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
- Functional cysts
- Benign tumors
- Borderline tumors
- Invasive tumors
- Metastatic tumors
Normal ultrasound findings

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

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
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

- Normal ovary
- Functional cysts
- Benign tumors
- Borderline tumors
- Invasive tumors
- Metastatic tumors
Functional cysts

Follicular cyst / simple cyst
Corpus luteal cyst

Functional cysts
Corpus luteal cyst

Functional cysts
Ovarian findings

- Normal ovary
- Functional cysts
- Benign tumors
- Borderline tumors
- Invasive tumors
- Metastatic tumors
Common ovarian pathology

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

Dermoid cyst
Benign tumors

Dermoid cyst
Endometrioma

Benign tumors
Benign tumors

Cystadenoma/ cystadenofibroma
Benign tumors

Cystadenoma/ cystadenofibroma
Benign tumors

Fibroma
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
Paraovarian cyst

Ovary

Benign tumors
Paraovarian cyst

Benign tumors
Benign tumors

Peritoneal pseudocyst

Basic Training
Ovarian findings

Normal ovary
Functional cysts
Benign tumors
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
### Benign or Malignant?

#### MALIGNANT (M)
1. Irregular solid tumor \( \geq 80\% \) solid
2. Ascites (fluid outside POD)
3. At least 4 papillary structures
4. Irregular multilocular solid
   largest diameter \( \geq 10\) cms
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

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**HPE: Benign Serous Cystadenofibroma**

- 23y
- Eager to conceive
- Ultrasound - Cyst

**US; IC; SR – M2, M3 & B3**
Benign Tumor

Borderline Tumor

FIGO Stage I Ovarian cancer

FIGO Stage II-IV Ovarian cancer

Metastasis to the ovary

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

<table>
<thead>
<tr>
<th>Age of patient</th>
<th>Type of center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum CA-125</td>
<td>Six ultrasound variables</td>
</tr>
</tbody>
</table>
IOTA-ADNEX (Assessment of Different NEoplasias in the adnexa) app

- Diameter of the largest solid part
  - Yes
- More than 10 locules?
  - Yes
- Number of papillations (papillary projections)
  - None
- Acoustic shadows present?
  - No
- Ascites (fluid outside pelvis) present?
  - Yes
- CA-125 (U/ml)
  - 42

Results

- Risk Metastatic Cancer to the Adnexa: 11.2%
- Risk stage II-IV Ovarian cancer: 8.8%
- Risk stage I Ovarian cancer: 10.9%
- Risk Borderline: 37.2%
- Risk of Malignancy: 68.0%
- Chance of Benign Tumor: 32.0%

Clear data
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 present no ▼
8. Ascites (fluid outside pelvis) present? no ▼
9. Serum CA-125 (U/ml) 197

calculate  Clear
Adnex model

HPE: CLEAR CELL CARCINOMA

- chance of benign tumor
- risk metastatic cancer to the adnexa
- risk stage II-IV ovarian cancer
- risk stage I ovarian cancer
- risk borderline

Basic Training
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