/ no relevant hx
- Had scan at local hospital 5 days earlier which showed 10cm right ovarian cyst



99x93x92mm

# Case 2

- Right adnexal cyst
- Normal uterus & left ovary
- Avascular
- No septations complete or incomplete
- No ascites



## Case 2: What category of cyst?

0  
unilocular

0  
unilocular solid

0  
multilocular

0  
multilocular solid

0  
solid

Mentimeter



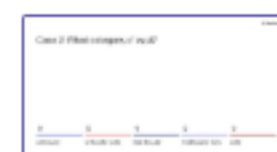
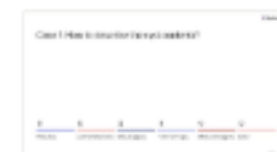
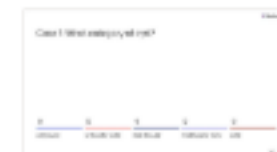
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## Case 2: What sort of cyst is it?

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Case 1: What category of cyst?



Case 1: How to describe the cyst contents?



Case 1: What sort of cyst is?

Case 1: Is it benign, malignant or undifferentiated?

Case 2 Is it benign, malignant or unclassified?



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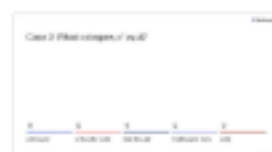
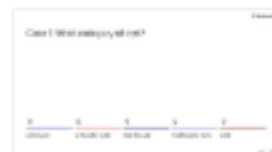
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# Case 2

## USS report:

Unilocular solid cyst 99x93x92mm

Low level echoes

One papillary projection

**Avascular**

Irregular cyst wall

No acoustic shadowing

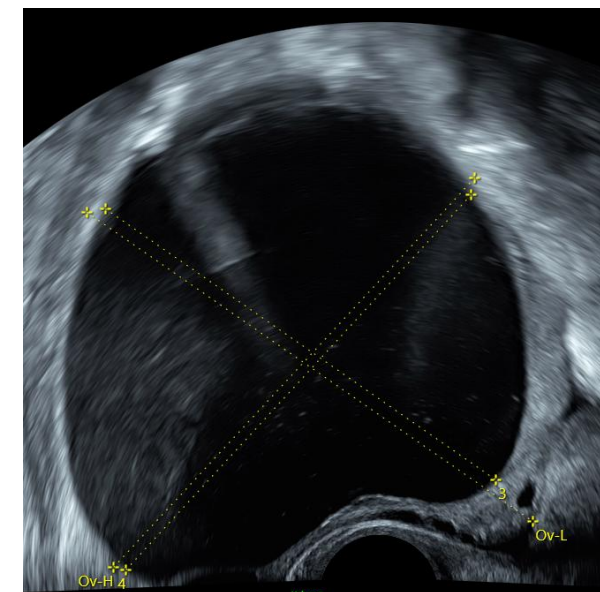
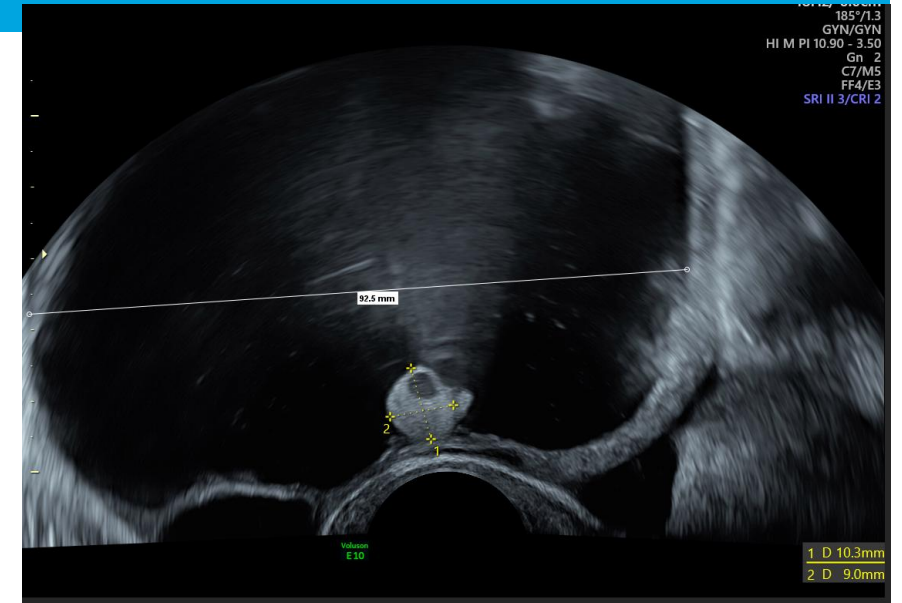
No ascites

