ISUOG Basic Training

Typical Ultrasound Appearances of Common Pathologies in the Adnexae

Learning objectives

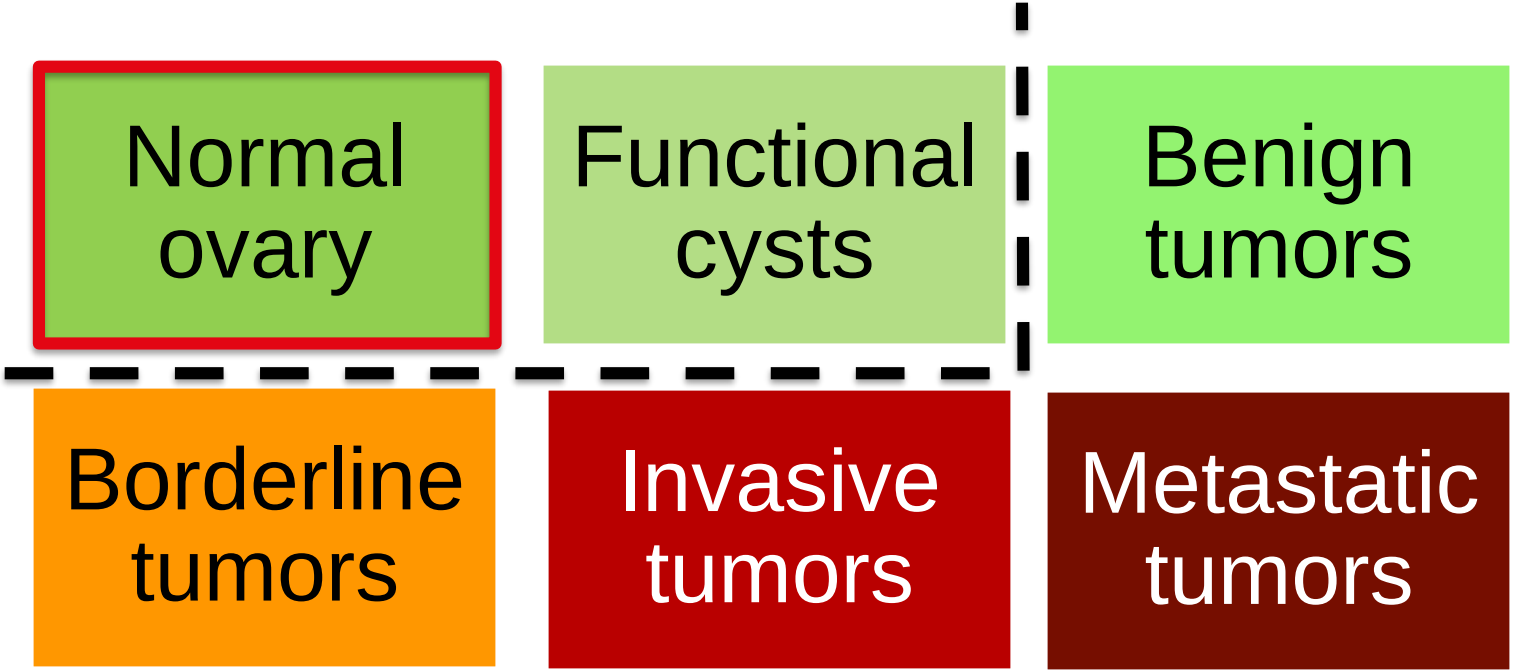
At the end of the lecture series you will be able to:

- Compare the differences between typical normal and common abnormal appearances of the adnexa in gynecological ultrasound examination

Key questions

1. How do normal ovaries typically look like?
2. What are the typical ultrasound appearances of the most common pathologies in the adnexa?
3. What diagnostic methods can I use to discriminate between benign and malignant adnexal pathology?
4. Which patients should I refer for specialist opinion?

Ovarian findings



Normal ovary

Normal ultrasound findings

- Differ between women before and after menopause
- Changes throughout the menstrual cycle

Normal ovary

How big is a normal ovary in a woman of fertile age?

Very variable

- Median 7 ml
- Range 2-17 ml
- (Range 1-20 ml)

303 women 20-39 years old with regular menstrual cycles, cd 4-8

Jokubkiene et al. J Ultrasound Med, 2012, 31(10):1635-49

What is a normal number of antral follicles before menopause?

Text books:

6-7 follicles/ovary

Jokubkiene et al:

Median 11 follicles (2-10 mm) /ovary

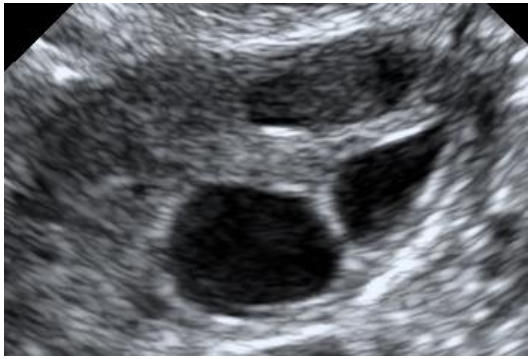
Range 1-36

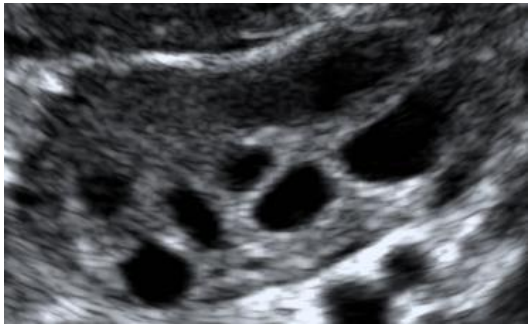
10th-90th percentile 4-20

57% had ≥12 follicles/ovary, i.e. PCO*

*PCO : ≥ 12 follicles/ovary

or ovary ≥ 10 ml (Rotterdam)





How big is a normal ovary in a postmenopausal woman?

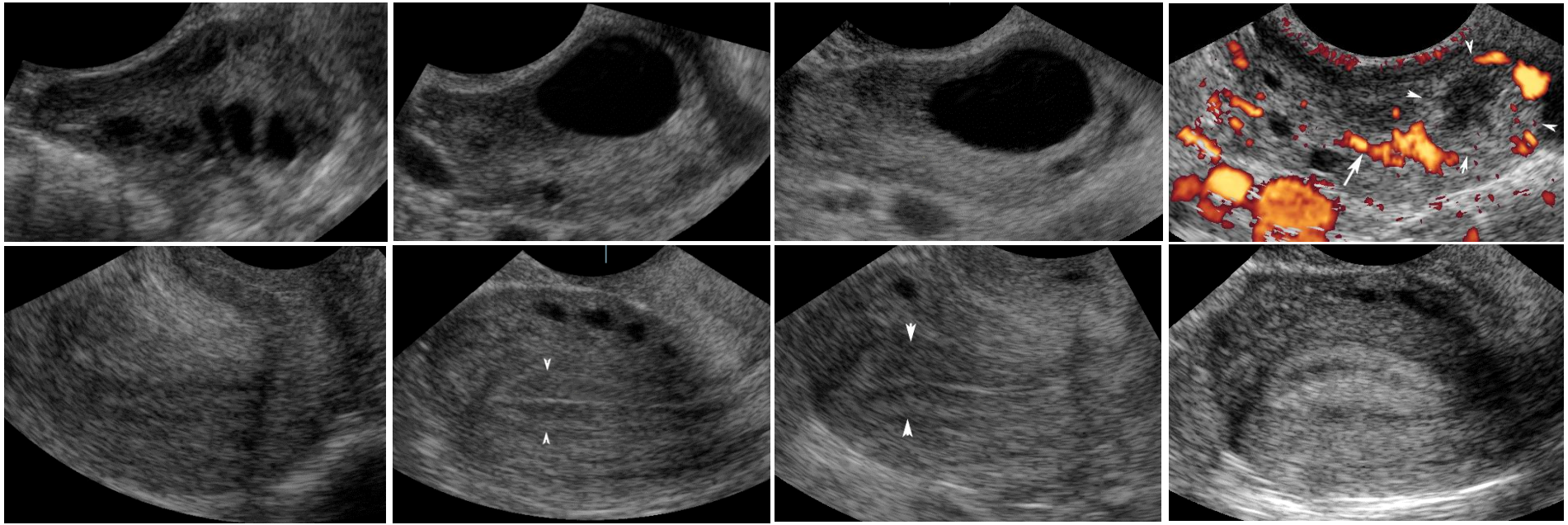
- Median 1x1x2 cm
- Median volume 1 ml
  - range: 0.4 - 4 ml

