Ultrasound Characteristics (Pattern Recognition) of Common Ovarian Tumours

Mr Jonathan Gaughran

Consultant Obstetrician & Gynaecologist

How common is common?

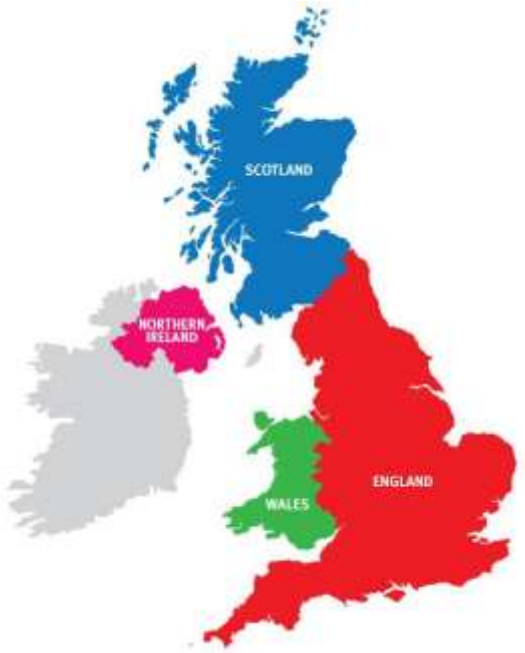
- Every day 21 women are diagnosed with ovarian cancer.
- 6th most common cancer in females.
- Rates are projected to rise by 5% in the UK between 2025 and 2040.

How big is the problem?

- Every day 11 women die from ovarian cancer.
- 5-year survival rates in the UK are below the European average.
- Only 35% survive 10 years.

What is the role of ultrasound?

- Primary screening tool.
- CT or MRI is NOT superior.
- Survival rates are directly linked to stage of disease.
- Ovarian cancer survival has almost doubled in the last 50 years.



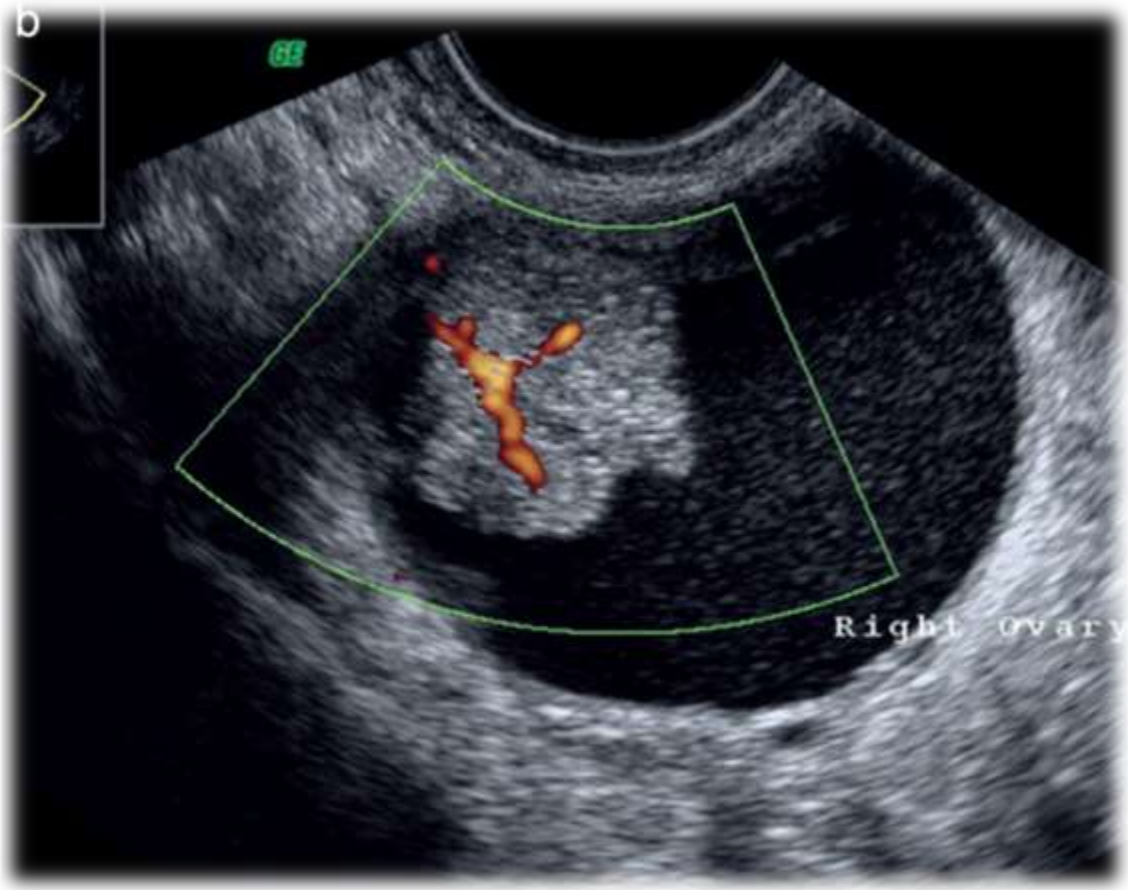
What is pattern recognition?

*A cognitive process that matches information from a **stimulus** with information retrieved from **memory.***