Benign on ultrasound as no malignant features

Findings suggestive of a *mucinous cystadenoma*

For MRI to exclude borderline ovarian tumour

MRI Serous borderline tumour



## Case 2

Surgery Right salpingo-oophorectomy, omental biopsy, appendicectomy

- Histology struma ovarii on the background of a mature teratoma
- No evidence of malignancy

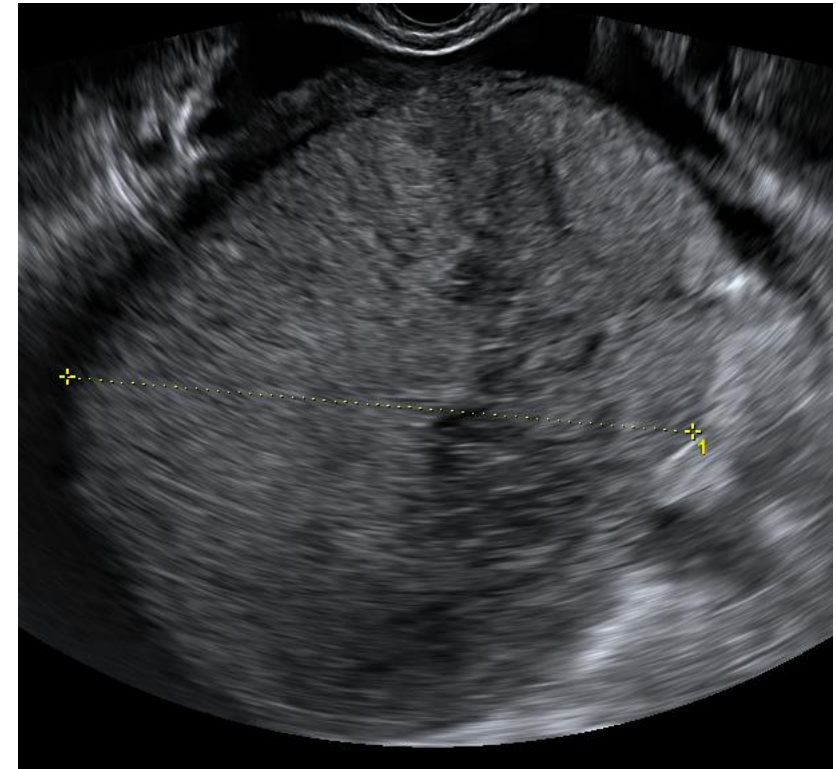
### Struma ovarii

Dermoid composed of entirely or predominantly > 50% mature thyroid tissue. Rare accounts for 3% of dermoid cysts.