144 asymptomatic postmenopausal women, 45-64 years old

Sladkevicius et al. UOG, 1995, 6(2): 81-90

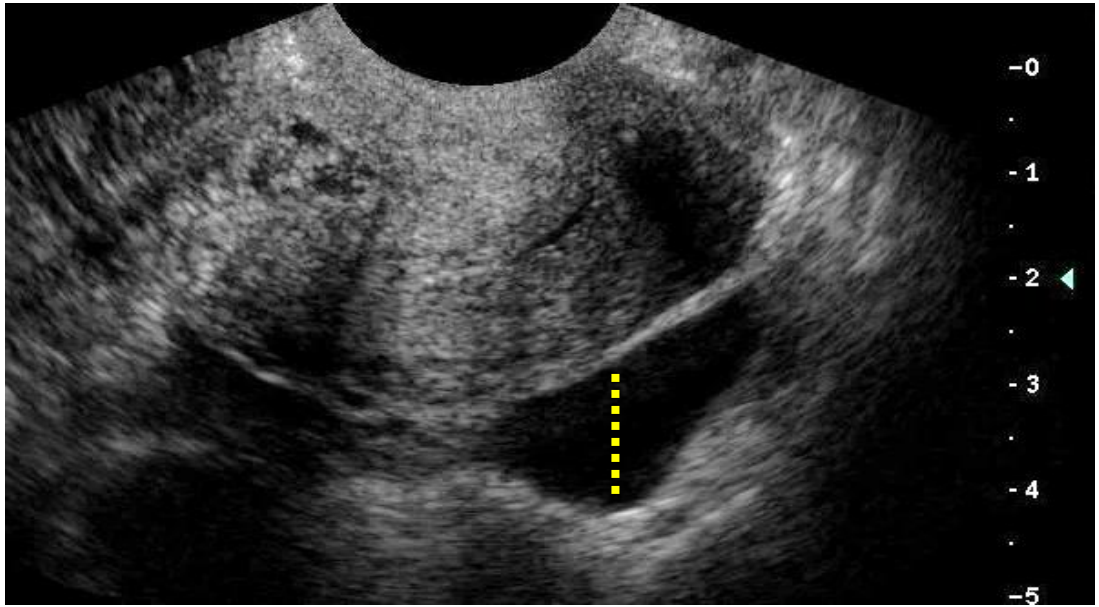
Normal ovary

Changes during the menstrual cycle

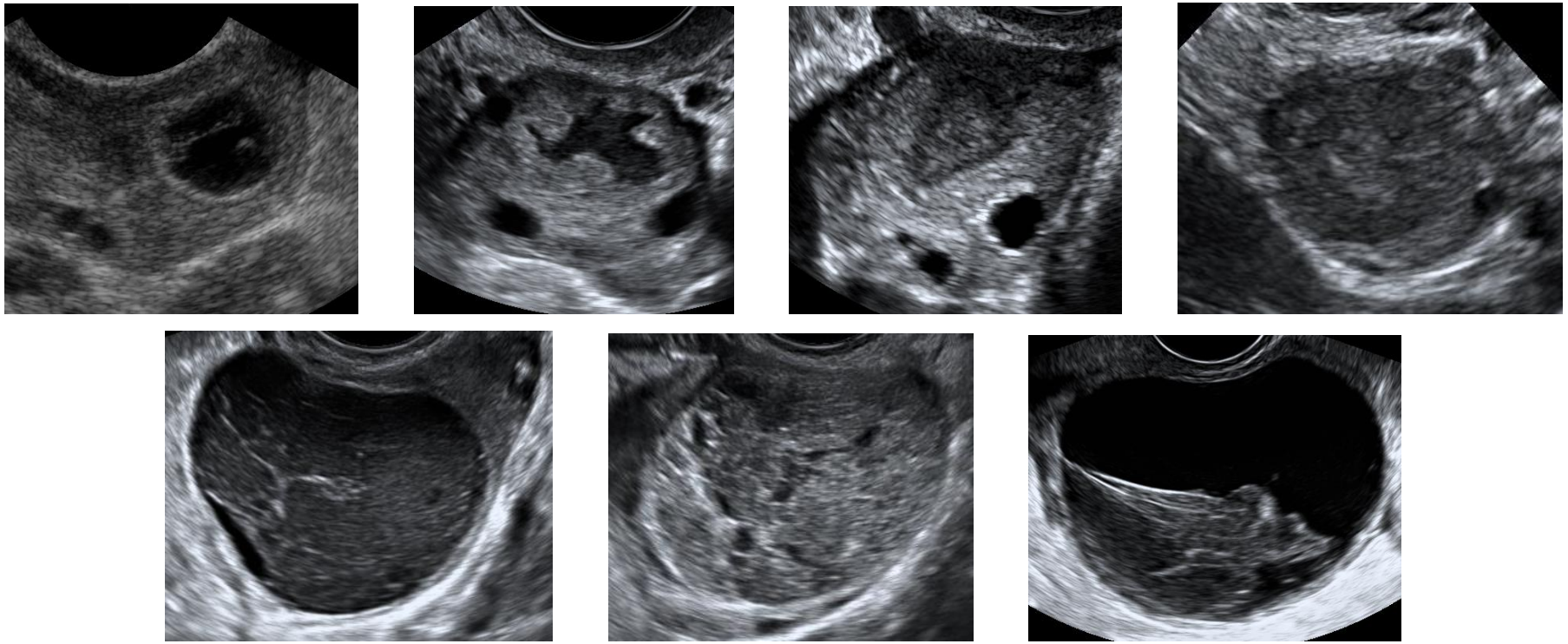


Post-menstruation	Proliferative phase 3 days before ovulation	Proliferative phase 1 day before ovulation	Secretory phase 6 days after ovulation

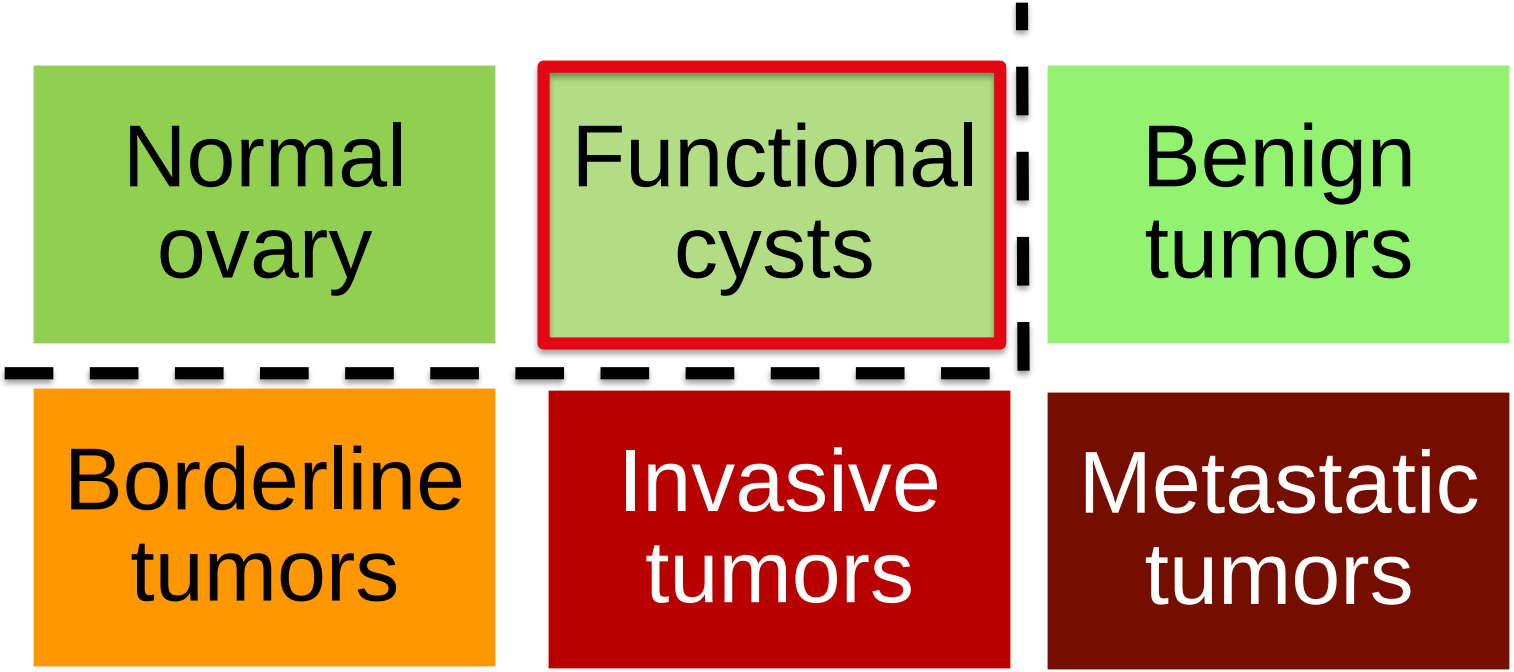
Some fluid in the pouch of Douglas is NORMAL before menopause



