ISUOG Basic Training

Examining the Uterus, Cervix, Ovaries and Adnexae:

Abnormal Findings

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Learning objective

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

• compare the differences between typical normal and common abnormal appearances presenting in gynecological ultrasound examinations
Key questions

• How do the ultrasound appearances of fibroids and adenomyosis differ?

• What are the typical ultrasound appearances of the most common endometrial and intracavitary pathologies?

• What are the typical ultrasound appearances of the most common pathologies in the adnexae?

• How do I describe my ultrasound findings using the standardized IOTA and IETA terminology?

• Which patients should I refer for specialist opinion?
The basis for ultrasound diagnosis in gynecology

• Gray scale ultrasound
• To use Doppler ultrasound, you must
  – be familiar with Doppler physics
  – understand the pitfalls of Doppler ultrasound
  – recognize Doppler artefacts
• Doppler settings must be correct
  – Pulse repetition frequency (PRF) 0.3- 0.6 KHz
Common myometrial pathology

- Myoma
- Adenomyosis
Most common myometrial pathology - myoma

Round, oval or lobulated solid tumor casting stripy shadows
Hyperechogenic uterine myoma
Cystically degenerated myomas
Typical myoma

Round, oval or lobulated solid tumor casting stripy shadows
Relatively common myometrial pathology - adenomyosis
Relatively common myometrial pathology - adenomyosis

• Enlarged uterus
  – asymmetrically enlarged
  – globally enlarged

• Fan shaped shadowing

• Cysts in the myometrium

• Poorly defined endometrial-myometrial border
Relatively common myometrial pathology - adenomyosis

Enlarged uterus

Asymmetically enlarged

Globally enlarged
Relatively common myometrial pathology - adenomyosis

Abnormal myometrial echogenicity

Fan shaped shadowing  Rain in the forest sign
Relatively common myometrial pathology - adenomyosis

Cysts in the myometrium

Poorly defined endometrium (subendometrial lines and buds)
Most common intracavitary pathology

- Polyp
- Submucuous myoma
- Hyperplasia
  - without atypia
  - with atypia
- Cancer
Typical ultrasound features of endometrial polyp

- Bright edge
- Hyperechogenic
- Regular cysts
- Feeding vessel
Typical ultrasound features of submucous myoma

- Solid tumor protruding into the uterine cavity, same echogenicity as myometrium
- On colour Doppler possibly ring of colour

Courtesy Dirk Timmerman
Typical ultrasound features of endometrial cancer

- Thick endometrium
- Inhomogenous echogenicity

- Richly vascularized on colour Doppler
Common ovarian pathology

- Follicle cyst
- Simple cyst
- Corpus luteum cyst
- Dermoid cyst
- Endometrioma
Dermoid cyst

White ball

Bright lines and dots

Shadowing

Shadowing

Basic training
Endometrioma

Wall nodularity
Common ovarian pathology

- Follicle cyst
- Simple cyst
- Corpus luteum cyst
- Dermoid cyst
- Endometrioma
Common extraovarian adnexal pathology

- Hydrosalpinx
- Paraovarian cysts
- Peritoneal inclusion cysts
Hydro-pyo-hemato-salpinx

Sausage shape

Cog wheel

Beads on a string

Incomplete septa

Incomplete septa
Hydrosalpinx
Paraovarian cyst

Ovary
Paraovarian cyst

Ovary
Peritoneal pseudocyst

Ovary
Rules of thumb for discriminating between benign and malignant adnexal masses

- **Malignant**
  - Irregularity

- **Benign**
  - NO irregularity

**Multilocular with many locules**
- Mucinous borderline gastrointestinal type
We need standardised terms, definitions and measurements to describe ultrasound images

- To understand each other
- To compare scientific studies
- To perform meta-analyses
- To conduct multicenter studies
How to describe ultrasound findings using standardised terminology