The stimulus

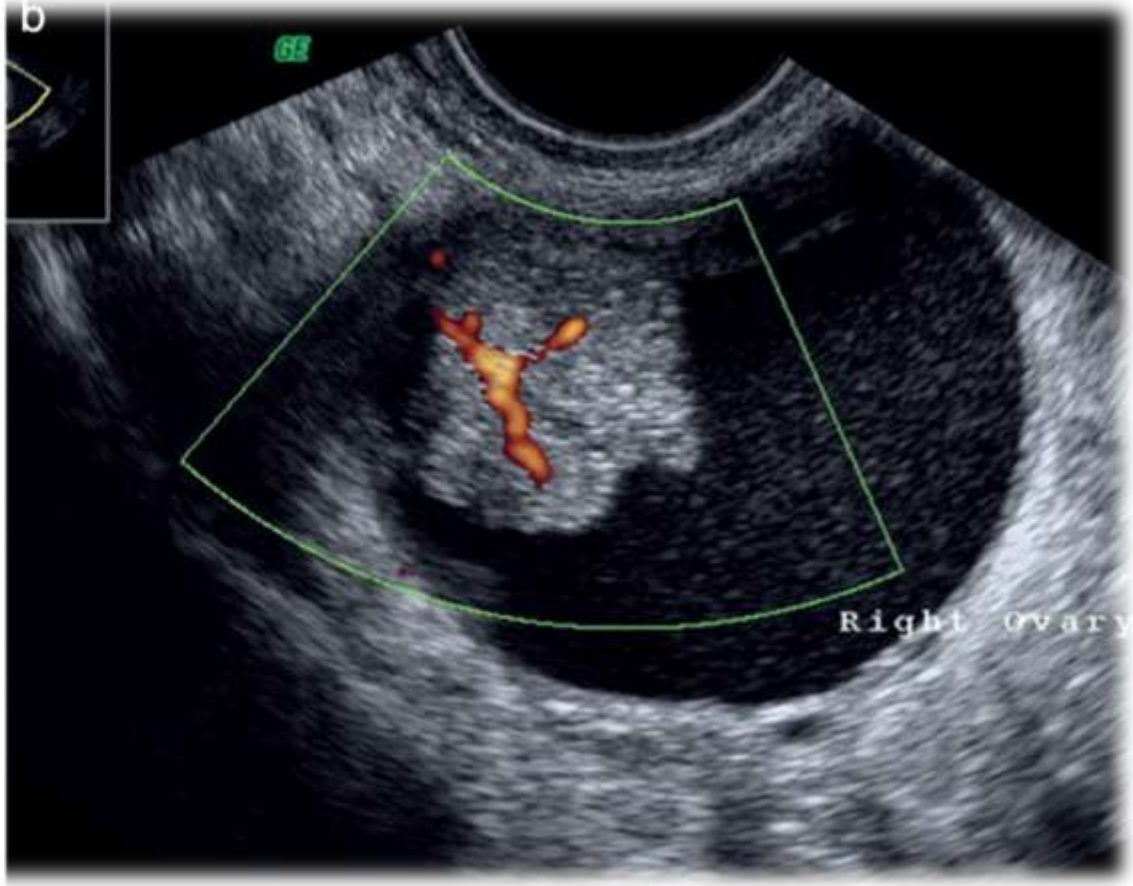
The stimulus

The memory

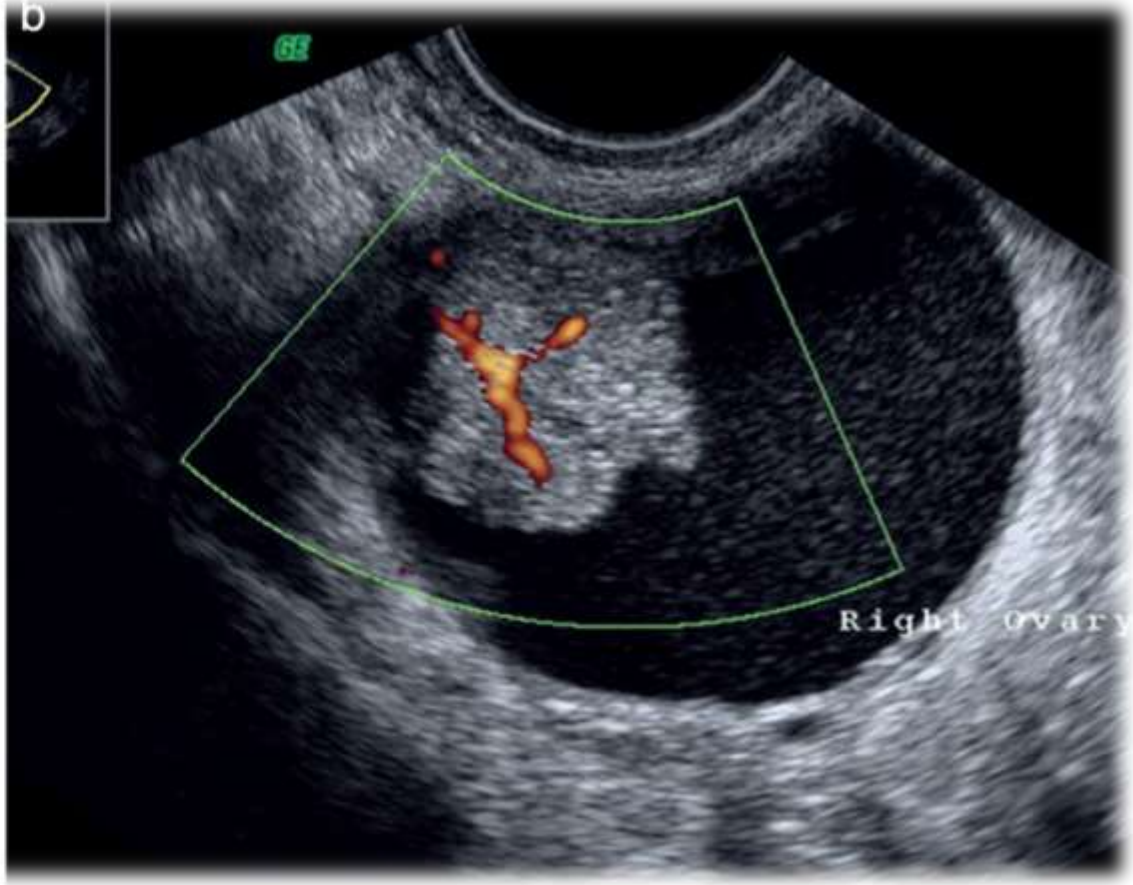


The memory

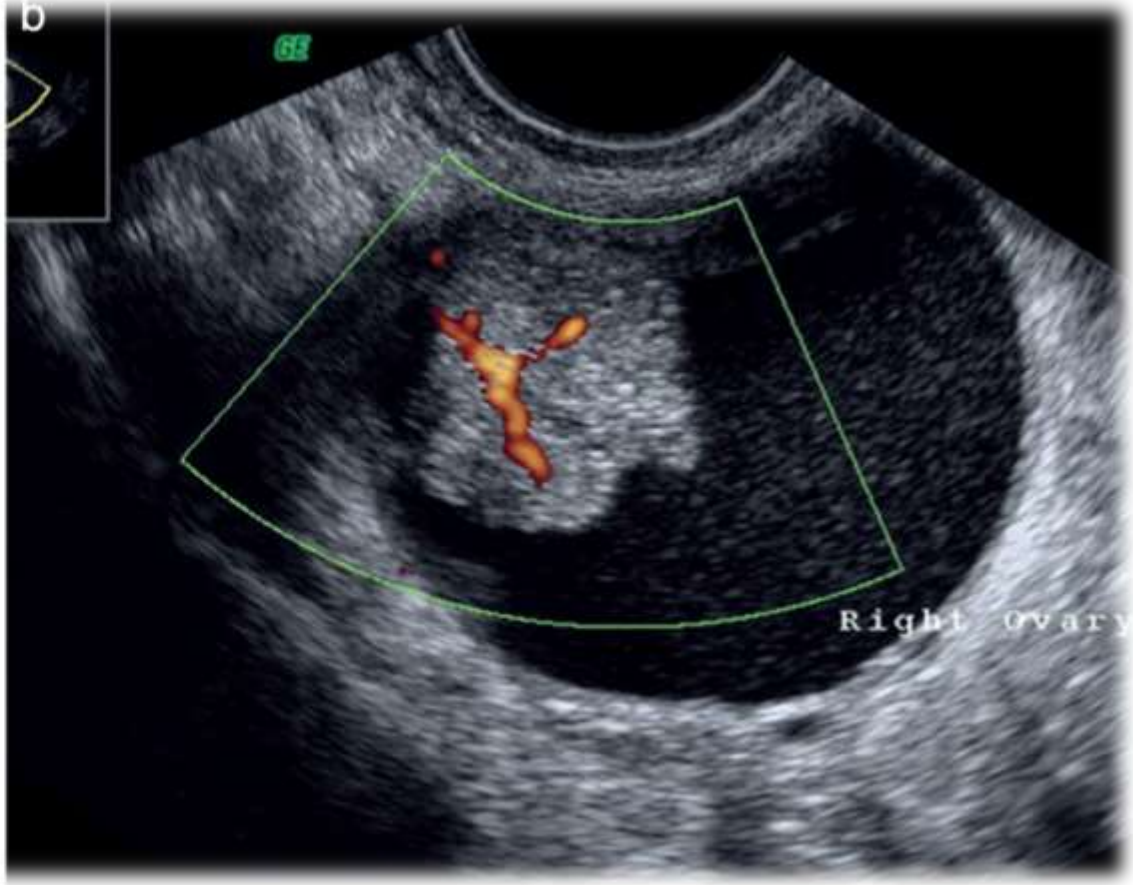
It’s cancer!



It’s definitely cancer!



It’s still cancer!



Understanding *versus* memorising

What do I want you to understand?

1. The aim of pattern recognition.

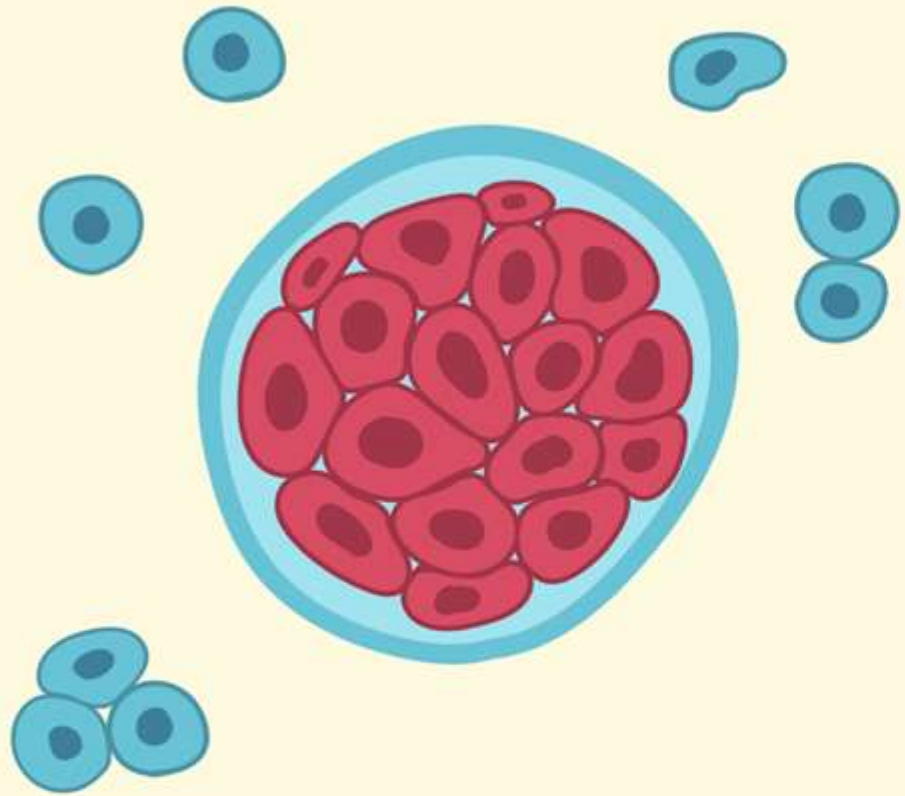
2. The importance of pattern recognition.

3. What are you *recognising*?

4. How do you teach pattern recognition?

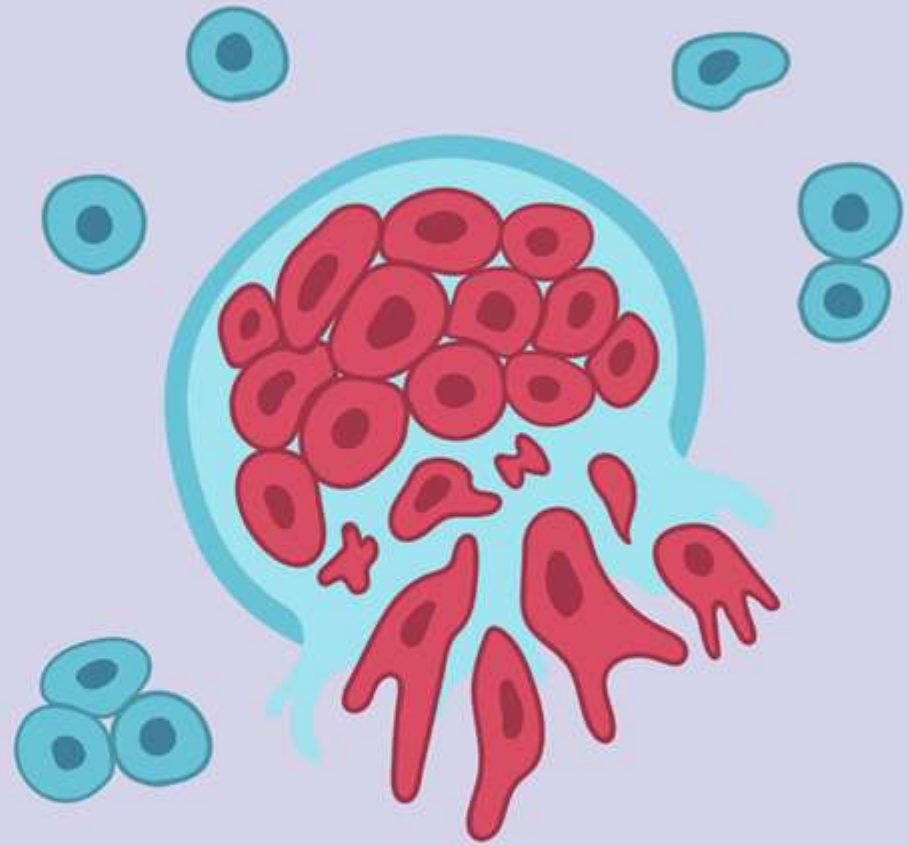
The aim pattern recognition

Benign Tumor



Cells are not cancerous and won't spread.

Malignant Tumor



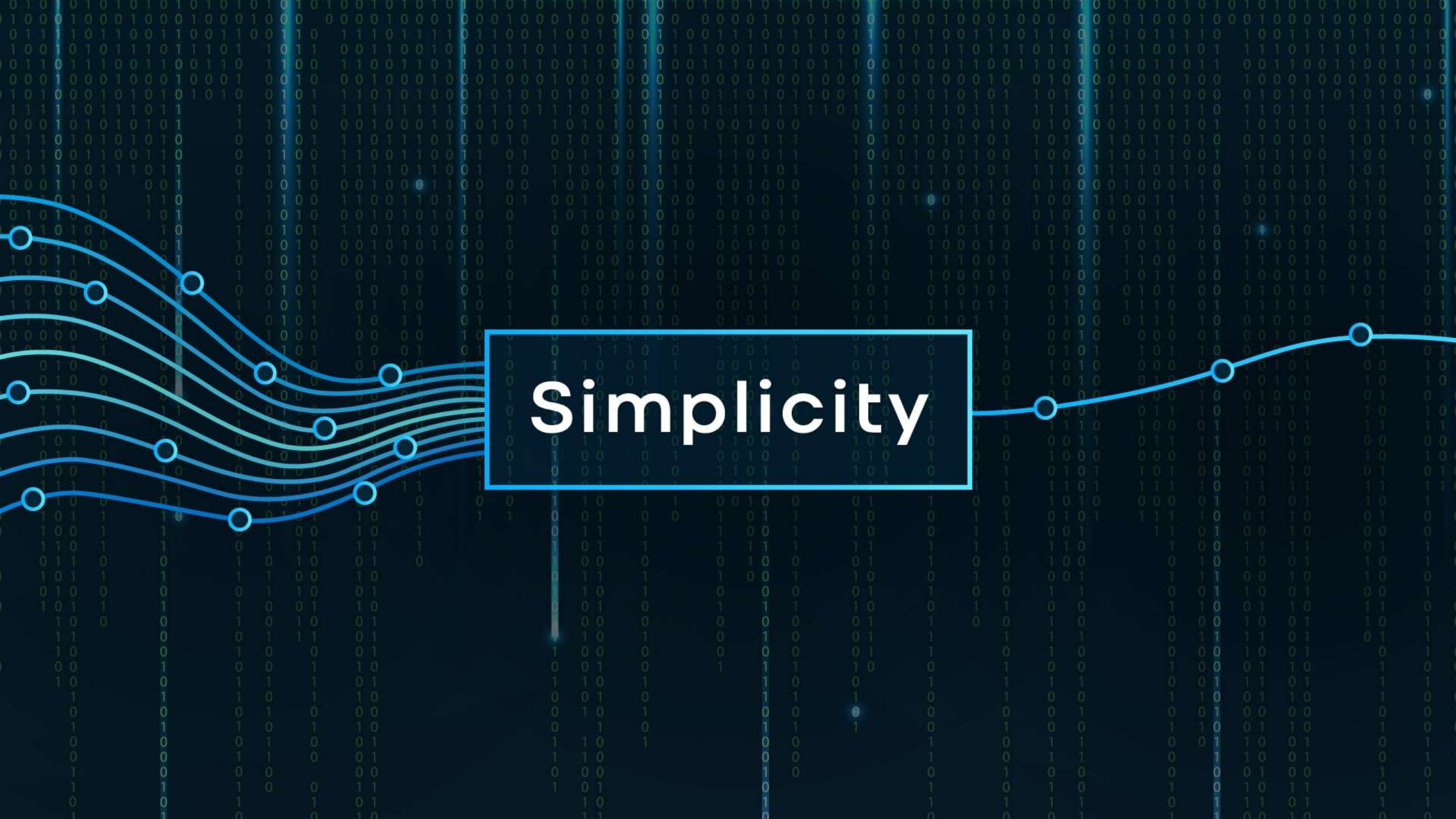
Cells are cancerous and can spread to other tissues and organs.