A corpus luteum may look different



Ovarian findings

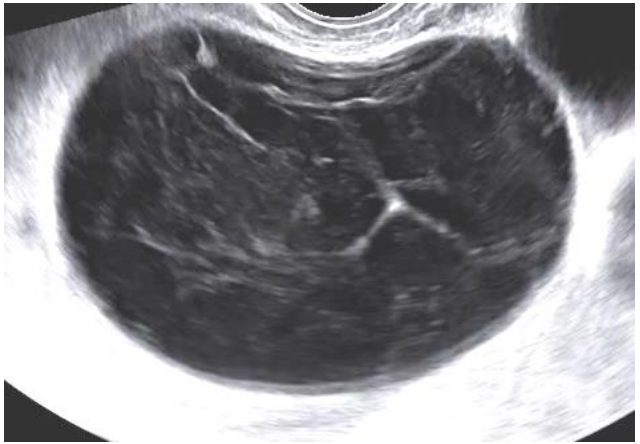


Functional cysts

Follicular cyst / simple cyst

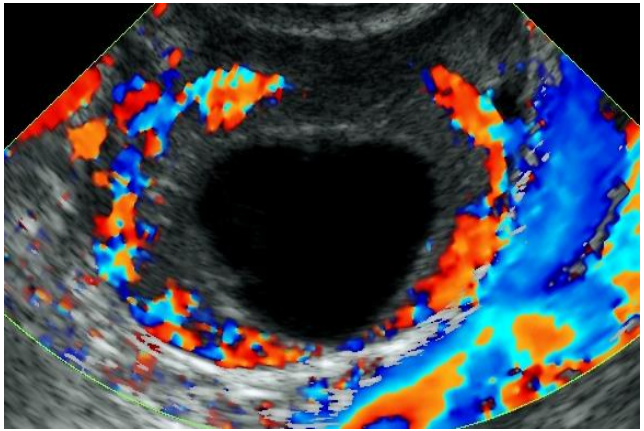
Functional cysts

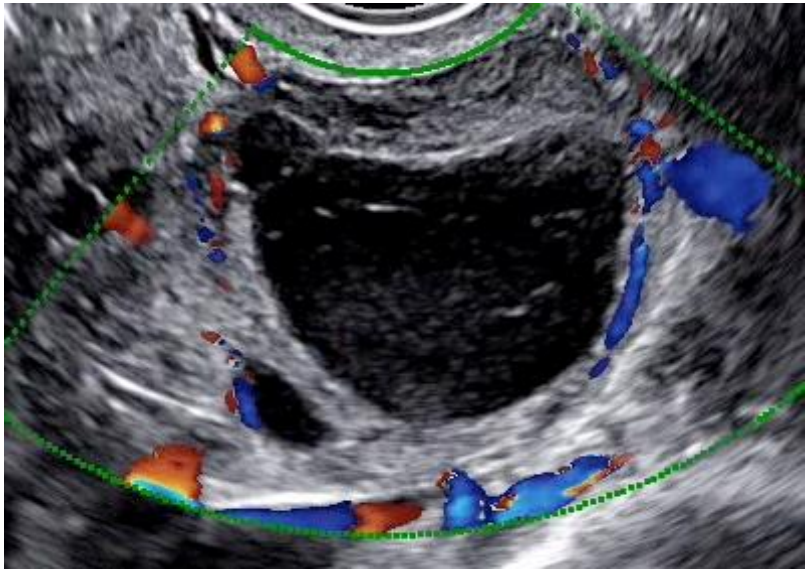
Corpus luteal cyst



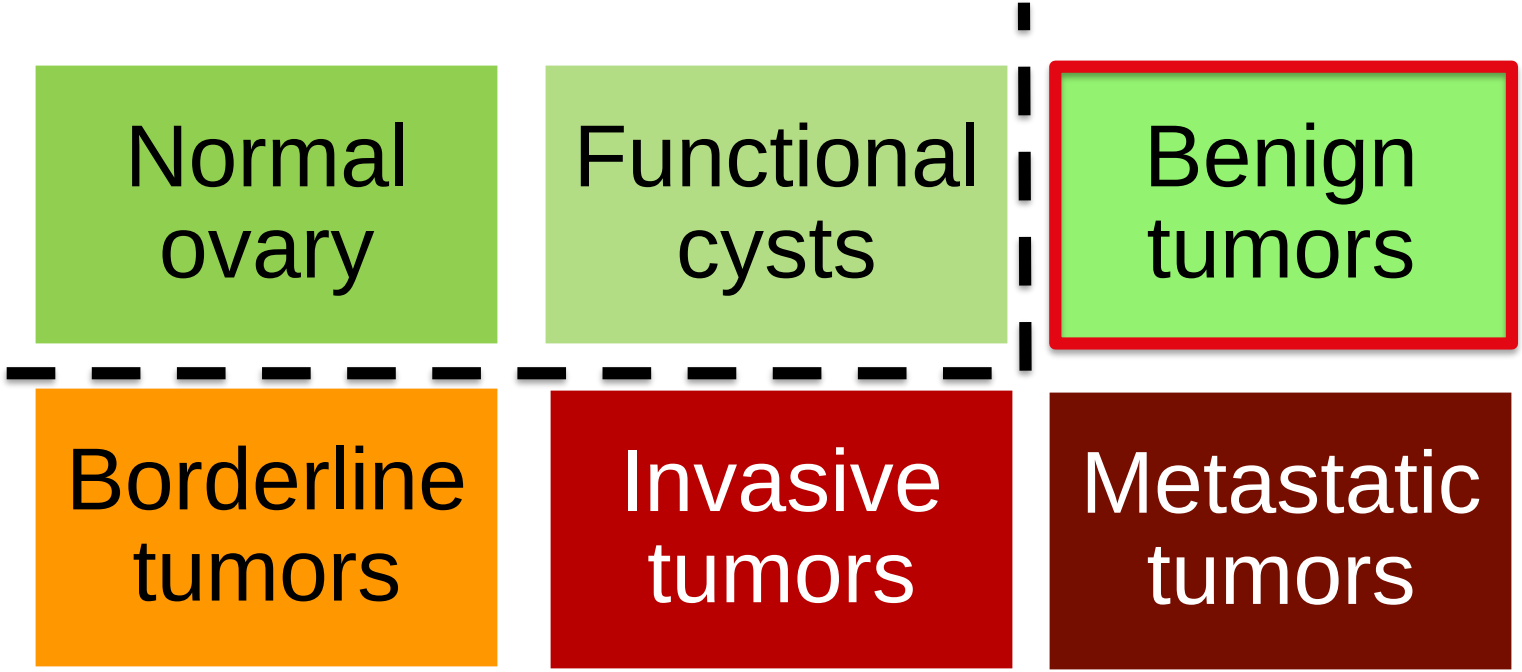
Functional cysts

Corpus luteal cyst





Ovarian findings



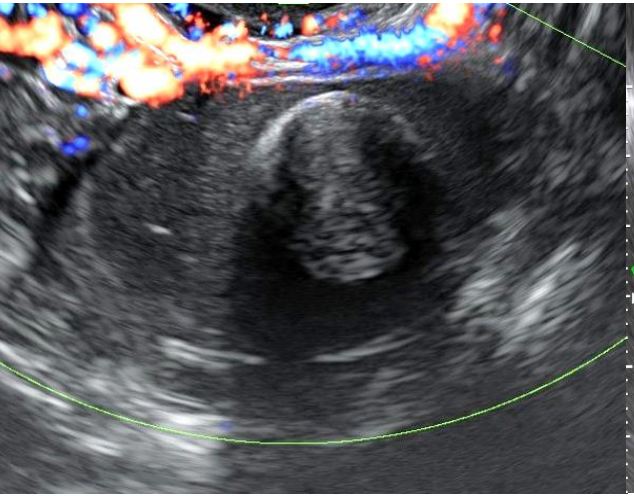
Benign tumors

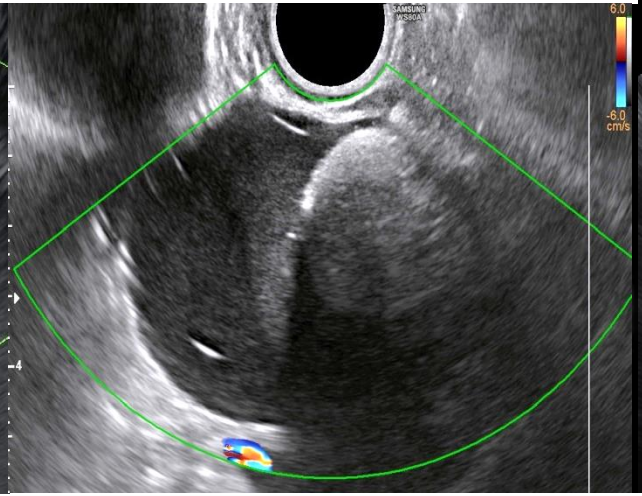
Common ovarian pathology

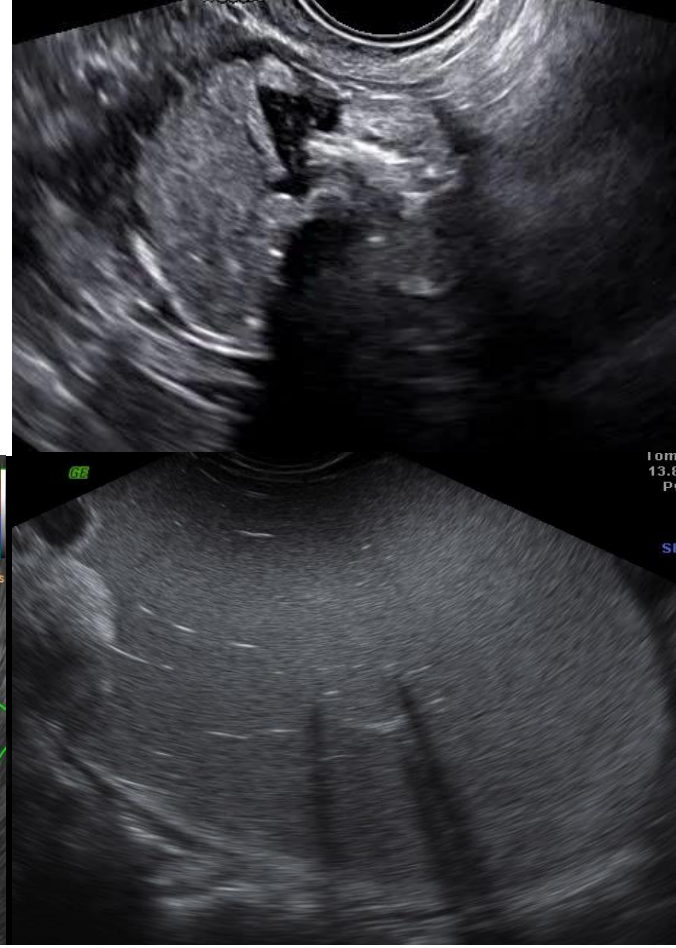
- Dermoid/mature teratoma
- Endometrioma
- Serous cystadenoma/cystadenofibroma
- Mucinous cystadenoma