U/S appearances no specific features from other teratomas

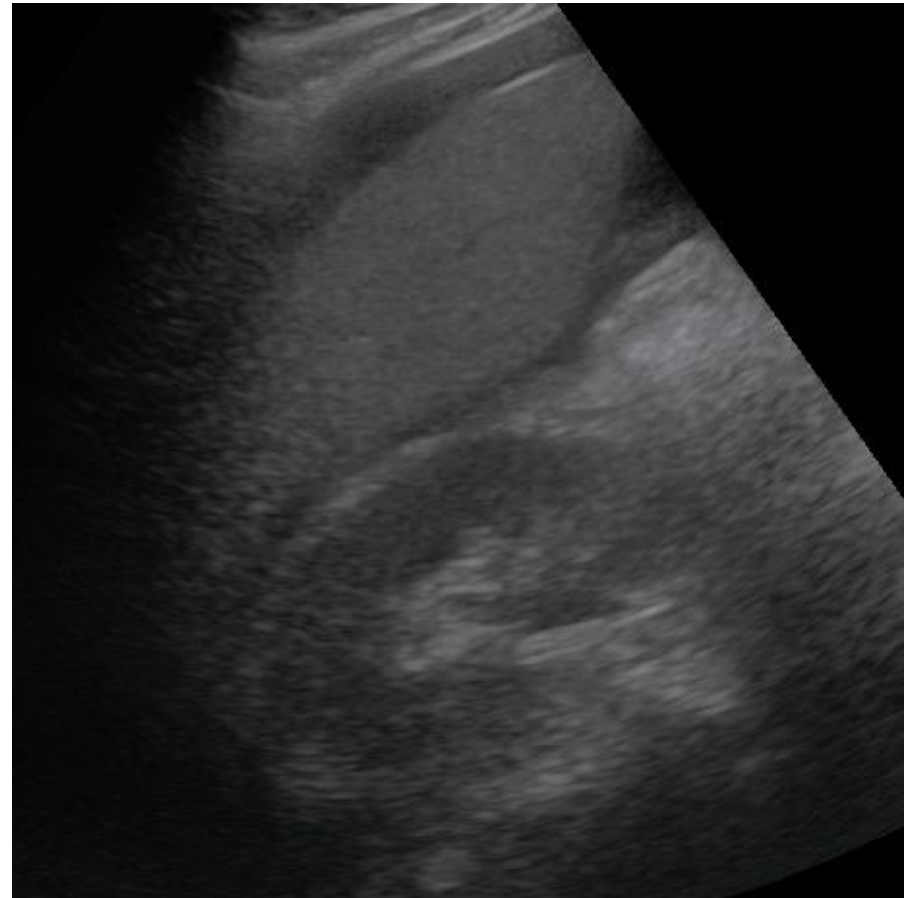
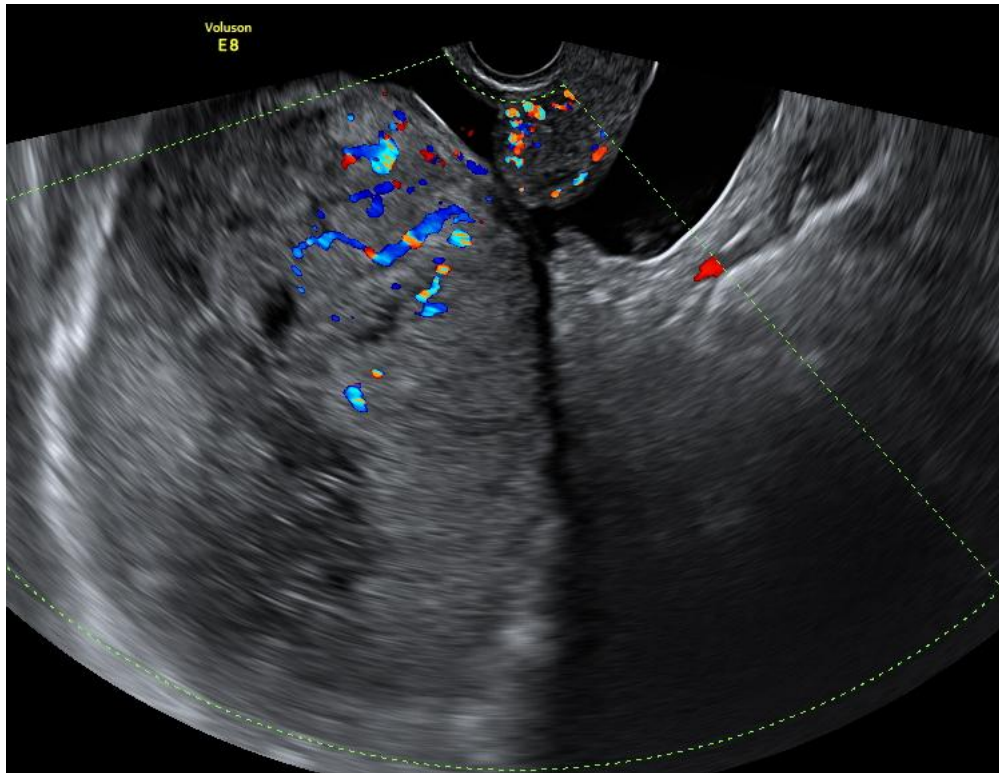
# Case 3

- 42 years
- 4 years previously left mastectomy breast Ca
- Attended RAC
- Right adnexal mass
- 154x138x112mm
- Normal uterus & left ovary



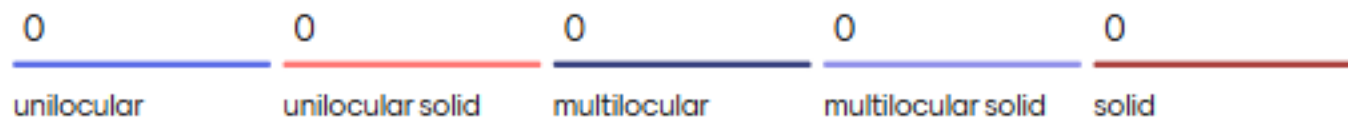
No acoustic shadowing

# Case 3





### Case 3: What category of cyst?



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Case 1: What category of cyst?

unilocular unilocular solid multilocular multilocular solid solid

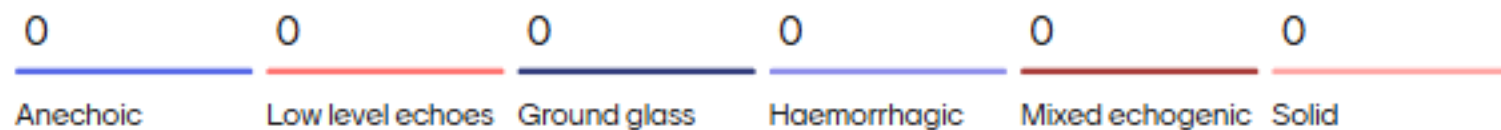
Case 1: How to describe the cyst contents?