The importance of pattern recognition

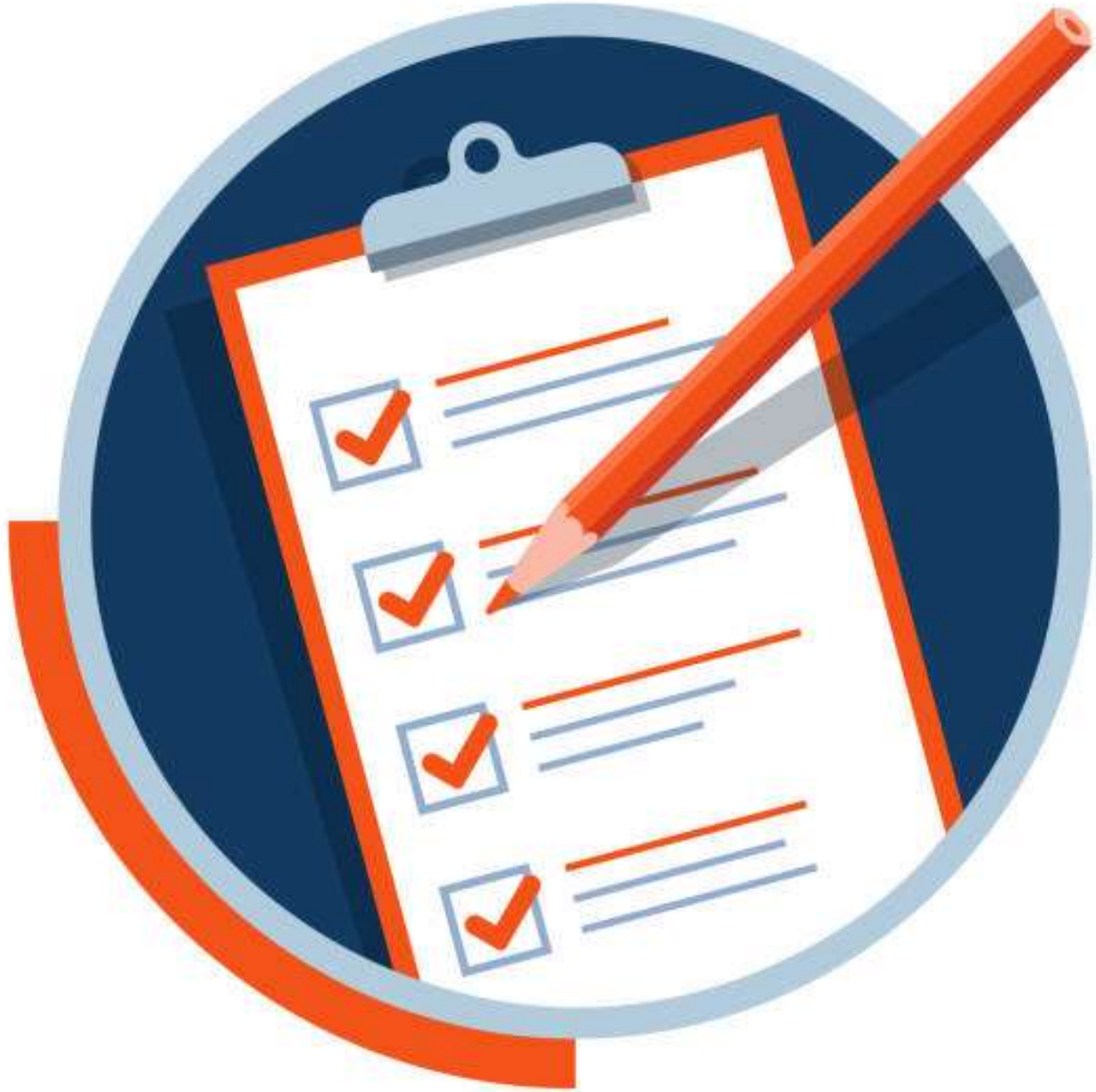
- Patient counselling and outcome
- Treatment planning
- Research & development
- Statistics

How do you recognise patterns?

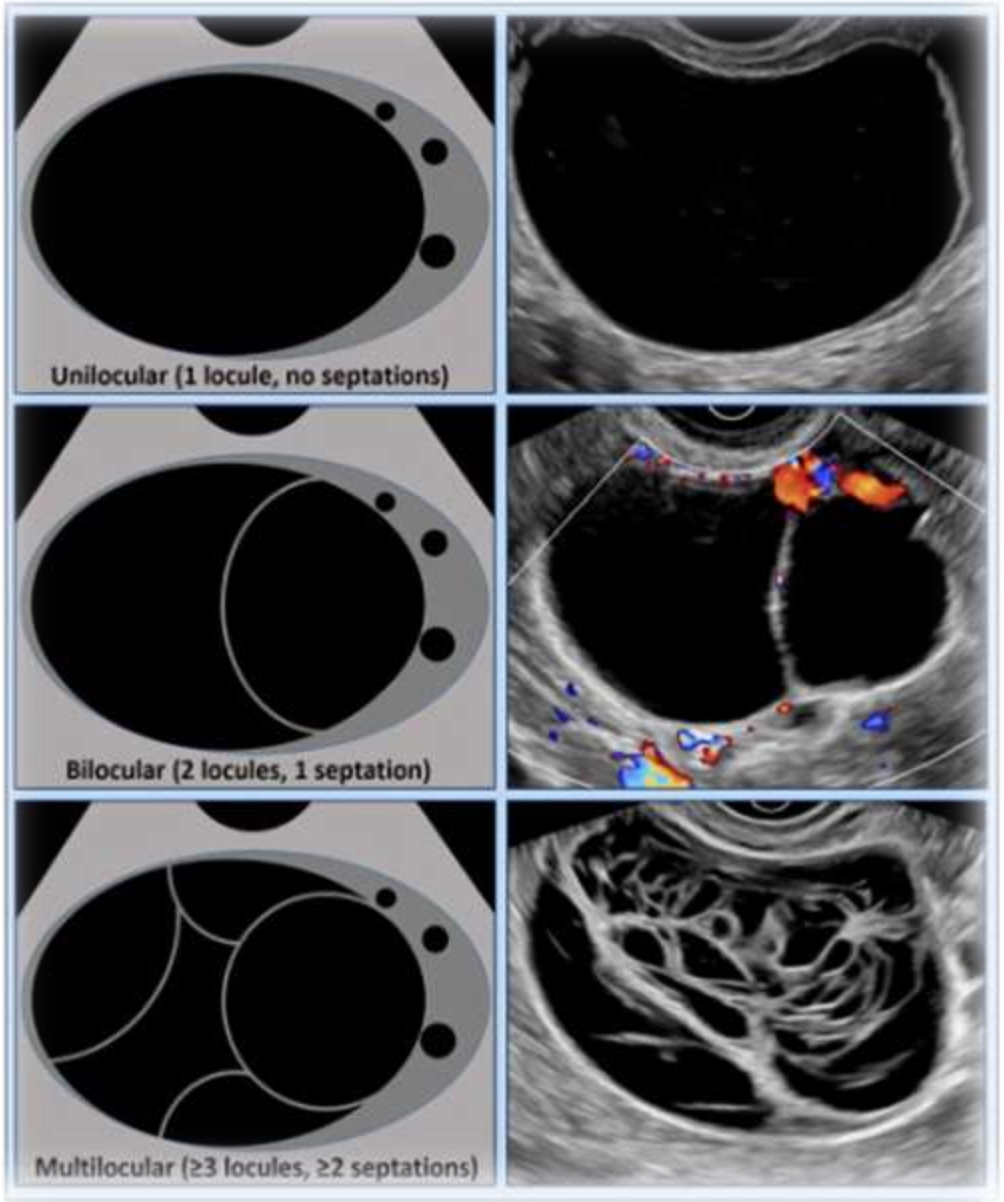
How do we **teach** pattern recognition?


Simplicity

‘Simple ovarian cyst’



1. Unilocular or multilocular?



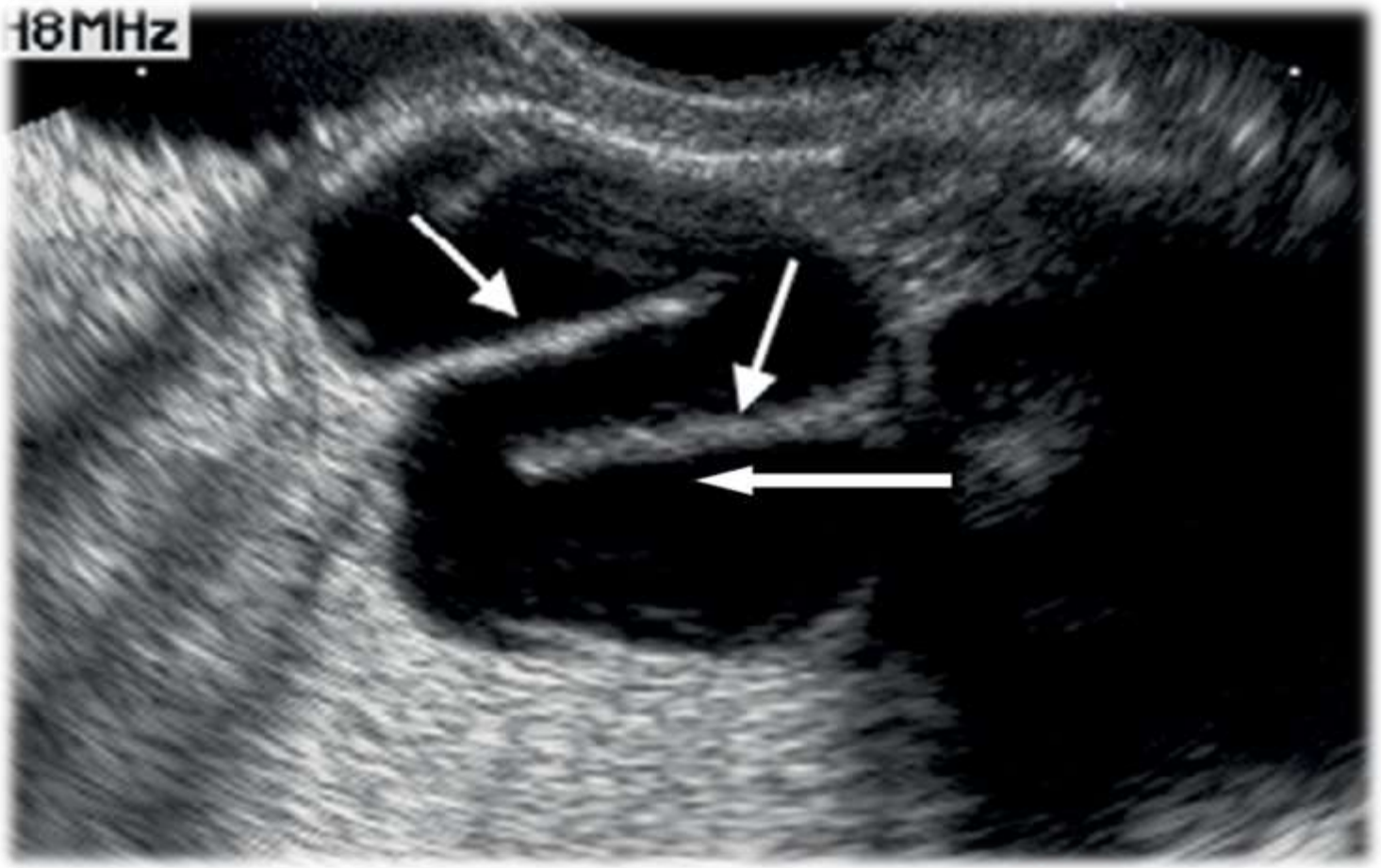
‘Septum’

‘A thin strand of tissue running across the cyst cavity from one internal surface to the contralateral side’