Benign tumors

Dermoid cyst

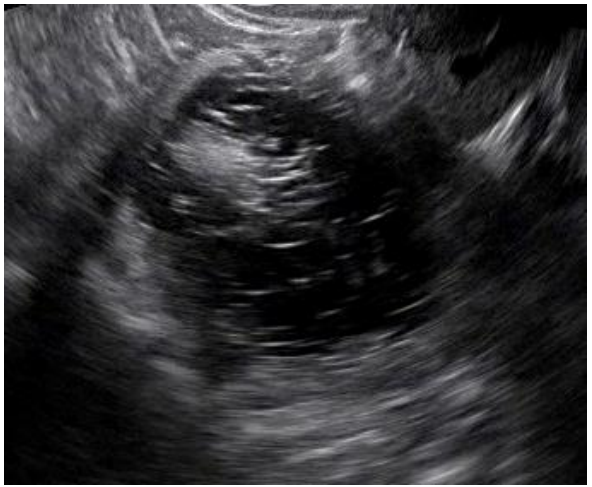






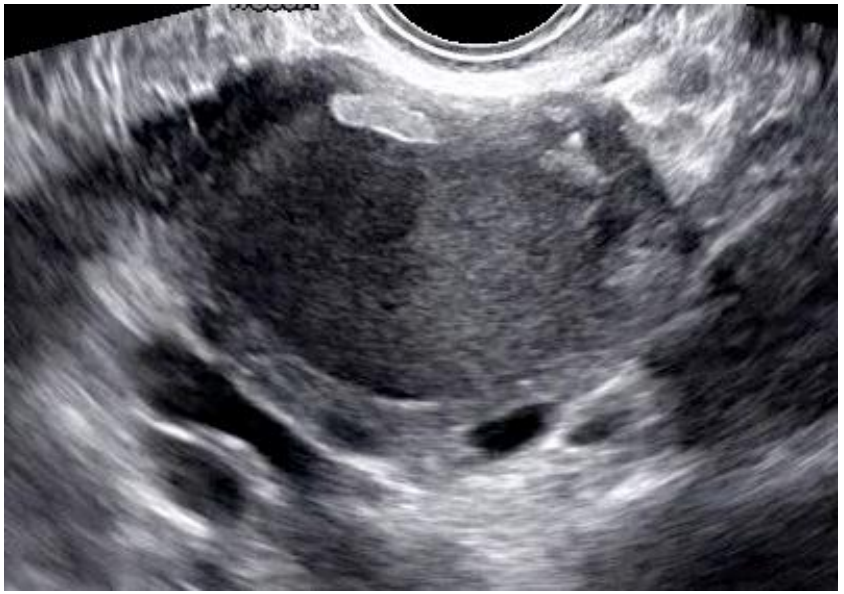
Benign tumors

Dermoid cyst



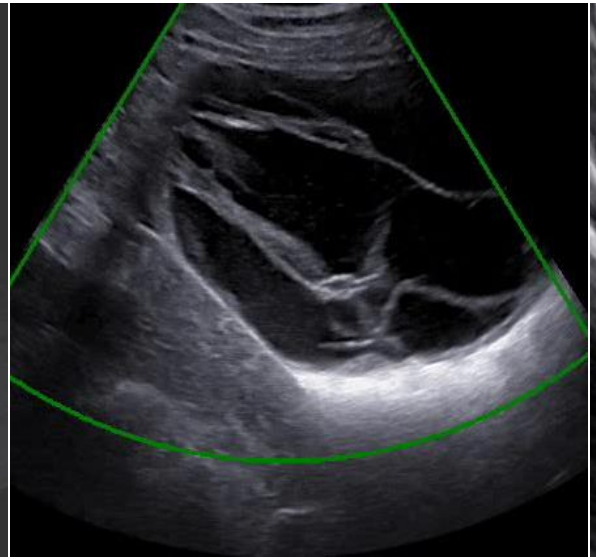
Benign tumors

Endometrioma



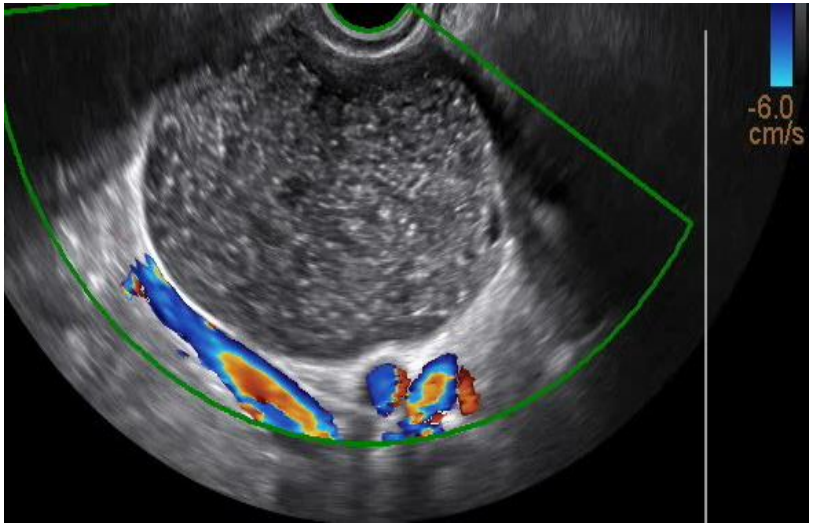
Benign tumors

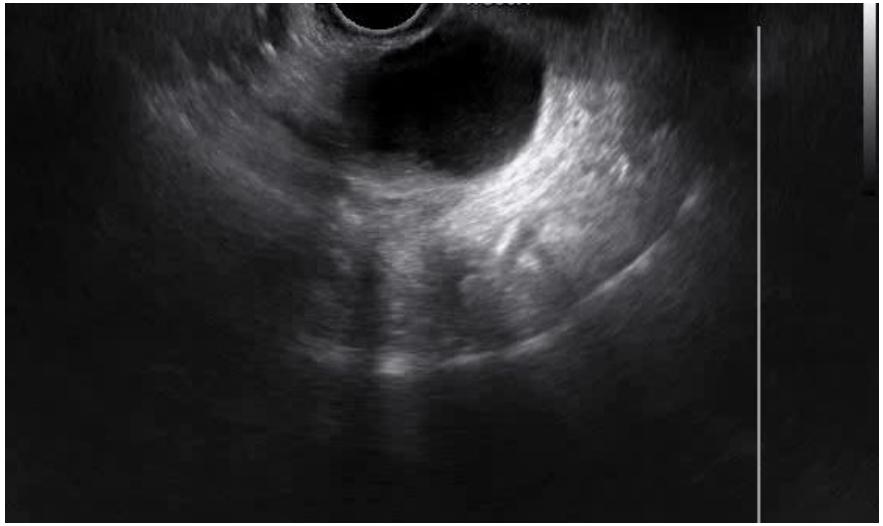
Cystadenoma/ cystadenofibroma



Benign tumors

Cystadenoma/ cystadenofibroma





Benign tumors

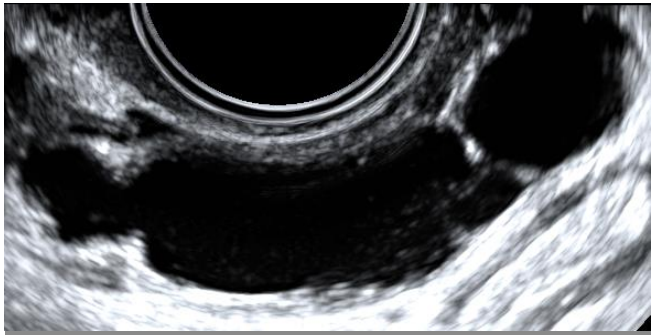
Fibroma

Benign tumors

Common extra-ovarian adnexal pathology

- Hydrosalpinx
- Paraovarian cysts
- Peritoneal inclusion cysts/ pseudocysts

Hydro-pyo-haemato-salpinx



Sausage shape

Cog wheel

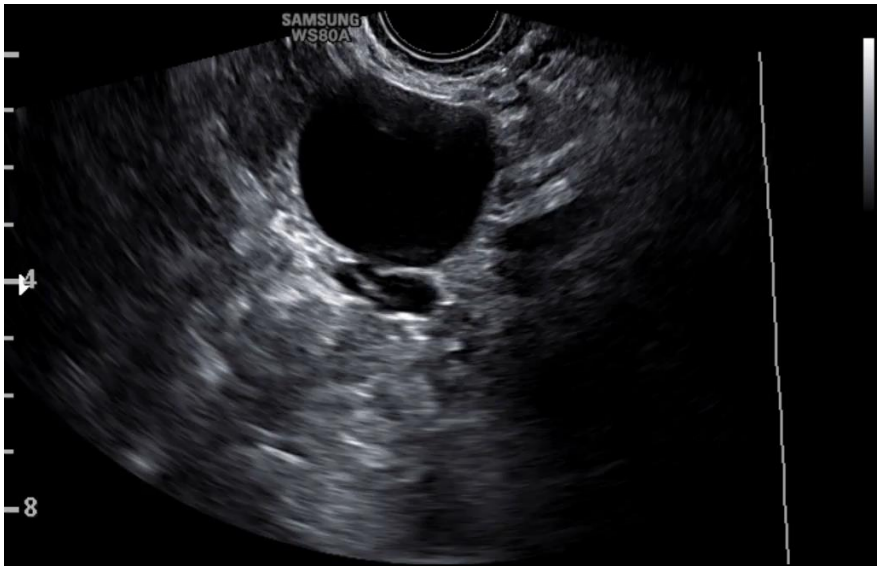
Beads on a string

Incomplete septa

Incomplete septa

Benign tumors

Hydrosalpinx

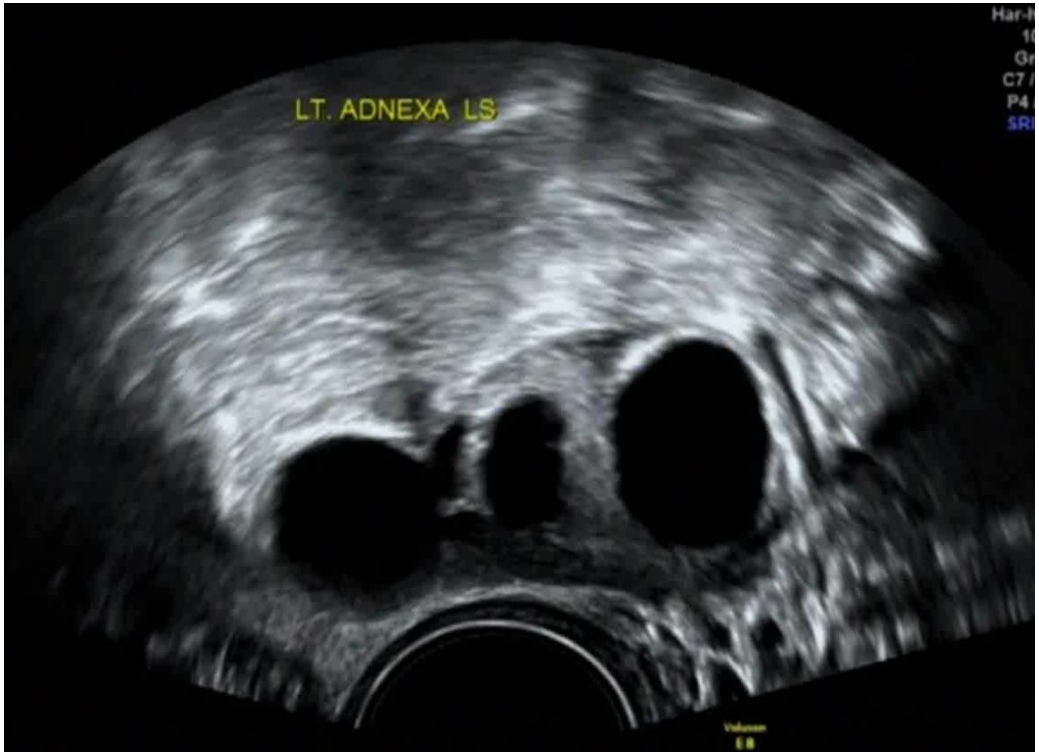


