



ISUOG Basic Training

Examining the Uterus: Cervix & Endometrium

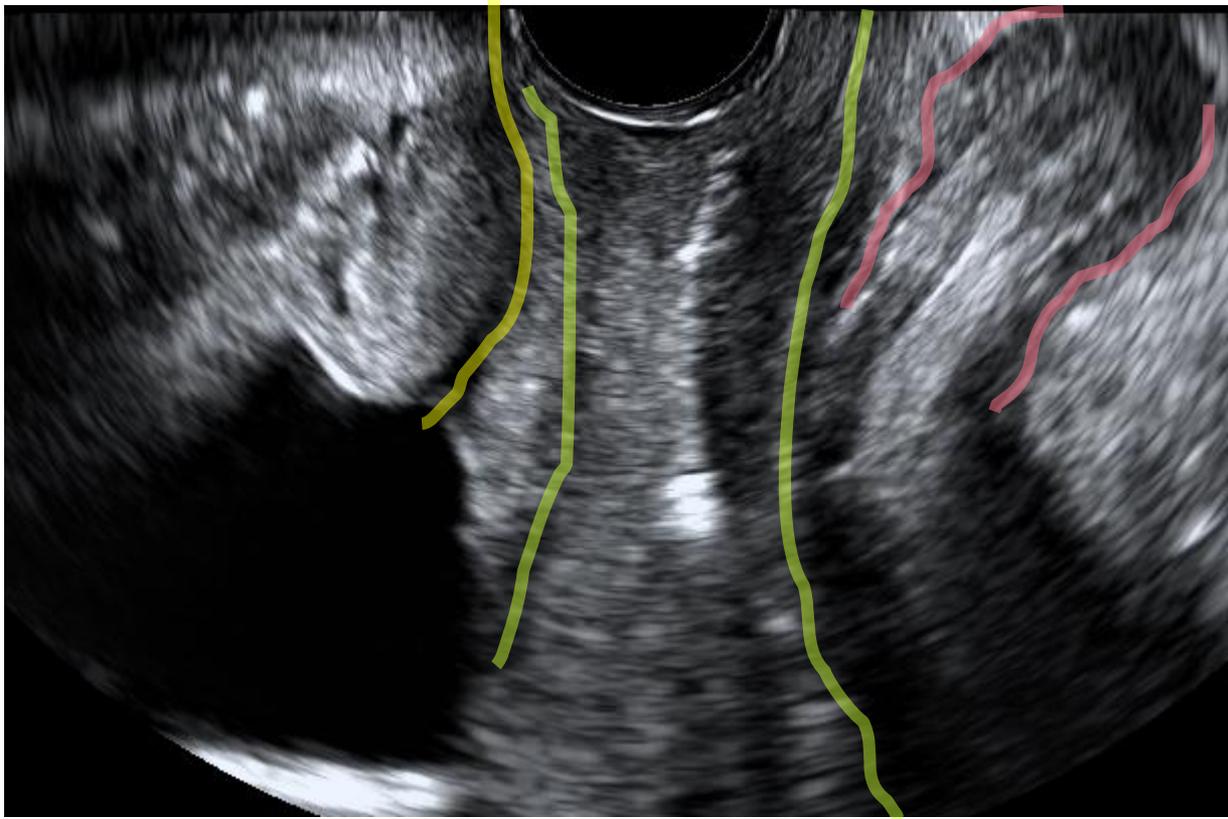
Learning objectives

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

- Recognise the typical ultrasound appearances of a normal cervix and endometrium
- Recognise the typical ultrasound appearances of abnormalities in the cervix and endometrium

Key points

- Understand the typical ultrasound features of a normal cervix and endometrium
- Understand the typical ultrasound features of common abnormalities in the cervix and endometrium
- Know when to refer for a specialist opinion