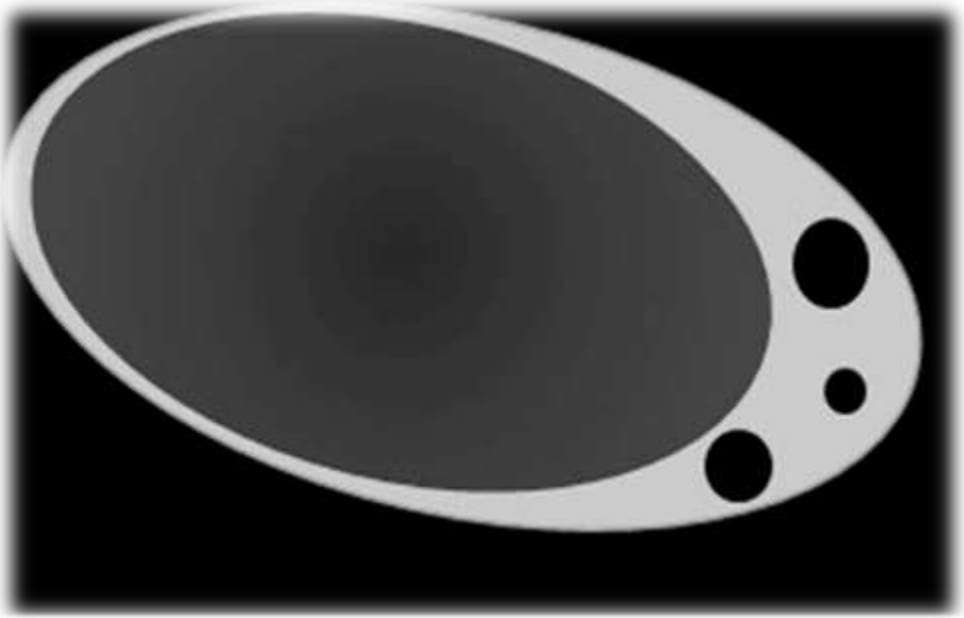
*An **incomplete** septum is a thin strand of tissue running across the cyst cavity from one internal surface to the contralateral side but is not complete in some scanning planes’*