Benign tumors

Paraovarian cyst

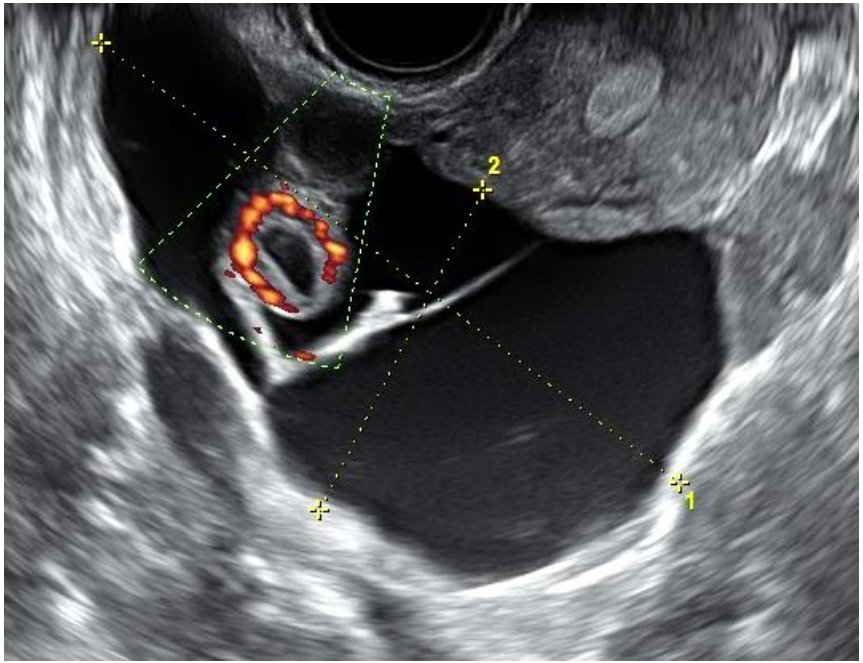
Benign tumors

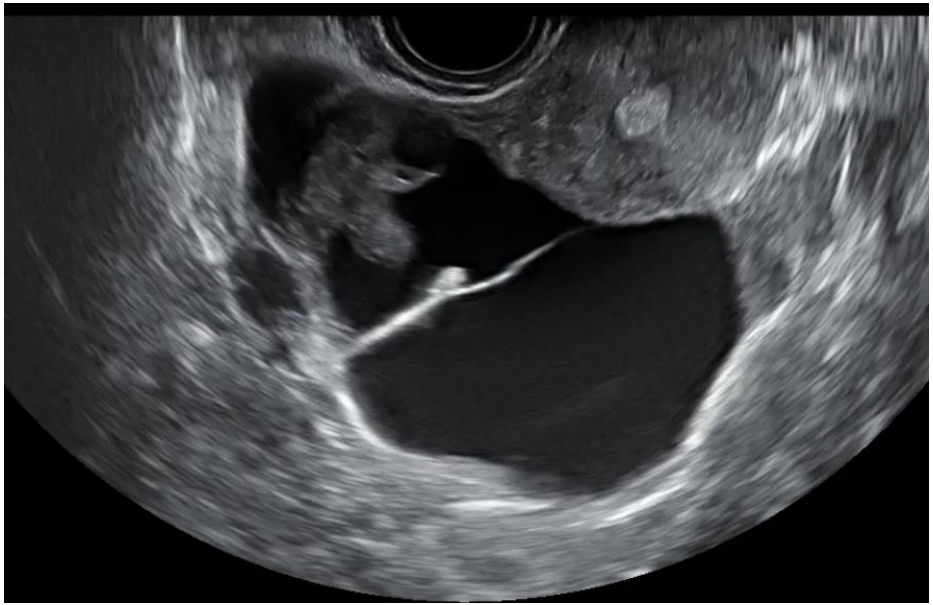
Paraovarian cyst



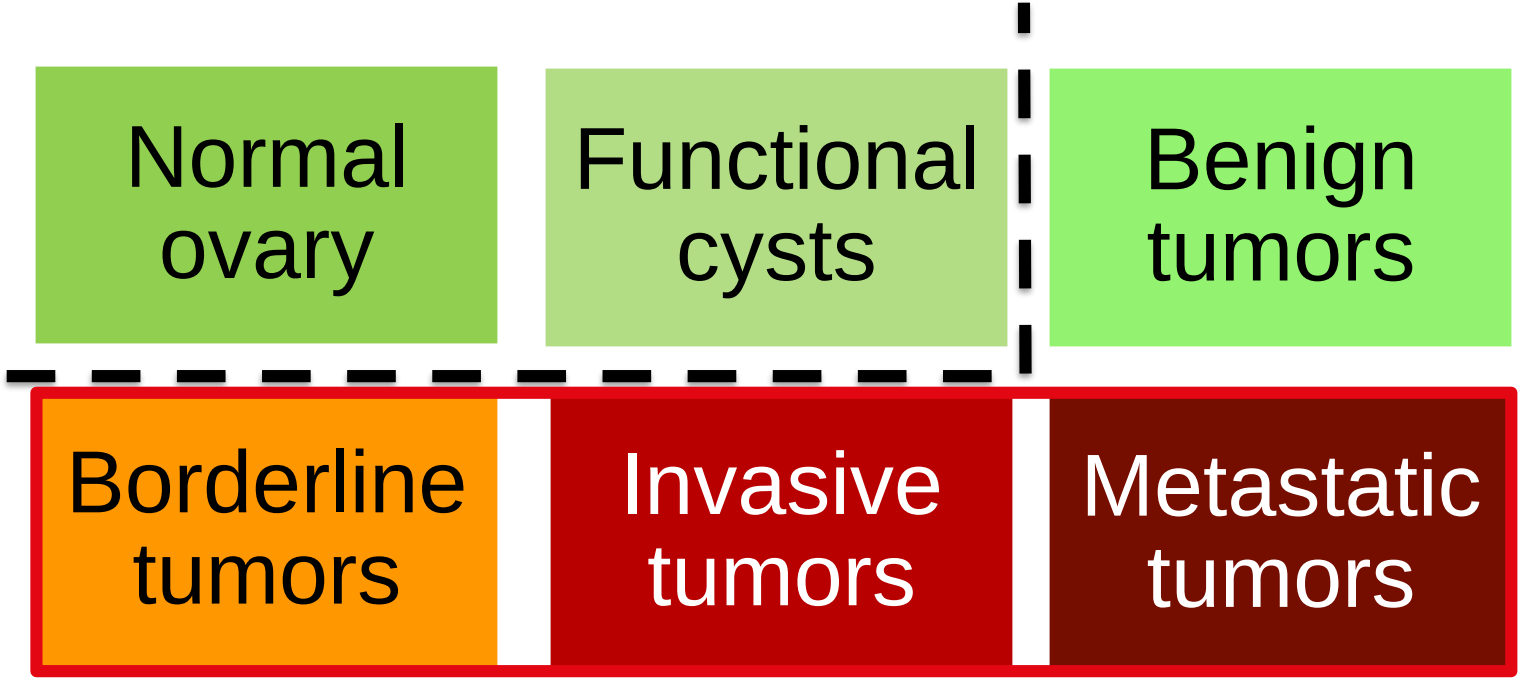
Benign tumors

Peritoneal pseudocyst





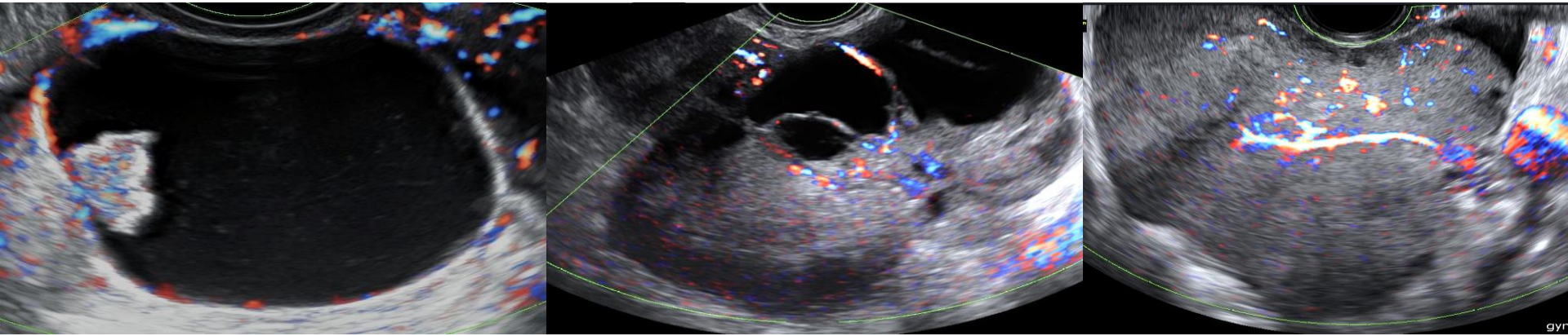
Ovarian findings



Borderline tumors

Invasive tumors

Metastatic tumors



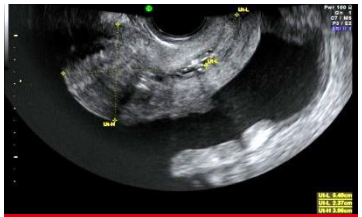
Multilocularity, wall irregularities, papillary projections, other solid components; high color score; ascites, peritoneal implants, omental cake.

Diagnostic methods to discriminate between benign and malignant adnexal pathology

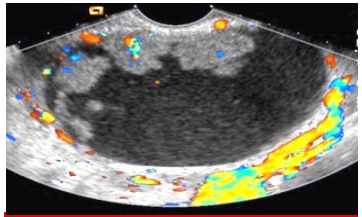
IOTA Simple Rules

Malignant features

Irregular solid tumor



Presence of ascites



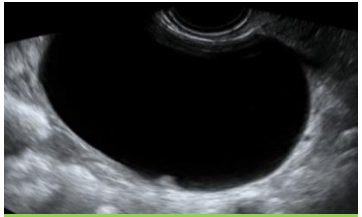