Gynecology

Adnexa

General

General1

OB

1st Trimester

Urology

Prostate

User Preset

1st Trim Anom

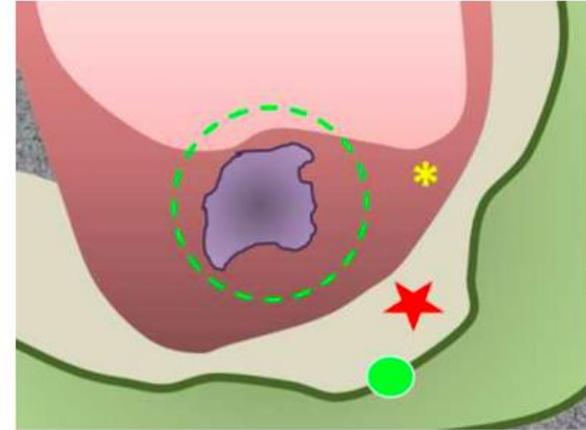
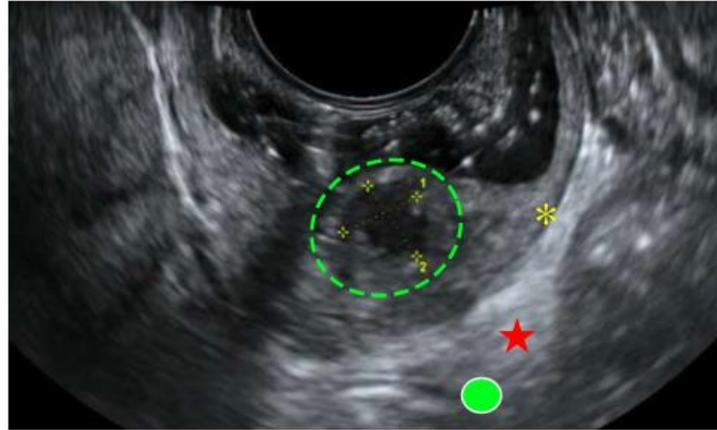
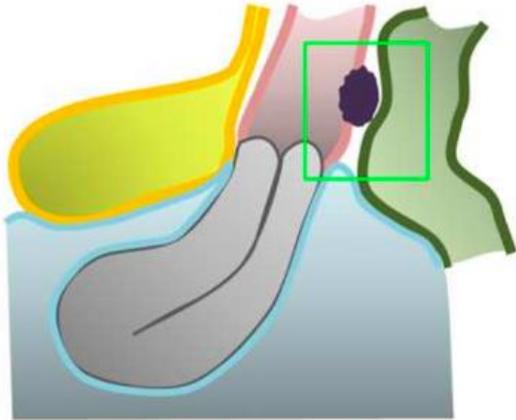
-2
-4
-6



Set Exit

| | |
|----|--------------------|
| P1 | Cine/Send |
| P2 | Rec/Send |
| U1 | Application Change |
| U2 | Exit |
| U3 | None |
| U4 | Volume Save |

Rectovaginal nodule of endometriosis



- You don't need to know how to recognise this
- It is just a reminder to not forget to look at the vagina when you start your TV US
- The more you see 'normal' the easier it will be to recognize abnormalities

Guerriero et al. *Ultrasound Obstet Gynecol*, 2016, 48: 318–332

Cervix

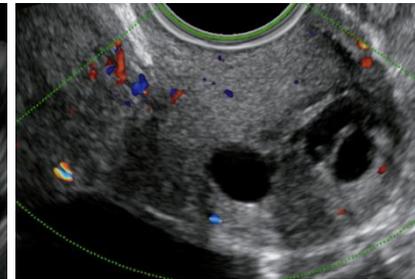
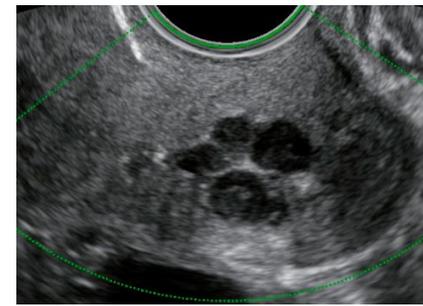