Anchole Lactobacilli Ground glass Psammomas Macrophages Solid

Case 1: What sort of cyst is?

Case 1: Is it benign, malignant or unclassified?

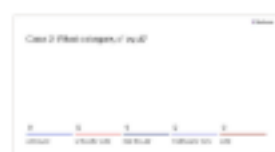
### Case 3: How to describe the cyst contents?



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Case 3: What sort of cyst is it?

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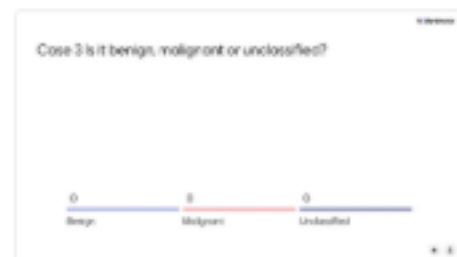
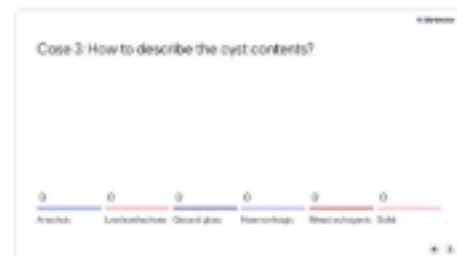
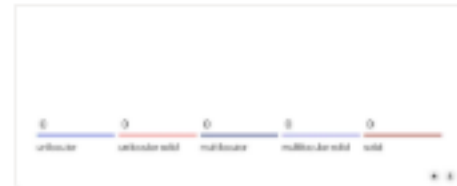


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Case 3 Is it benign, malignant or unclassified?



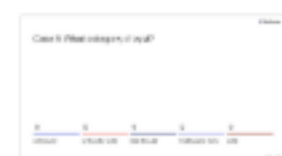
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# Case 3

154x138x112mm

Solid cyst

Internally solid few cystic spaces

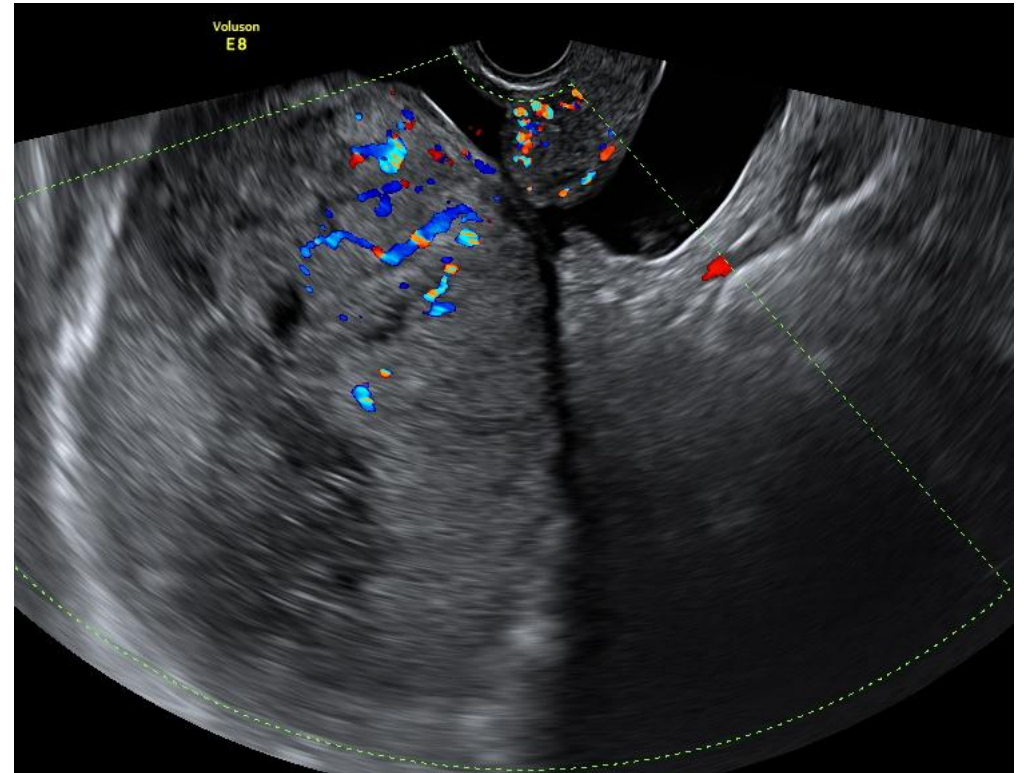
Vascularity score 2

Smooth wall

Ascites

No benign features therefore malignant

*Pattern recognition?*



# Case 3

## MRI

Large pedunculated fibroid (necrotic) right ovary not seen separately  
Imaging reviewed at MDM appearances could be malignant, as right ovary not seen, is suspicious of malignancy