≥ 4 papillary projections

Irregular multilocular-solid tumor ≥ 100mm

Colour score 4 (strong blood flow)

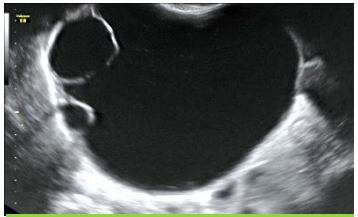
Benign features

Unilocular cyst

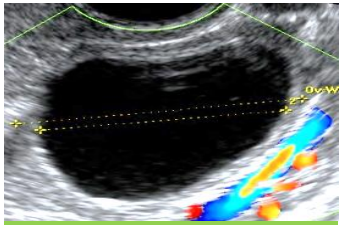


Tumor with largest solid component < 7mm

Acoustic shadows



Smooth multilocular tumor < 100mm



Colour score 1 (no blood flow)

Simple Rules

- Malignant if *one or more* M-features apply *without* presence of B-features
- Benign if *one or more* B-features apply *without* presence of M-features
- Inconclusive if *no* features present or if *both* B and M-features apply

MALIGNANT (M)
1. Irregular solid tumor (>/= 80% solid)
2. Ascites (fluid outside POD)
3. At least 4 papillary structures
4. Irregular multilocular solid largest diameter >/= 10cms
5. Strong blood flow (colour score 4)