Complete septum

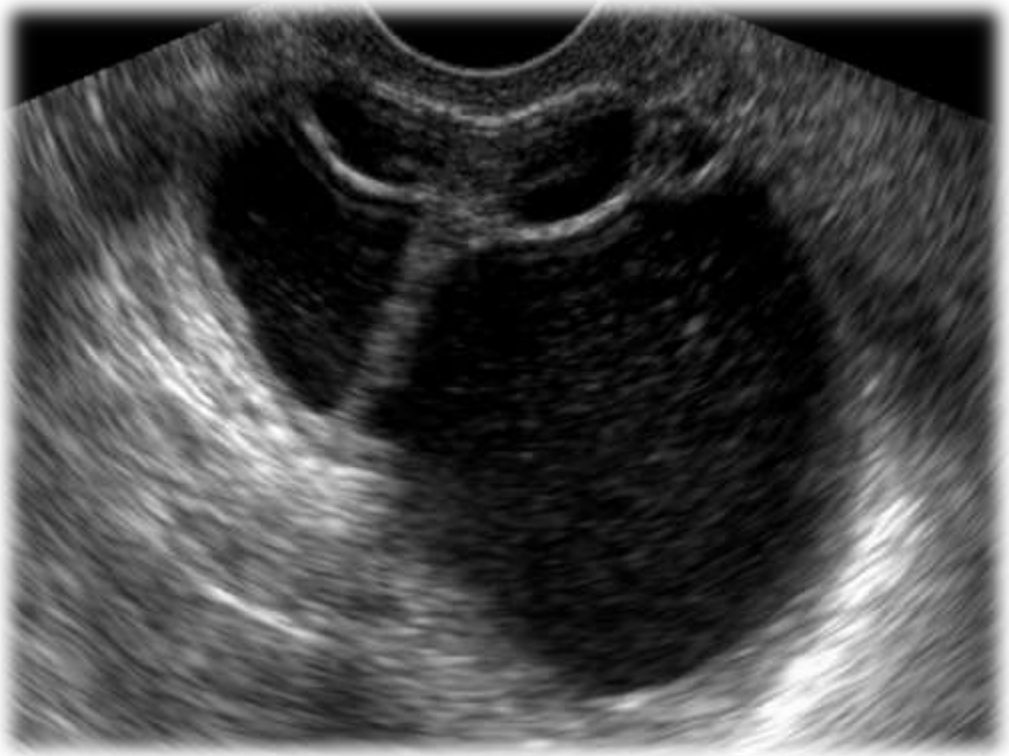
Incomplete septum

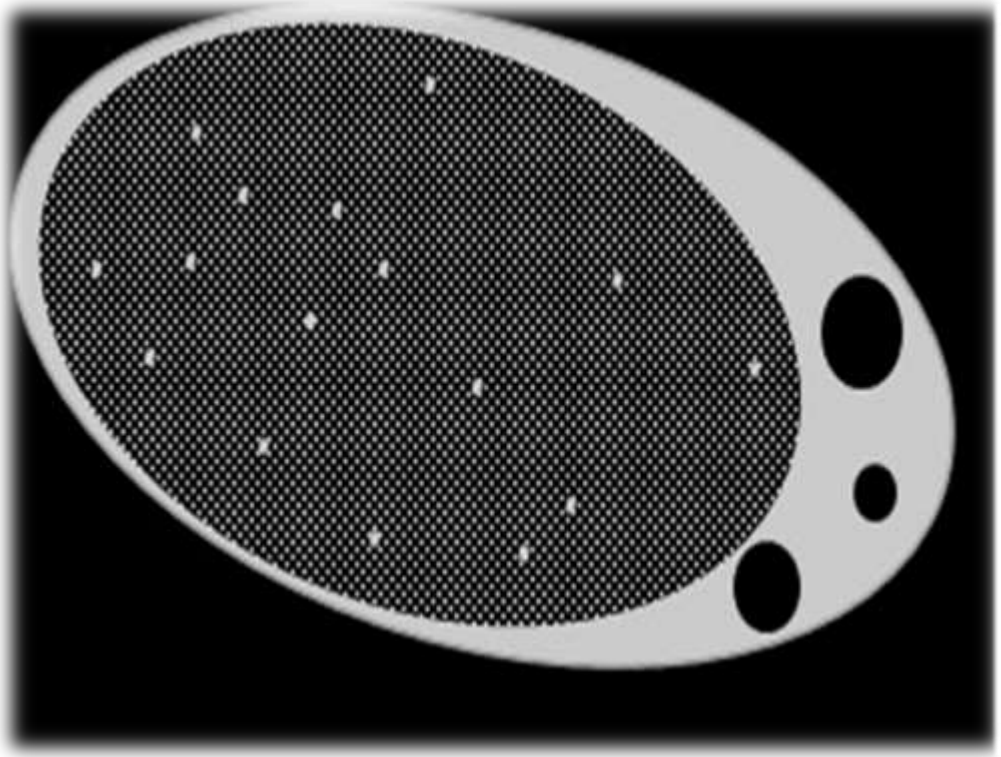


2. Cyst contents - Anechoic



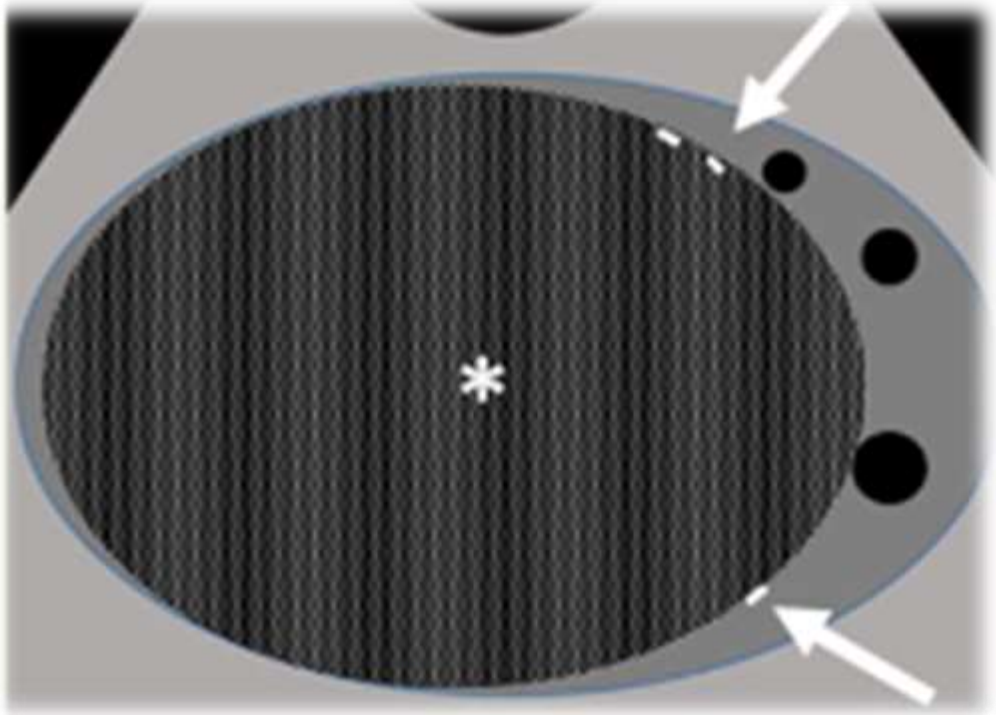
2. Cyst contents – Low level echoes



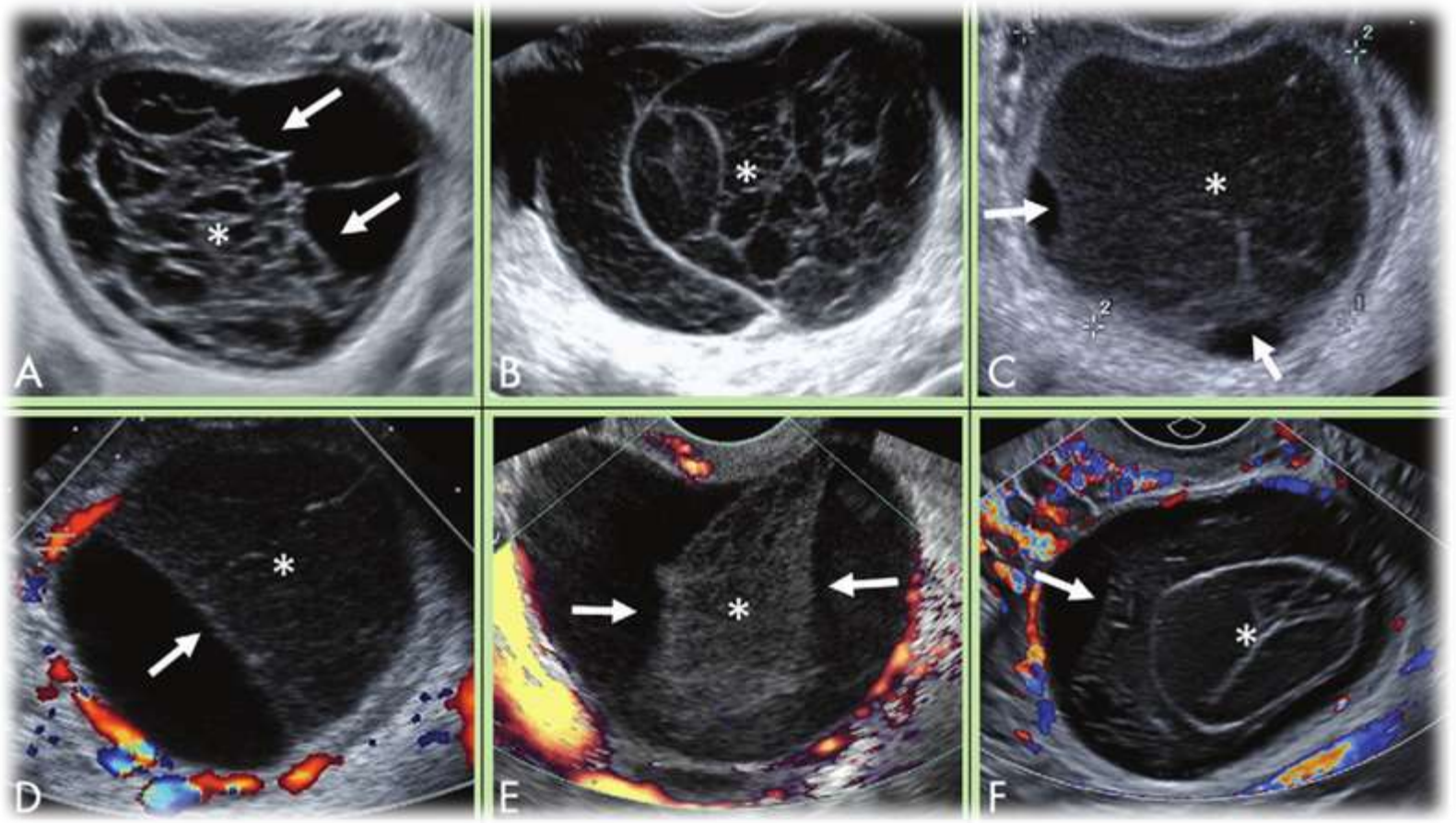


2. Cyst contents

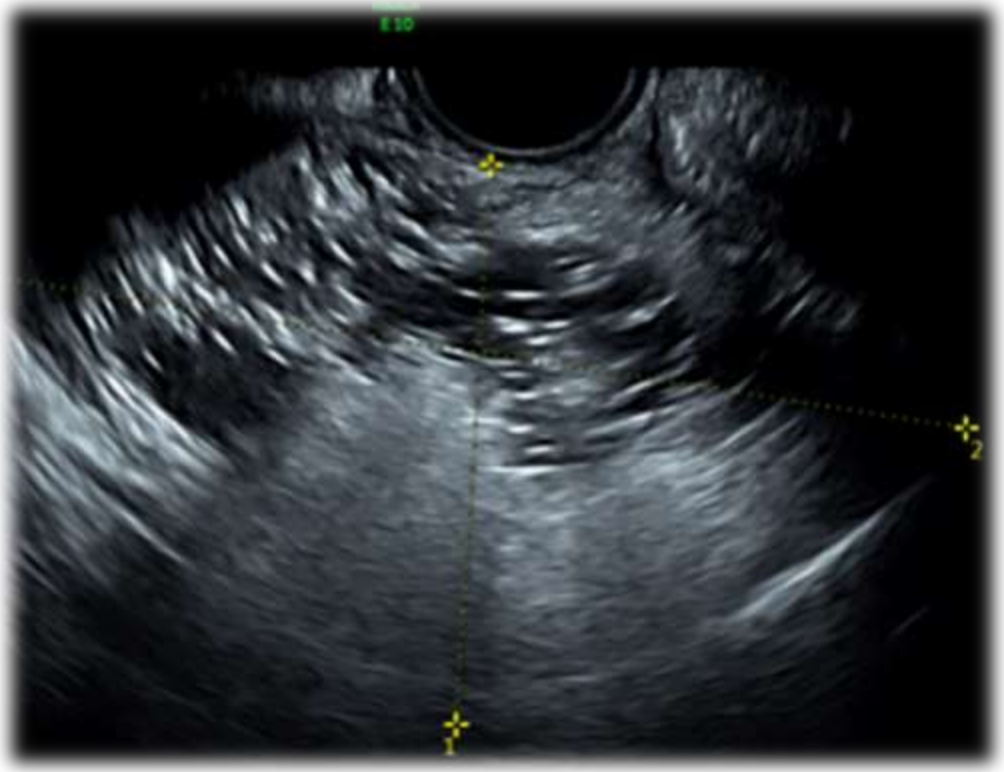
Ground glass

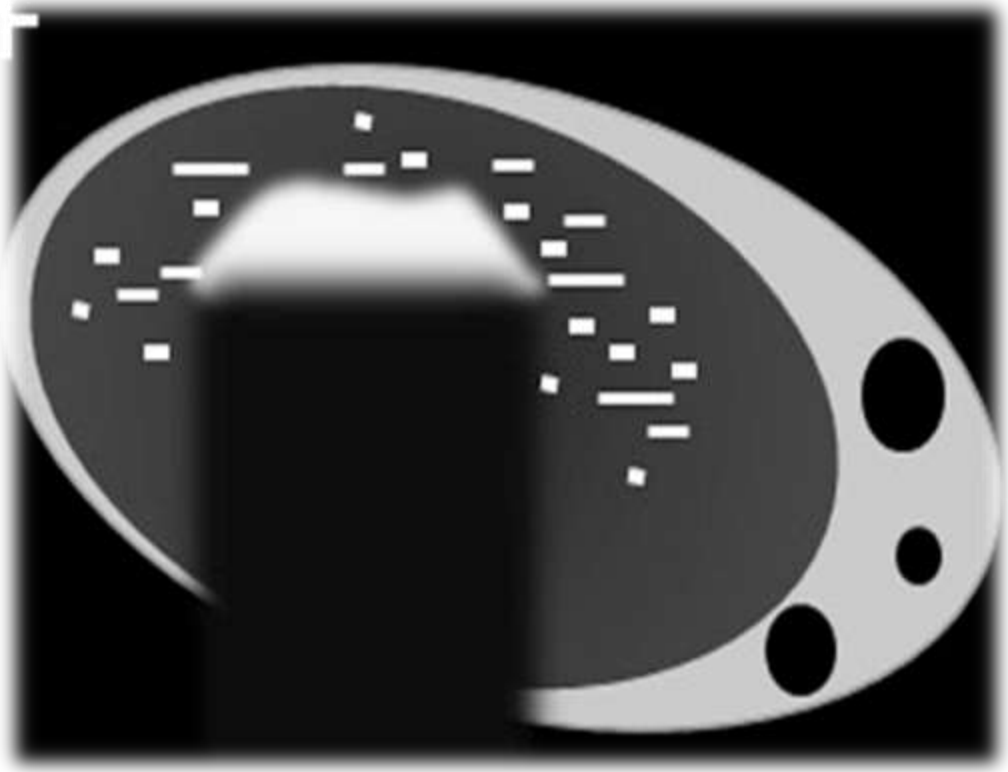


2. Cyst contents - Haemorrhagic

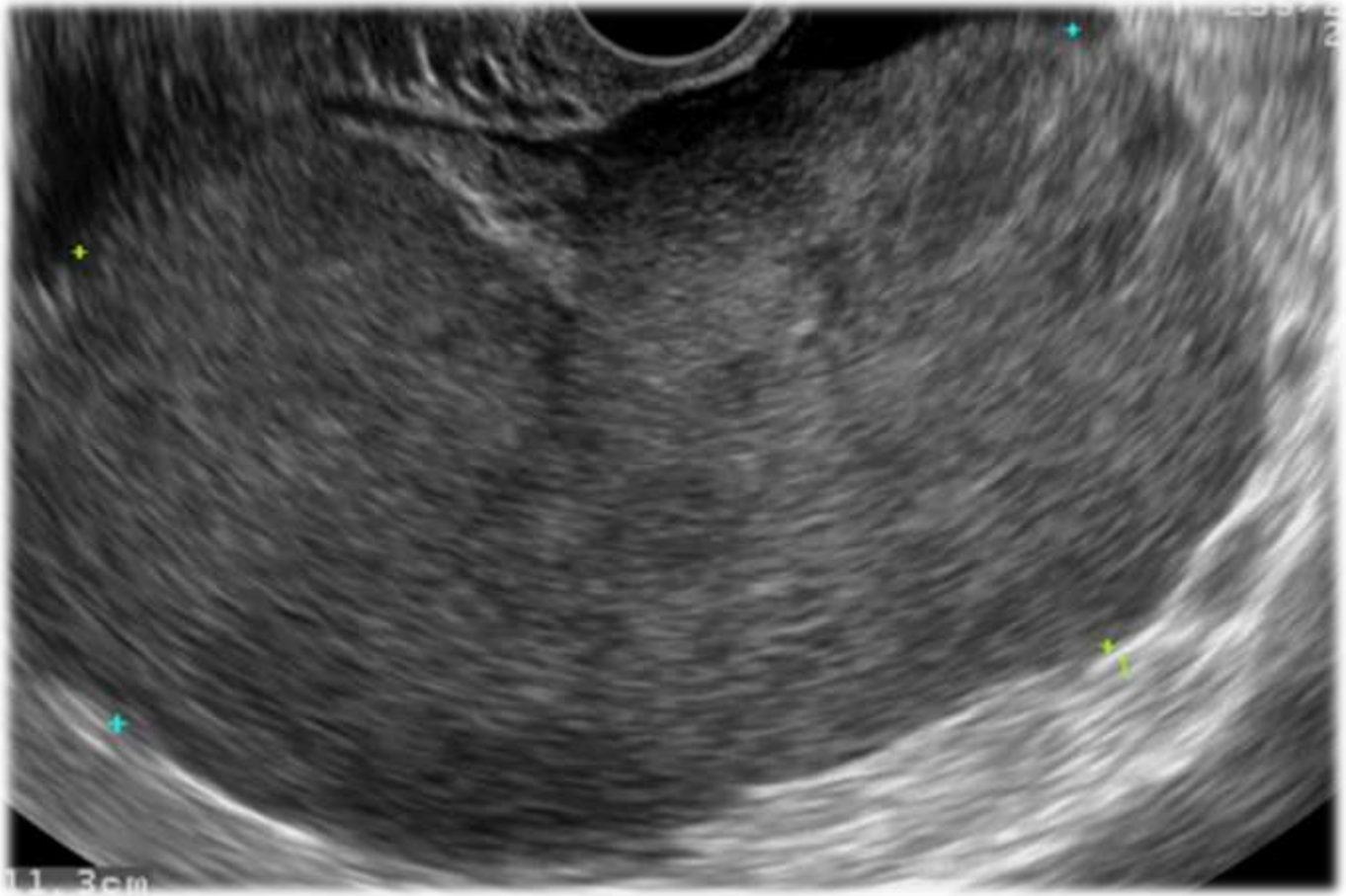


2. Cyst contents – Mixed echogenic





2. Cyst contents: Solid



‘Solid’

‘An area within the lesion exhibiting high echogenicity in keeping with tissue’

NB: A septum does not make a lesion ‘solid’

Thickened lesion walls are not ‘solid’

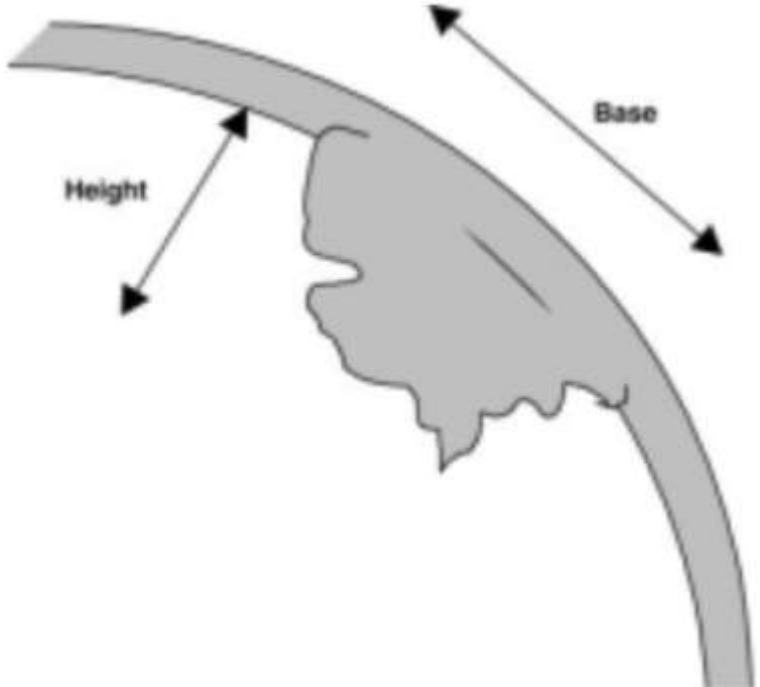
Blood clots are not ‘solid’