## Histology

TAH, BSO

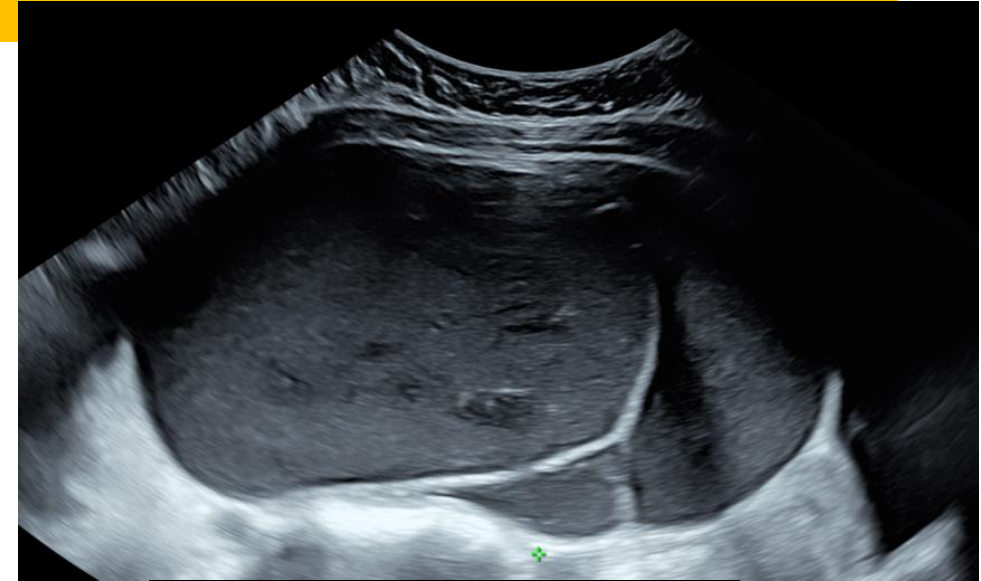
Metastatic adenocarcinoma from known breast primary

# Case 4

- 31 yrs old
- GP referral
- Large firm mobile abdominal mass

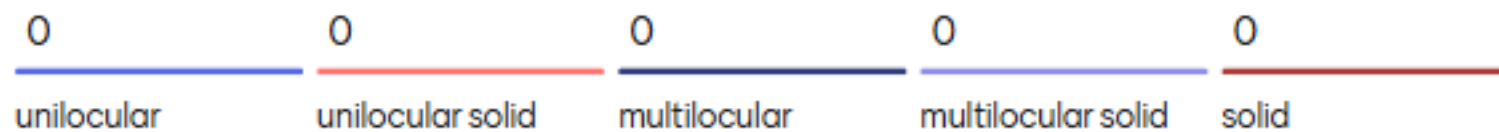
## On USS

- Right adnexal mass
- Normal uterus & left ovary
- 168x134x94mm
- Avascular
- No ascites
- No acoustic shadowing





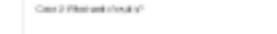
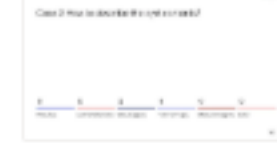
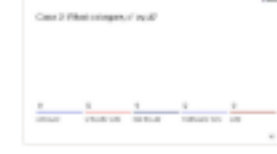
# Case 4: What category of cyst?



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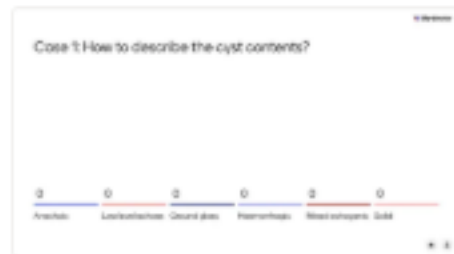
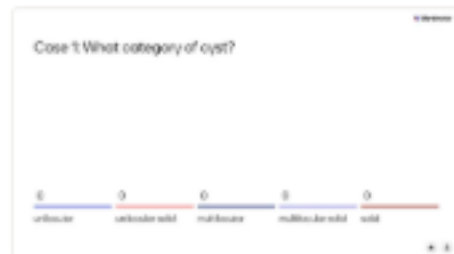
### Case 4: How to describe the cyst contents?



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## Case 4: What sort of cyst is it?

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Select which slide to add

Case 1: What category of cyst?



Case 1: How to describe the cyst contents?



Case 1: What sort of cyst is?

Case 1: Is it benign, malignant or undifferentiated?

Case 4 Is it benign, malignant or unclassified?