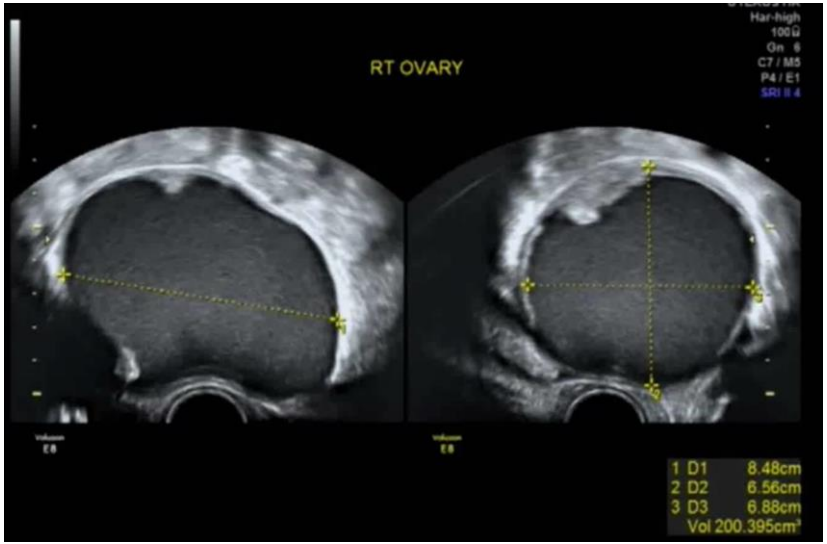
BENIGN (B)
1. Unilocular – no solid
2. Unilocular solid, largest diam. <7mm
3. Acoustic shadows
4. Smooth multiloculated < 10cm
5. No blood flow - colour score 1

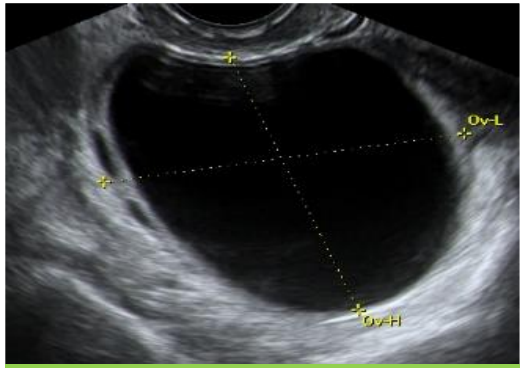
Benign or Malignant?

- 23y
- Eager to conceive
- Ultrasound - Cyst

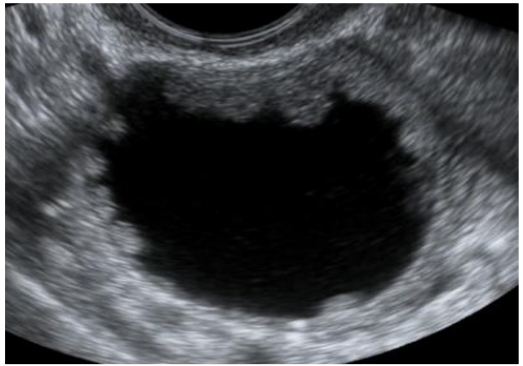
US; IC; SR – M2, M3 & B3

HPE: Benign Serous Cystadenofibroma

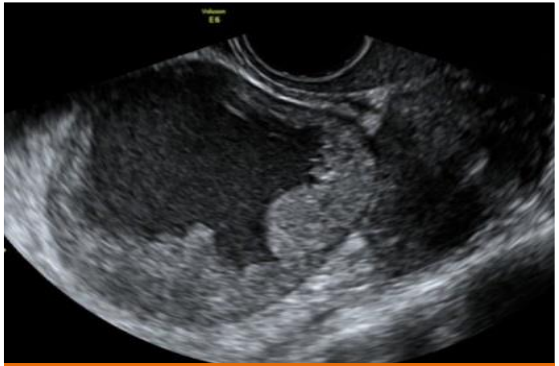




Benign Tumor



Borderline Tumor



FIGO Stage I Ovarian cancer

IOTA

ADNEX
Assessment of Different
NEoplasias in the adneXa

The ADNEX-model computes the risk that a detected adnexal mass for which surgery is indicated is benign, borderline, stage I invasive, stage II-IV invasive, or metastatic cancer to the adnexa.

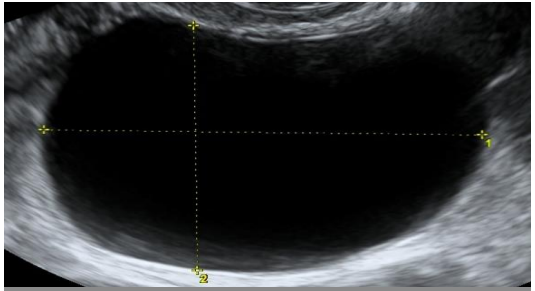
Start Analysis

FIGO Stage II-IV Ovarian cancer

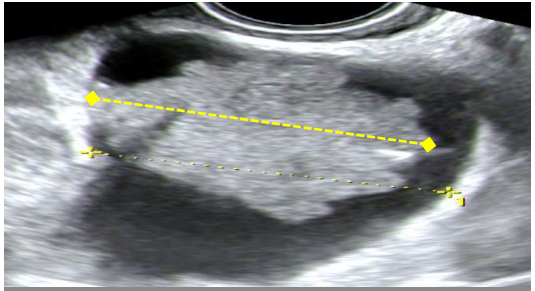
Metastasis to the ovary

IOTA-ADNEX (Assessment of Different NEoplasias in the adneXa) variables

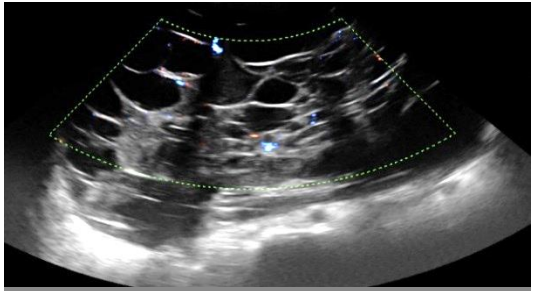
- Age of patient
- Type of center
- Serum CA-125
- Six ultrasound variables



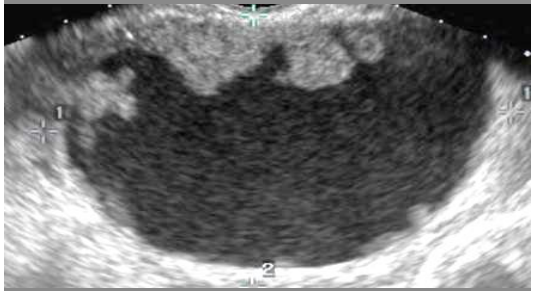
(1) maximum diameter of lesion (mm)



(2) proportion of solid tissue

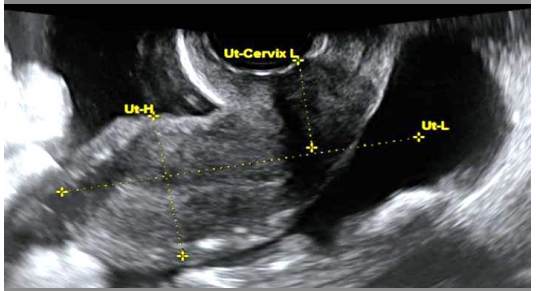


(3) more than 10 cyst locules (yes vs no)



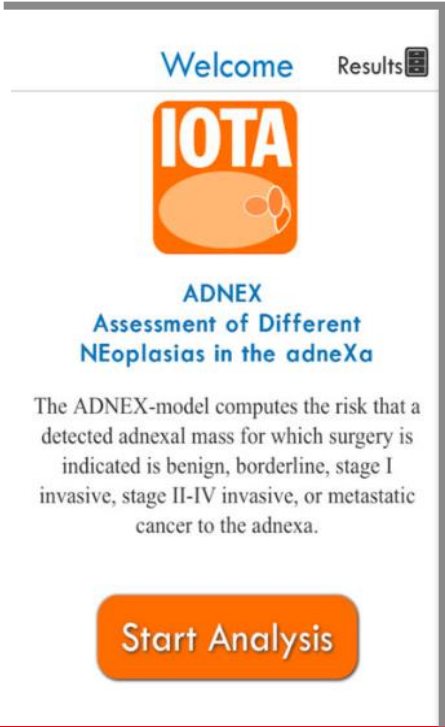
(4) number of papillary projections (0, 1, 2, 3, more than 3)