Cervical findings

- Nabothian follicle
- Cervical polyp
- Cancer

Nabothian follicle

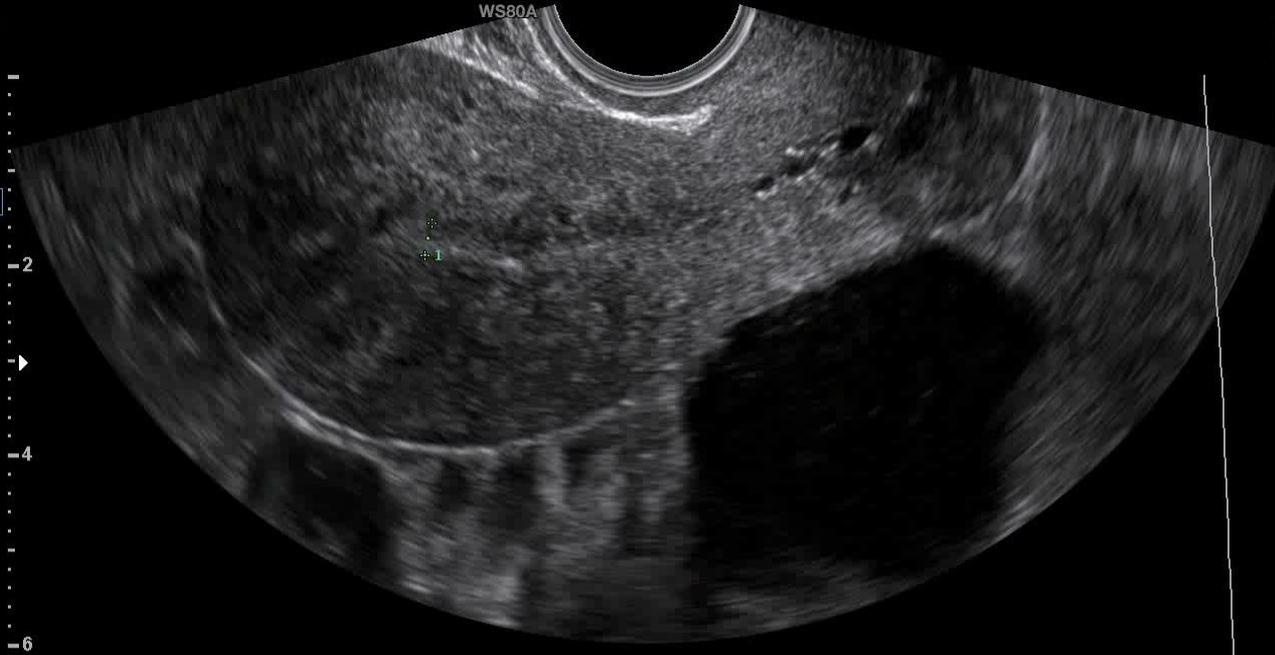
- Mucus-filled cyst on surface of cervix
 - Caused by squamous epithelium of the ectocervix growing over the columnar epithelium of the endocervix
 - This tissue growth can block the cervical glands
- On ultrasound:
 - Anechoic
 - Avascular



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- Gynecology
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ET