Rokitansky nodule in a dermoid is not ‘solid’

*Papillary projections **are** ‘solid’*

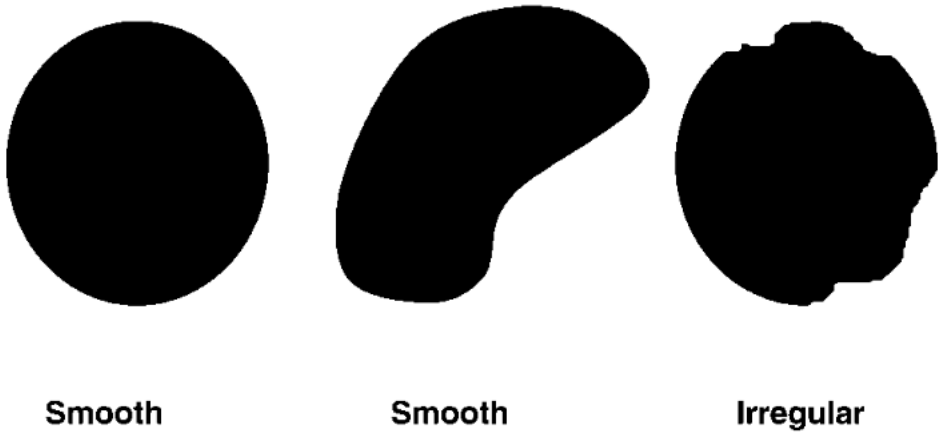
Papillary Projections

'A solid projection arising from the cyst wall and measuring >3mm in height'

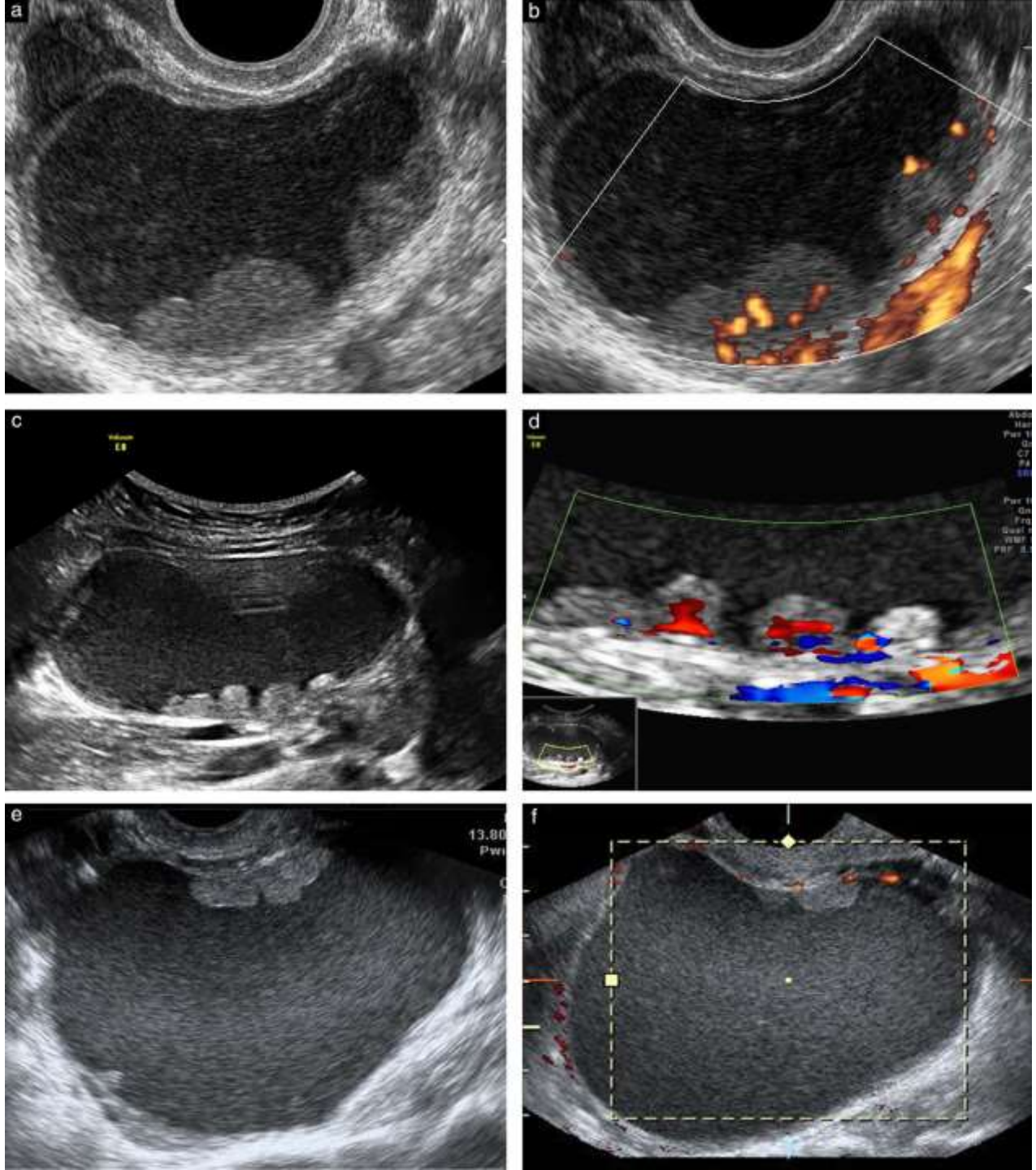


Smooth or irregular cyst wall

- Dependant on the presence or absence of solid papillary projection(s)



Papillary Projections



Deciphering if something is solid or not

1. Give it a poke.

2. Apply Doppler (PRF 0.3).

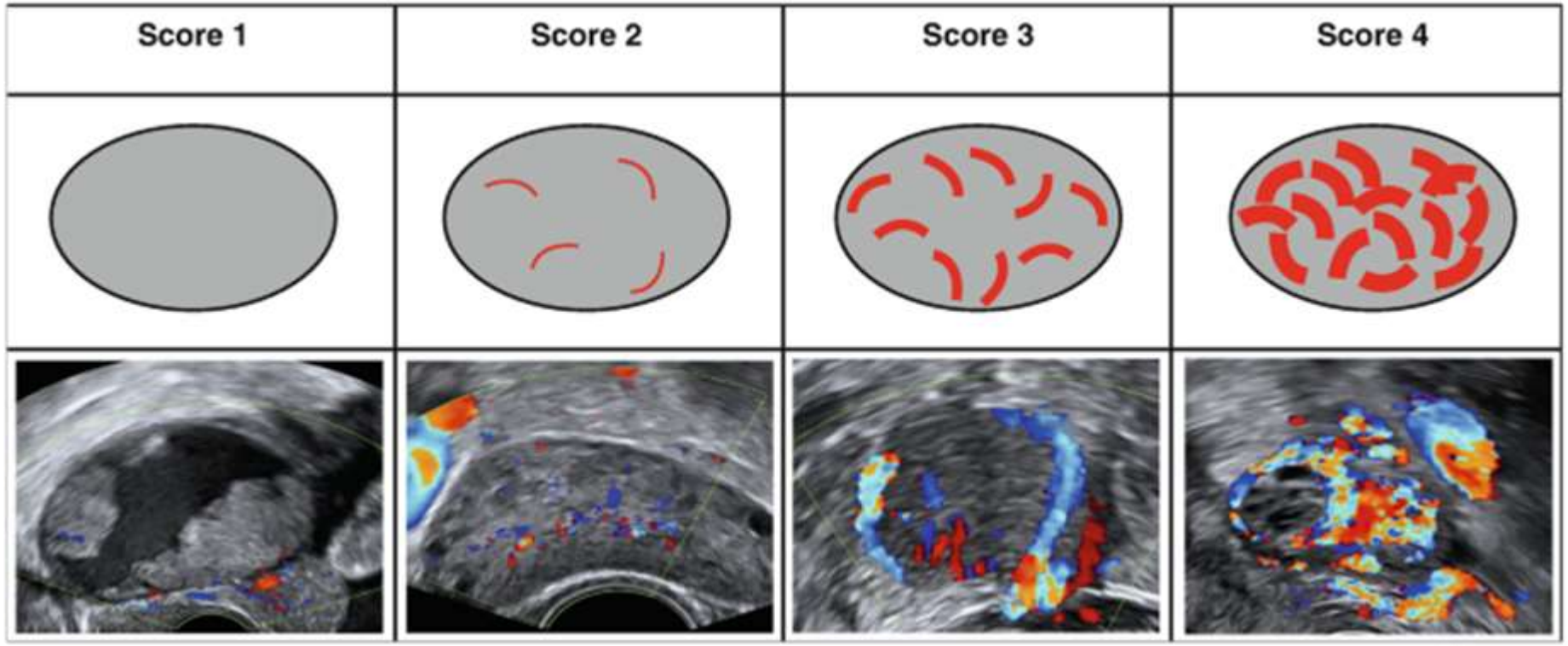
3. Positive Doppler signal = solid; Negative Doppler signal = may still be solid.

4. If in doubt, call it solid!

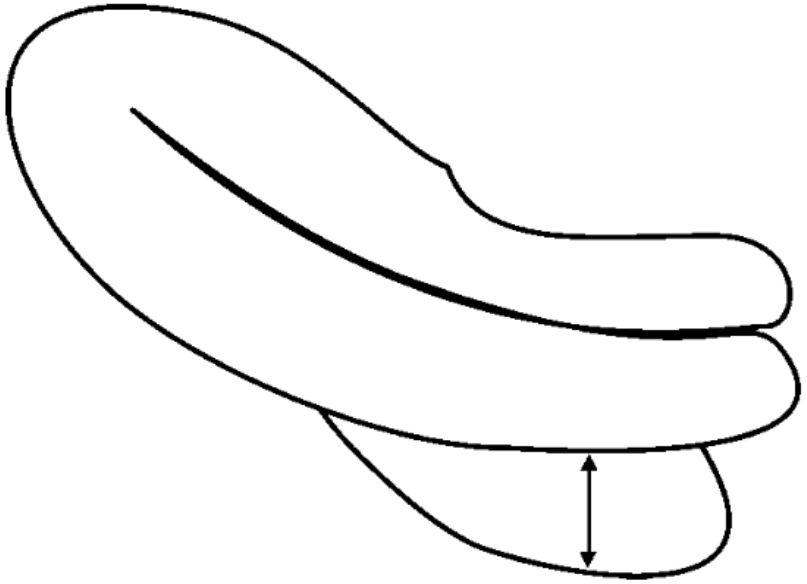
6 categories

1. Unilocular cyst
2. Multilocular cyst
3. Unilocular – solid cyst
4. Multilocular-solid mass
5. Solid tumour (Solid component >80% of lesion)
6. Not classifiable (e.g. because of poor visualisation)

Vascular pattern



Ascites



Types of ovarian cancer

1. Epithelial Ovarian Cancer
2. Sex-Cord Stromal Cell
3. Malignant Ovarian Germ Cell Tumours
4. Secondary Malignancy (Krukenburg)
5. Borderline Ovarian Tumours.