Mentimeter



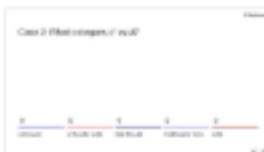
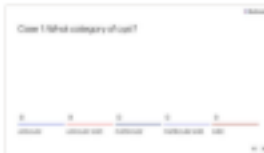
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BMUS cases

Select which slide to add





# Case 4

168x134x94 mm  
Multilocular cyst  
Low level echoes

**Avascular**

Smooth wall

No ascites

No acoustic shadowing

*No malignant features therefore benign*

*Pattern recognition?*



# Case 4

## MRI

Multilocular cystic mass. Proteinaceous content

Benign epithelial neoplasm – cystadenoma most likely serous

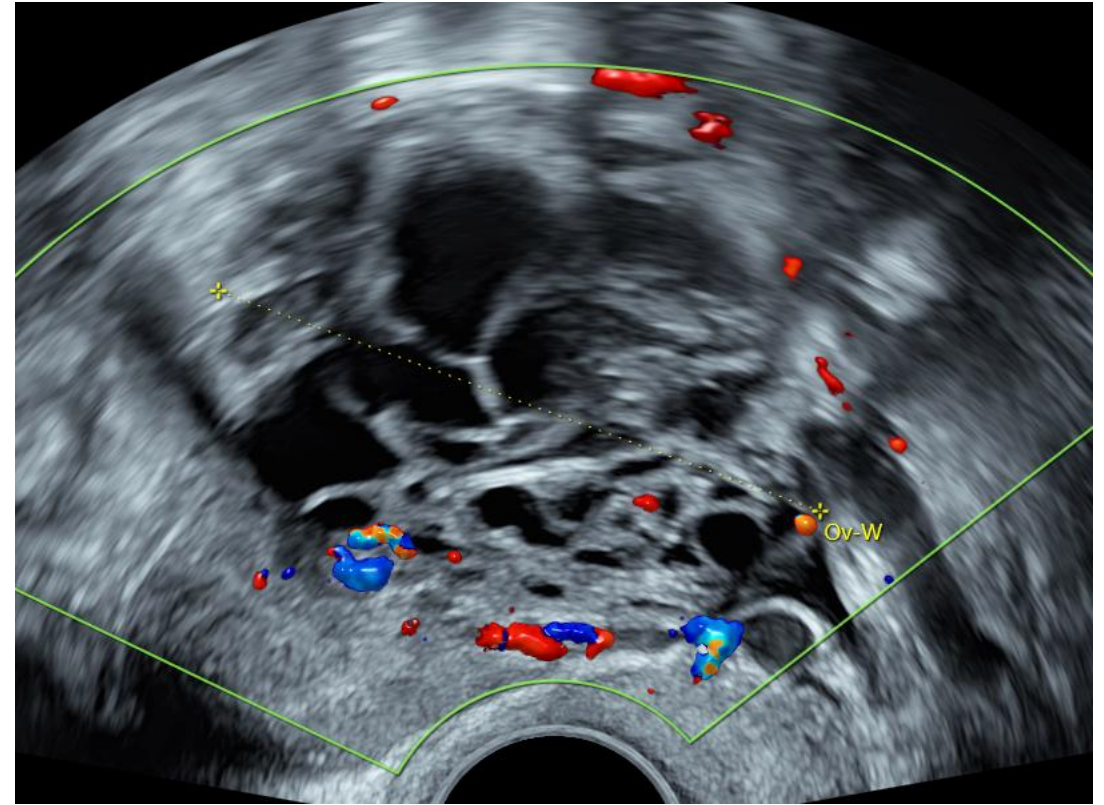
## Surgery

Right cystectomy – borderline epithelial tumour (mucinous)

2/12 later robotic RSO, Omentectomy & appendicectomy

# Case 5

51 yrs old  
Peri-menopausal bleeding  
Attended RAC  
Left adnexal mass  
60x60x40mm  
Normal uterus & right ovary  
  