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 J. VERGOTE

Ultrasound Obstet Gynecol. 2010 Jan;35:103
Terms, definitions and measurements to describe the sonographic features of the endometrium and intrauterine lesions: a consensus opinion from the International Endometrial Tumor Analysis (IETA) group

Consensus statement on how to
• measure
• describe ultrasound images
• terms
• definitions
IOTA terms for describing an adnexal mass

- Solid component
- Papillary projection
- Type of tumor
- Echogenicity of cyst fluid
- Shadowing
- Ascites
- Color score
IOTA definition of solid component

- A structure that has echogenicity suggestive of tissue
  - (myometrium, ovarian stroma)
IOTA definition of solid component

• The "white ball" in a dermoid cyst is NOT a solid component
IOTA definition of solid component

- Blood clot or other amorphous material is NOT a solid component
IOTA definition of solid component

- Blood clot, amorphous material or solid tissue?
  - push on the lesion
IOTA definition of solid component

• Blood clot, amorphous material or solid tissue?
  – colour Doppler

If in doubt – classify as solid tissue
IOTA definition of papillary projection

- Protrusion of solid tissue into a cyst cavity \( \geq 3 \text{ mm (height)} \)

- Protrusions \(<3 \text{ mm (height)}\) = irregularities

- Papillary projections = solid component
Five types of lesion/tumor (IOTA)

- **Unilocular**
- **Unilocular solid**
- **Multilocular solid**
- **Multilocular**
- **Solid**
Five types of cyst contents (IOTA)

- Anechoic
- Low level
- Ground glass
- Haemorrhagic
- Mixed
Shadowing (IOTA)
Ascites (IOTA)

Fluid outside the pouch of Douglas
The IOTA colour score

Adjust settings: maximize detection of flow without artifacts
(Pulse repetition frequency 0.3-0.6 KHz, 3-6 cm/s velocity scale)
Measurements
How to measure a lesion, an ovary or a solid component of a lesion

- Three orthogonal diameters
- Where the lesion/ovary/solid component appears to be **at its largest**
  - maximum diameter
  - mean diameter
  - volume
    - \((L \times D \times W \times 0.5)\)
How to measure a papillary projection

• **Measure** the largest papillary projection
• **Three orthogonal diameters**
• **Height**: do not include cyst wall or septum
The IETA consensus statement

How to describe
• endometrial echogenicity
• endometrial midline
• endometrial-myometrial junction

If fluid in the cavity
• fluid echogenicity
• endometrial outline
• Intracavitary lesion

On colour/power Doppler
• colour content
• morphology of endometrial vessels and more....

Anything that protrudes into a fluid-filled uterine cavity
The IETA consensus statement
Intracavitary lesion - pedunculated or sessile?

Pedunculated: $a/b < 1$

Sessile: $a/b > 1$
IETA consensus statement
Doppler ultrasound examination of the endometrium

Adjust settings: maximize detection of flow without artifacts
(Pulse repetition frequency 0.3-0.6 KHz, 3-6 cm/s velocity scale)

Colour score 1 = no colour
Colour score 2 = minimal colour
Colour score 3 = moderate colour
Colour score 4 = abundant colour
Which patients should I refer for specialist opinion?

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

Common uterine pathology that manifests typical ultrasound appearance is:

- Myoma
- Adenomyosis
- Polyps
- Endometrial cancer
Key points

Common cystic structures in the adnexa with typical ultrasound appearances are

- Functional cysts
- "Simple cysts"
- Dermoid cyst
- Endometrioma
- Hydrosalpinx
- Paraovarian cysts
- Peritoneal inclusion cysts

For other adnexal lesions the following

- Any irregularity classifies the mass as malignant

Any irregularity classifies the mass as malignant

Some multilocular cysts with innumerable cyst locules are borderline tumors
Key points

We should use a standardised terminology when we describe ultrasound images of:

- Adnexal lesions (IOTA)
- The endometrium /uterine cavity (IETA)
- The myometrium (MUSA)
- Deep infiltrating endometriosis (IDEA)
Key points

When in doubt:
refer for second opinion
THANK YOU