1. Epithelial ovarian cancers (75%)

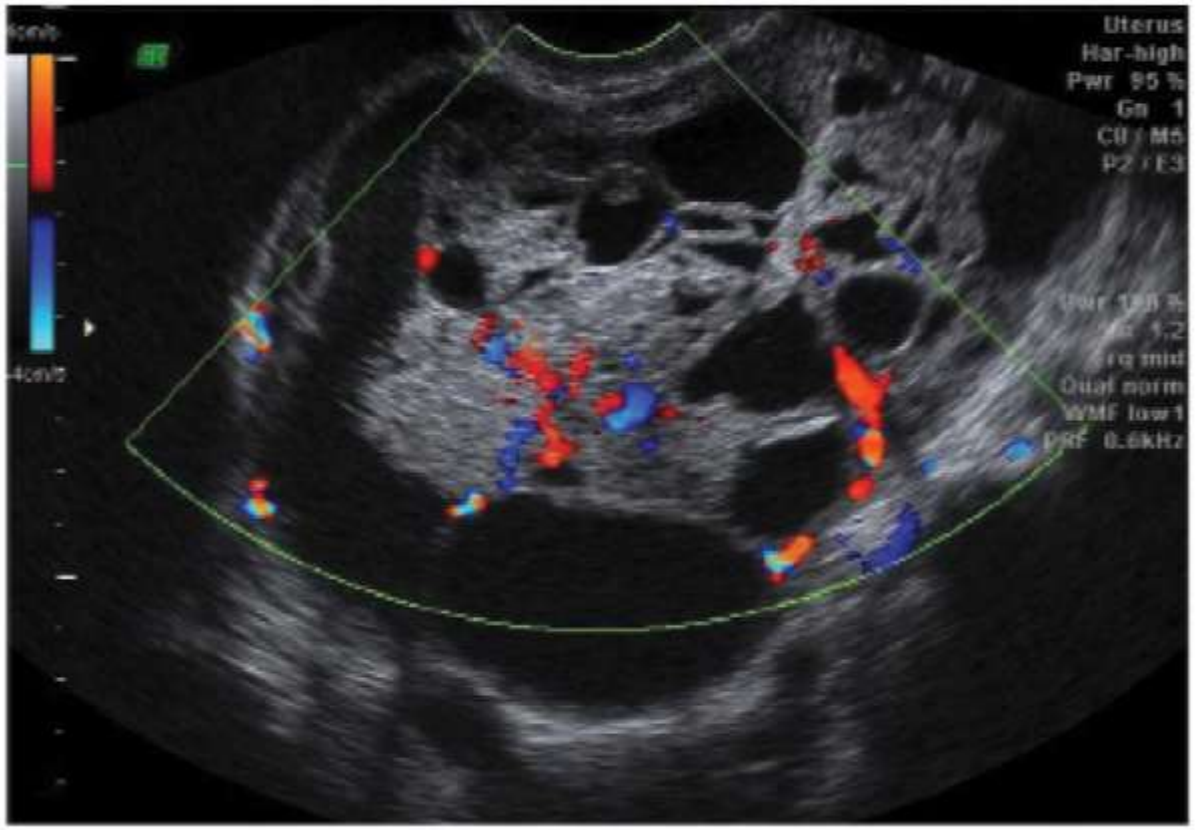
a) Serous ovarian carcinoma.

b) Mucinous ovarian carcinoma.

c) Ovarian clear cell & endometroid carcinoma.

Serous ovarian carcinoma

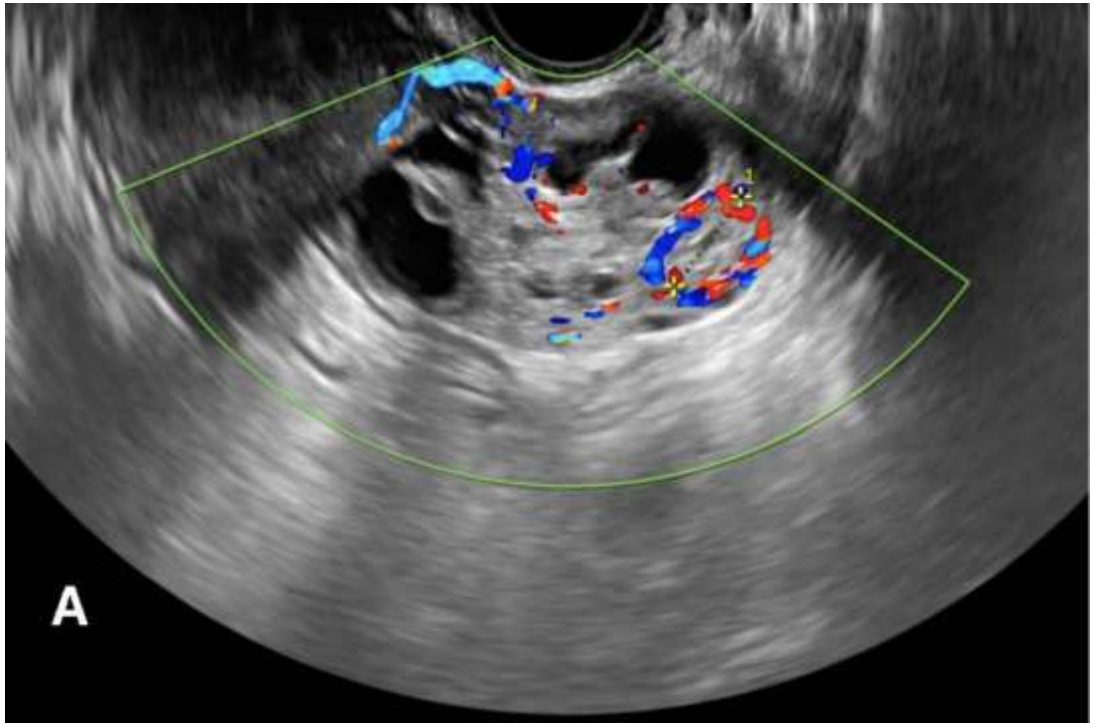
- The stimulus: 80% over the age of 50 years. Elevated CA 125

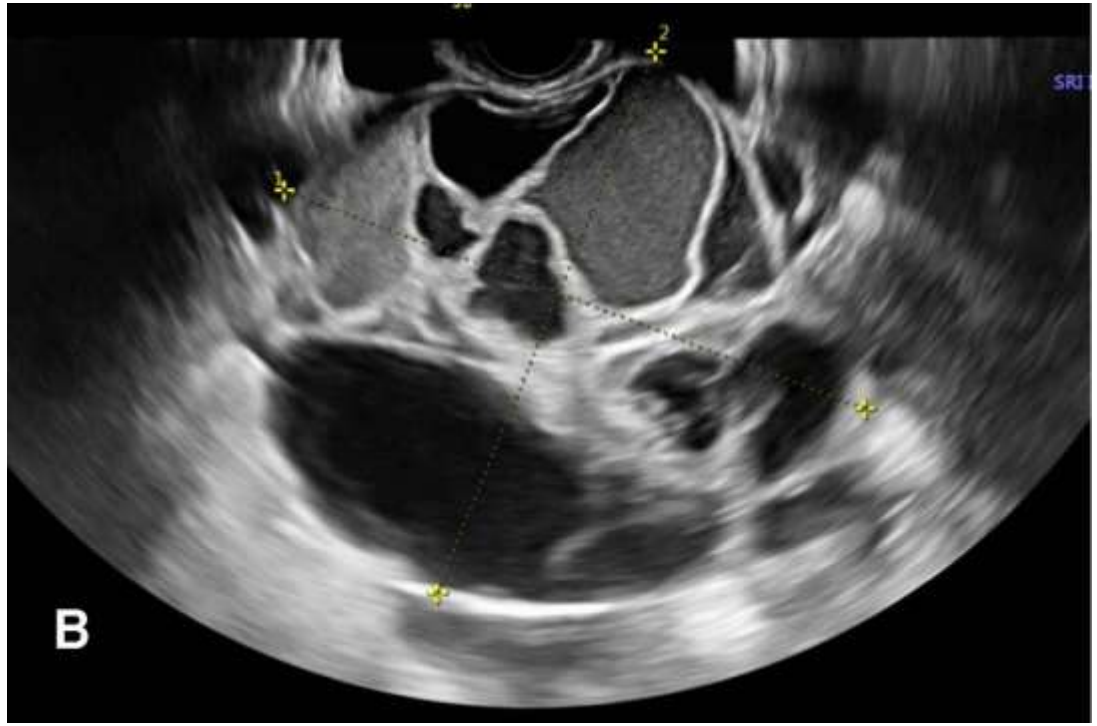


B

Mucinous ovarian carcinoma

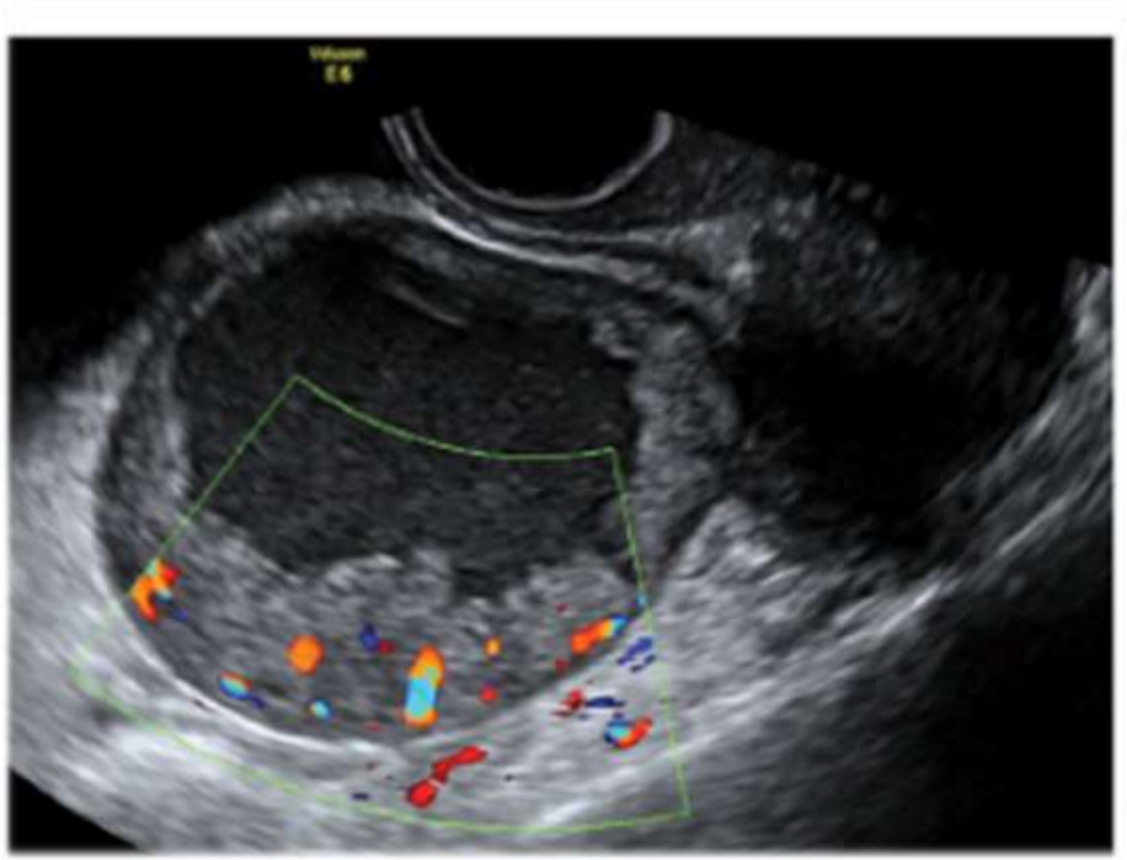
- The stimulus: 80% over the age of 50 years. Elevated CEA & CA 19-9





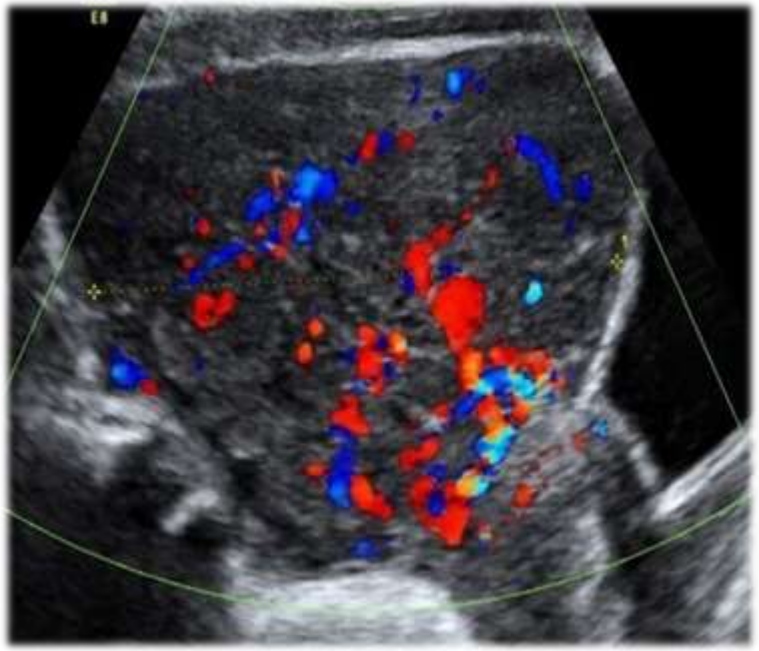
Ovarian clear cell & endometroid carcinoma

- The stimulus: Endometriosis!