No ascites  
No acoustic shadowing





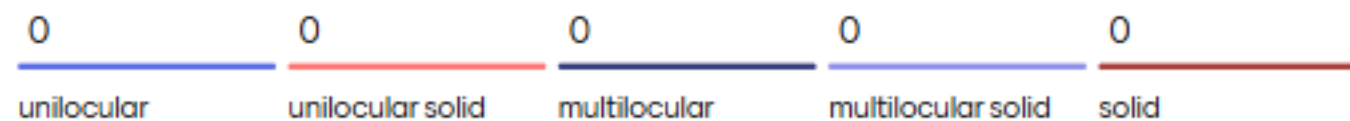
Mentimeter

Menti

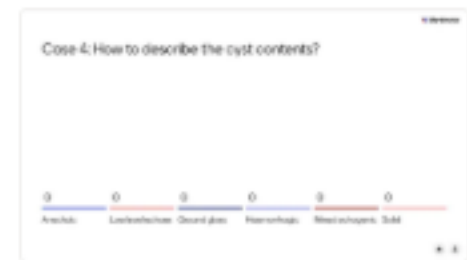
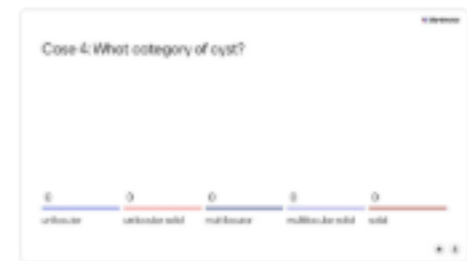
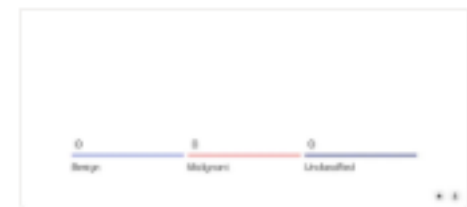
BMUS cases



Case 5: What category of cyst?



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### Case 5: How to describe the cyst contents?



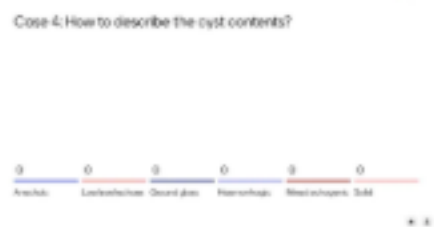
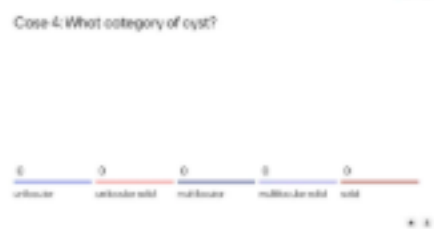
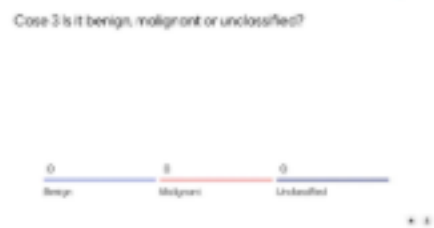
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Case 5: What sort of cyst is it?



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Case 1: What sort of cyst is it?

Case 2: How to describe the oral content?

Case 3: What sort of cyst is it?

Case 4: How to describe the oral content?

Case 5: What sort of cyst is it?

Case 6: How to describe the oral content?

Case 7: What sort of cyst is it?

Case 8: How to describe the oral content?

Case 5 Is it benign, malignant or unclassified?



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BMUS cases

Case 3 What category of case?

Case 4 How to describe the cell contents?

Case 6 What sort of cytoplasm?

Case 8 Is it benign, malignant or unclassified?

Case 9 What category of case?

Case 10 How to describe the cell contents?