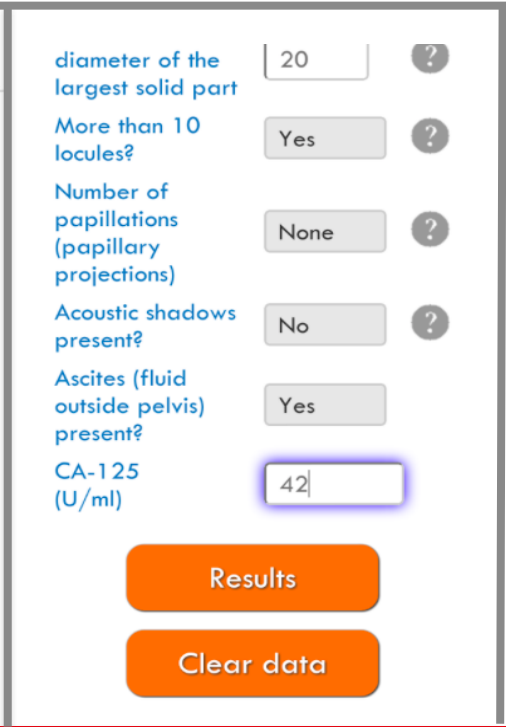
(5) acoustic shadows (yes vs no)

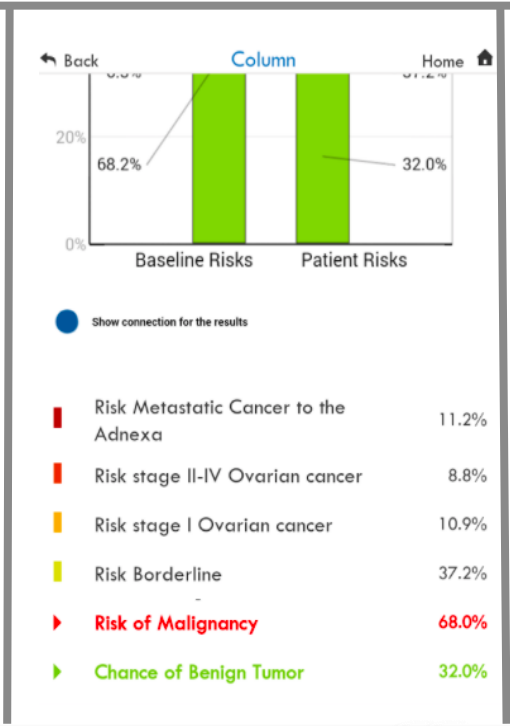


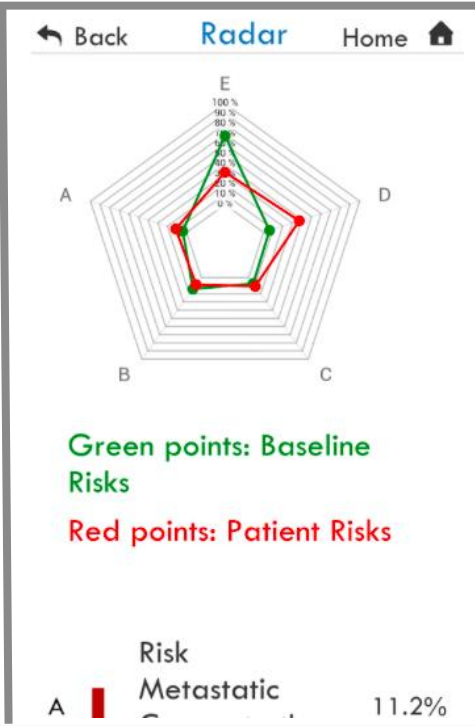
(6) ascites (yes vs no)

IOTA-ADNEX (Assessment of Different NEoplasias in the adneXa) app

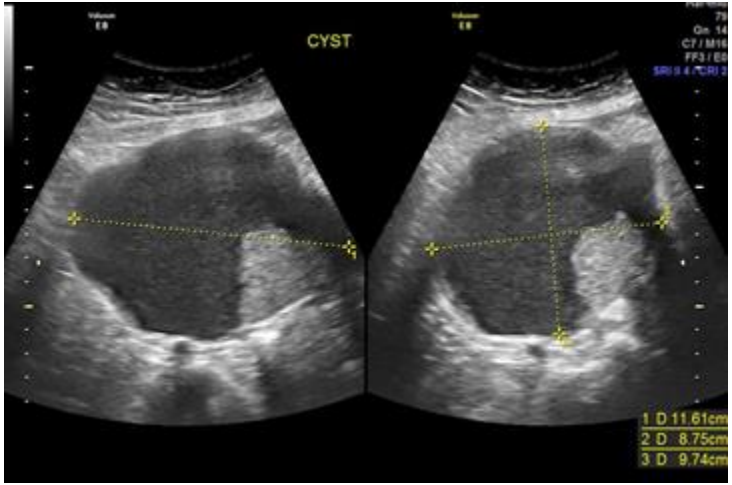








Adnex model



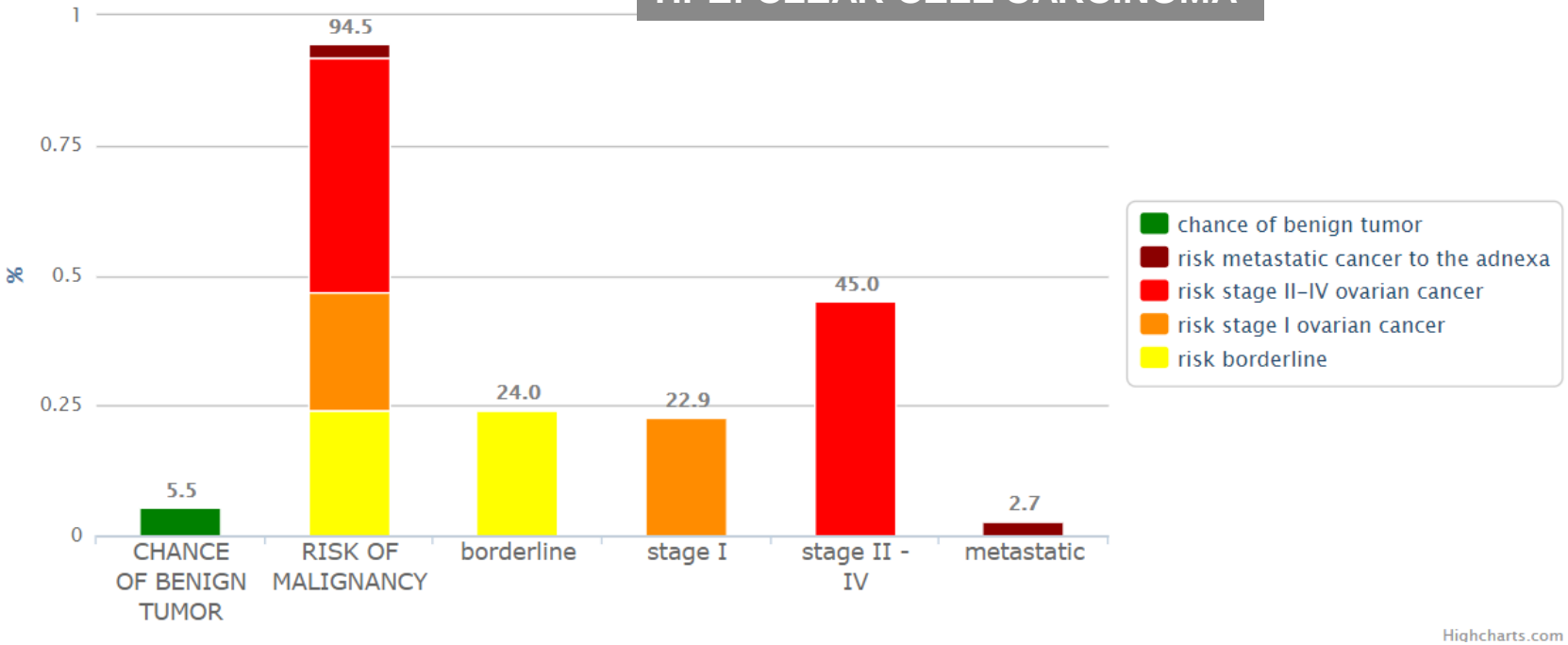
IOTA - ADNEX model

1. Age of the patient at examination (years) 48
2. Oncology center (referral center for gyn-oncol)? yes
3. Maximal diameter of the lesion (mm) 116
4. Maximal diameter of the largest solid part (mm) 58
5. More than 10 locules? no
6. Number of papillations (papillary projections) more than three
7. Acoustic shadows prese no
8. Ascites (fluid outside pelvis) present? no
9. Serum CA-125 (U/ml) 197

calculate Clear

Adnex model

HPE: CLEAR CELL CARCINOMA



Which patients should I refer for specialist opinion?

- Those in whom you are uncertain about the diagnosis (especially if you suspect malignancy)

Key points

When in doubt:

refer for second opinion