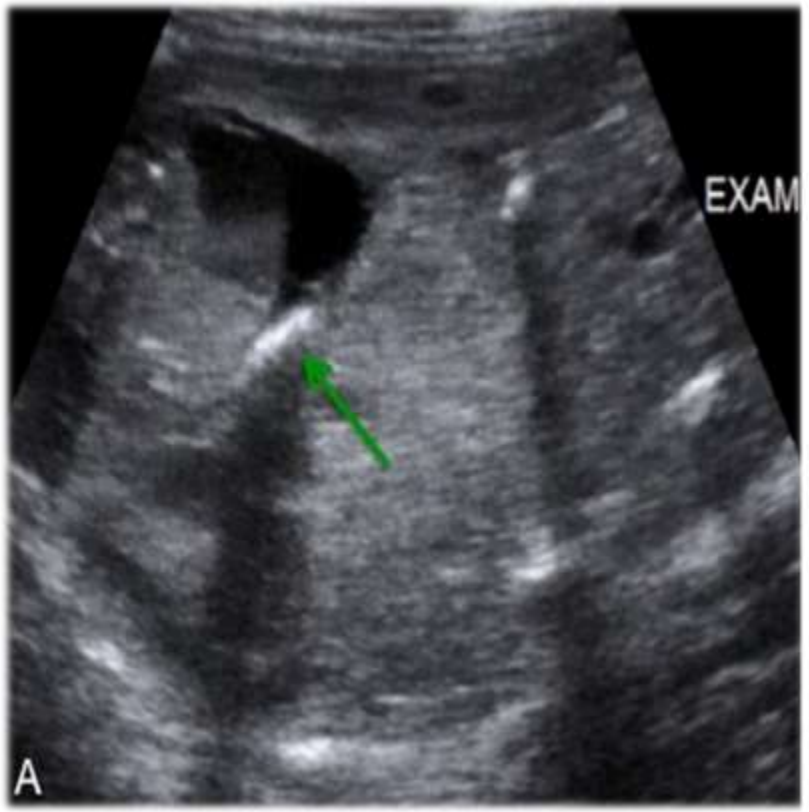
2. Sex Cord Stromal Cell (7%)

- The stimulus: younger patients and elevated oestrogen or testosterone.

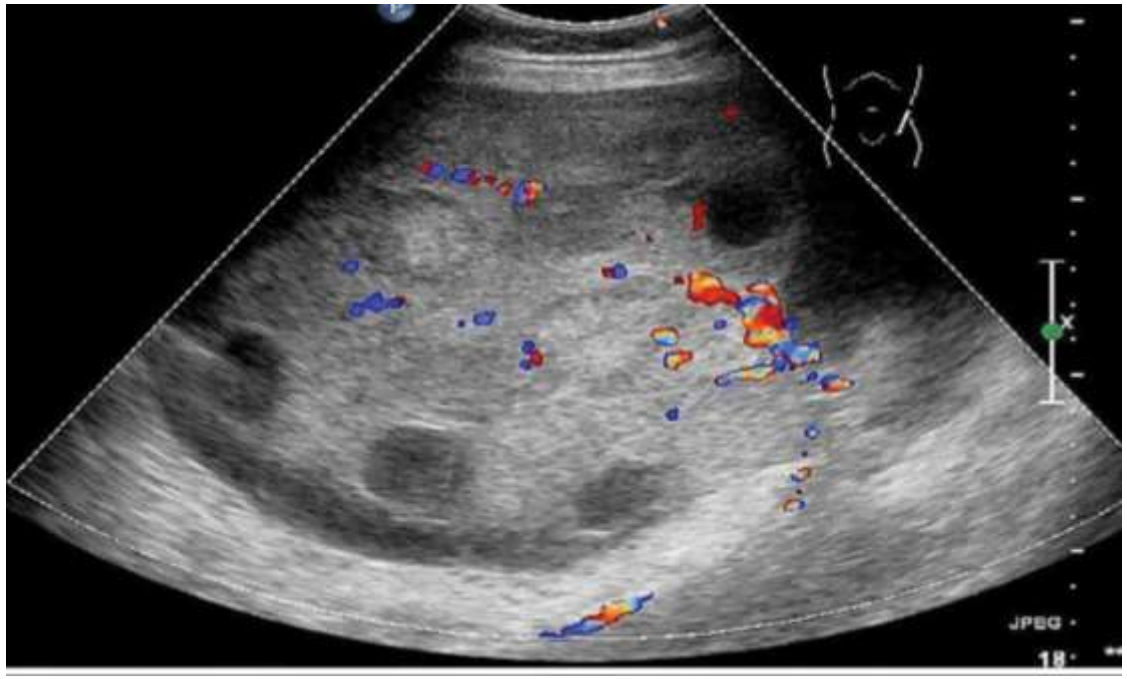


3. Malignant Ovarian Germ Cell Tumours (2%)

- Stimulus: Women in 20s and 30s. Pain. Ascites. LDH, βhCG αFP



4. Krukenberg tumours (16%)

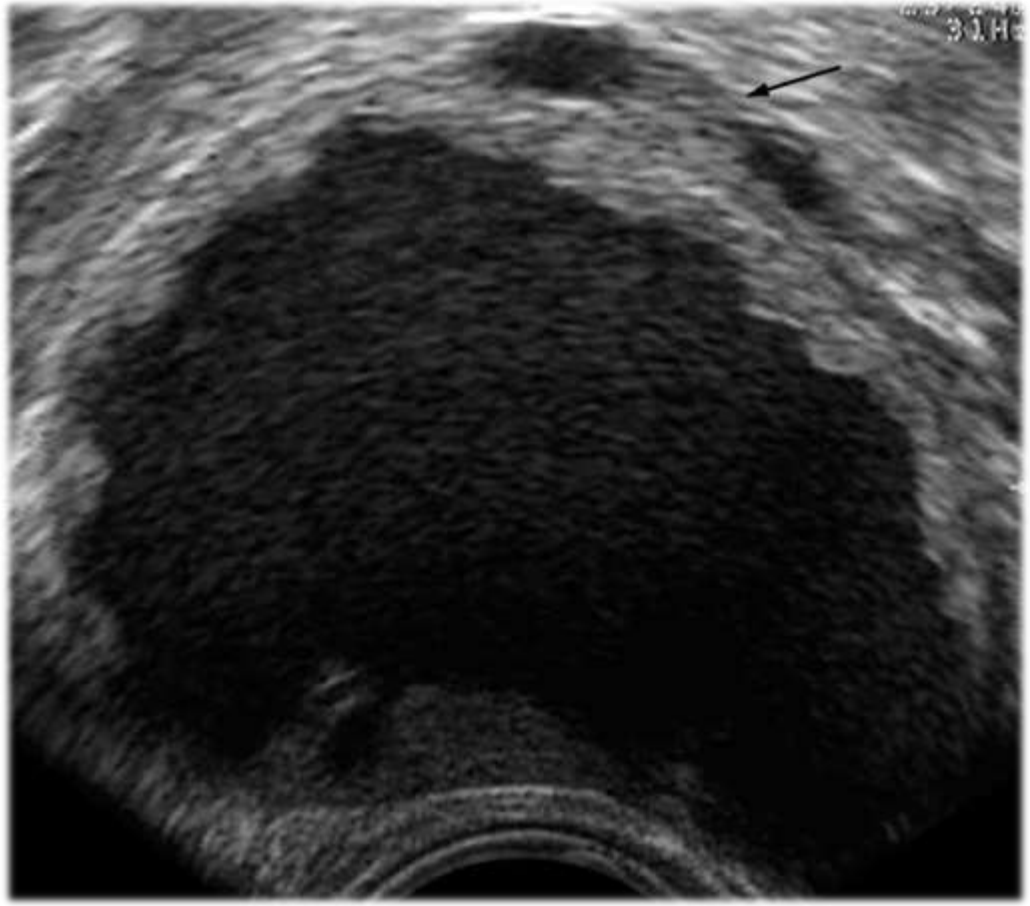


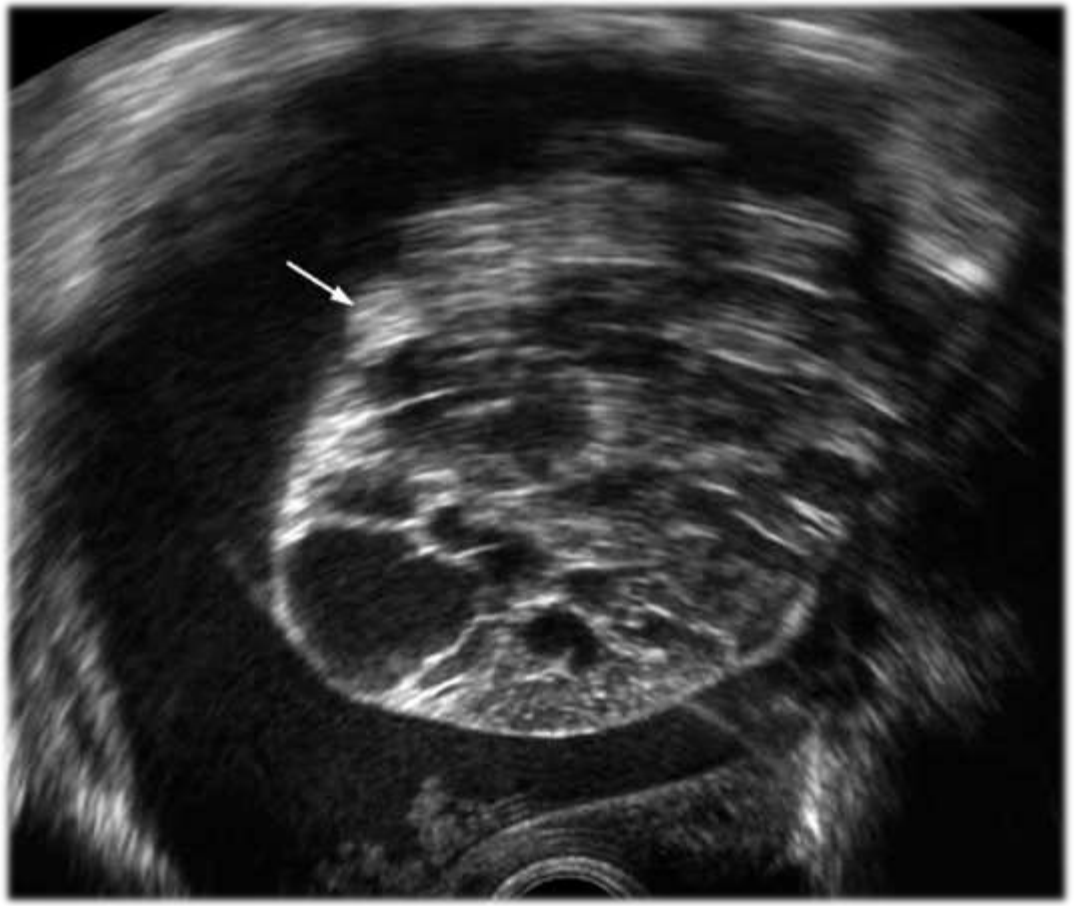
Borderline ovarian tumours

20% appear as a ‘simple cyst’

Serous borderline ovarian tumours

Mucinous borderline ovarian tumour





Is Pattern recognition reliable?

Take home messages

- The aim is to decipher benign from malignant.
- Use a simple cyst as your reference point.
- The more complex: the more concern.
- Solid / Doppler / ascites = cancer.
- Borderline tumours can look simple.


Any Questions