# Case 5

60x60x40mm

Multilocular solid

Mixed echoes part cystic/ part solid

Irregular internal wall

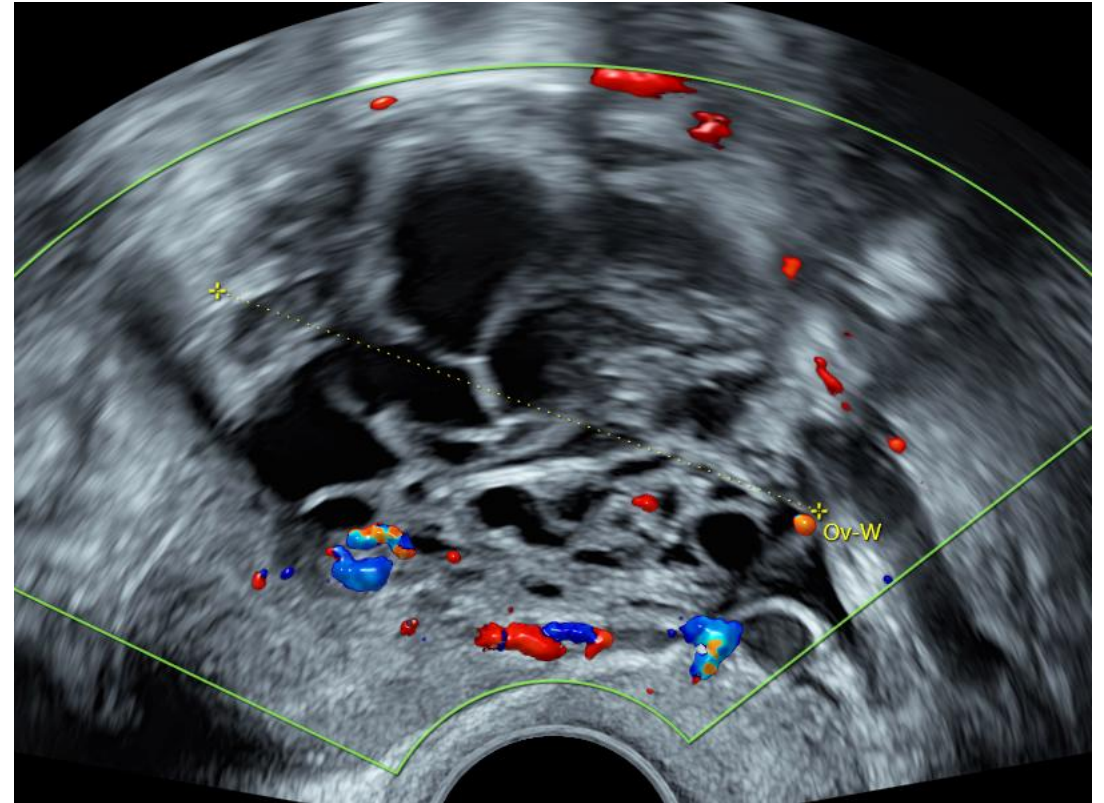
Vascular score 2

No ascites

No acoustic shadowing

*Unclassified – no benign/ malignant features*

*Pattern recognition?*



# Case 5

## *MRI*

Multilocular left cystic mass suggestive of a granulosa cell tumour

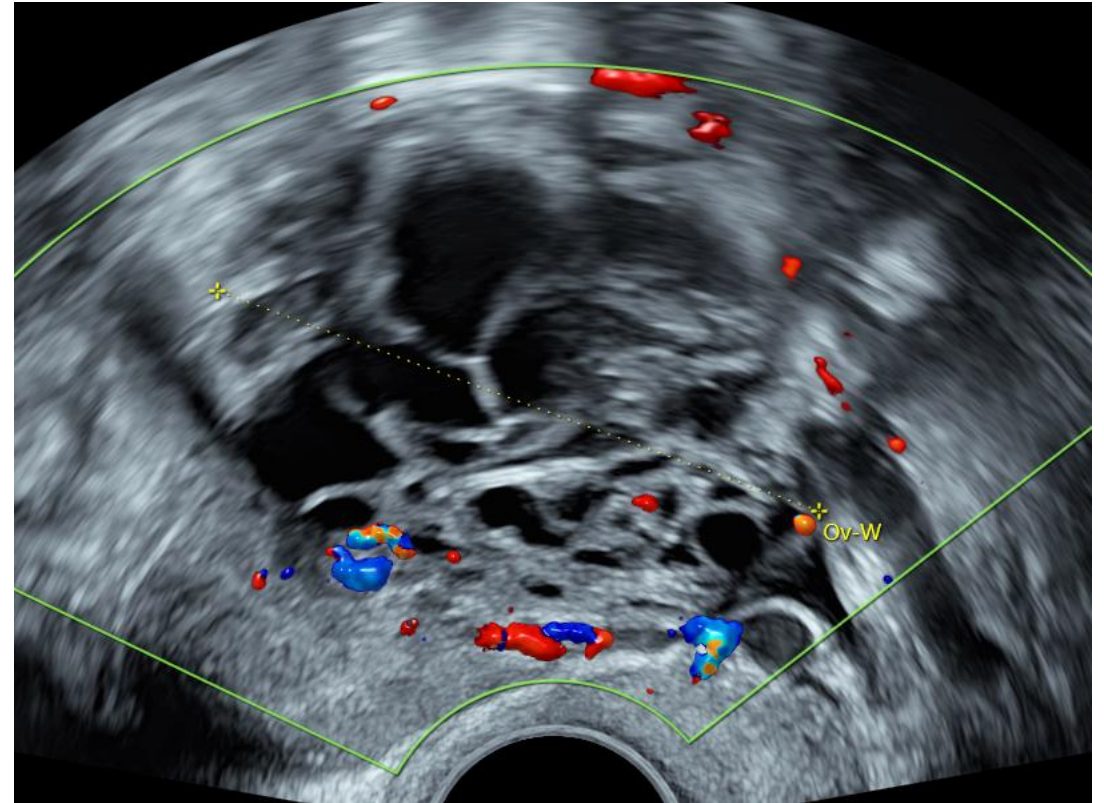
No f/u – histology not known

## *Granulosa cell tumour*

Slow growing

5% of ovarian malignancies

'Swiss cheese' appearance on ultrasound



- Use a systematic approach
- Use IOTA terminology
- Don't panic - apply simple rules
- Try pattern recognition
- Follow up your cases
- 'Ultrasound piece of the jigsaw'

*Aim is to provide a clinically useful report which will optimise patient care*