D1 3.49 mm

A

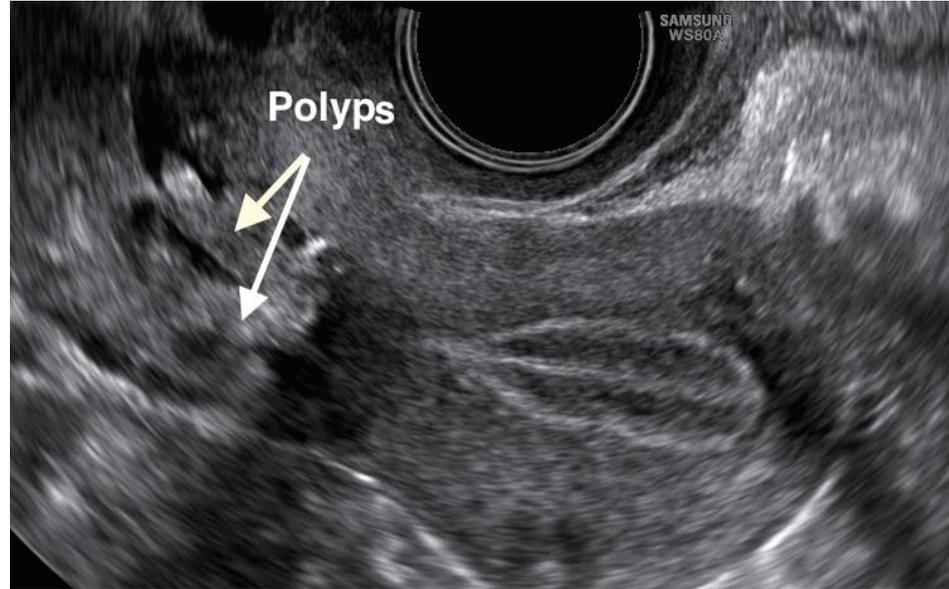
Control panel with a central trackball and four buttons labeled P1, P2, U1, U2, U3, and U4. The buttons are arranged in two columns: P1 and P2 on the left, U1 and U2 on the right, U3 and U4 on the far right. Below the trackball are buttons labeled 'Set' and 'Exit'.

- P1 Cine/Send
- P2 Rec/Send
- U1 Application Change
- U2 Exit
- U3 None
- U4 Volume Save

#223/223

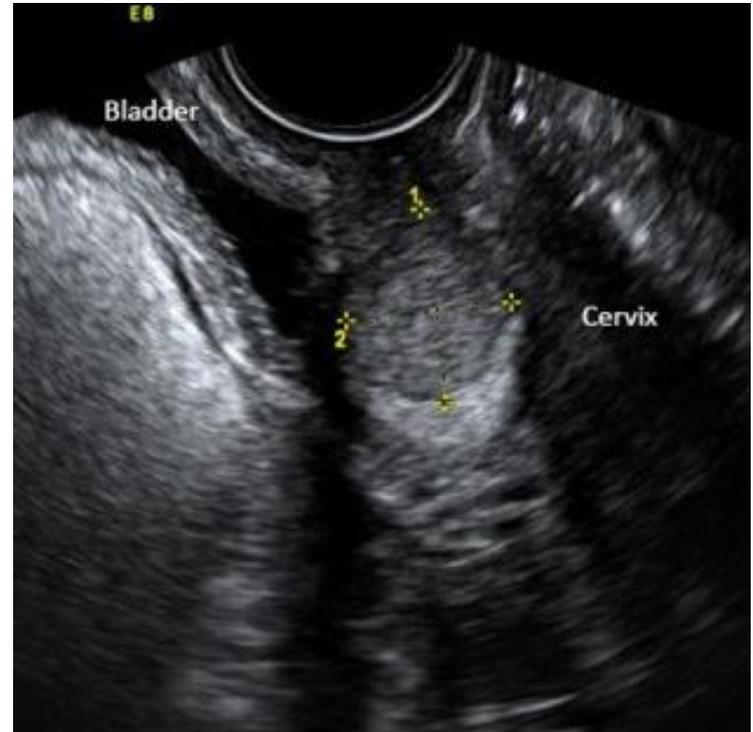
Cervical polyps

- Sessile or pedunculated well-circumscribed masses within endocervical canal
- Hypo or hyper-echogenic
- Identifying the stalk attaching to the cervical wall helps differentiate it from an endometrial polyp
- May have feeding vessel

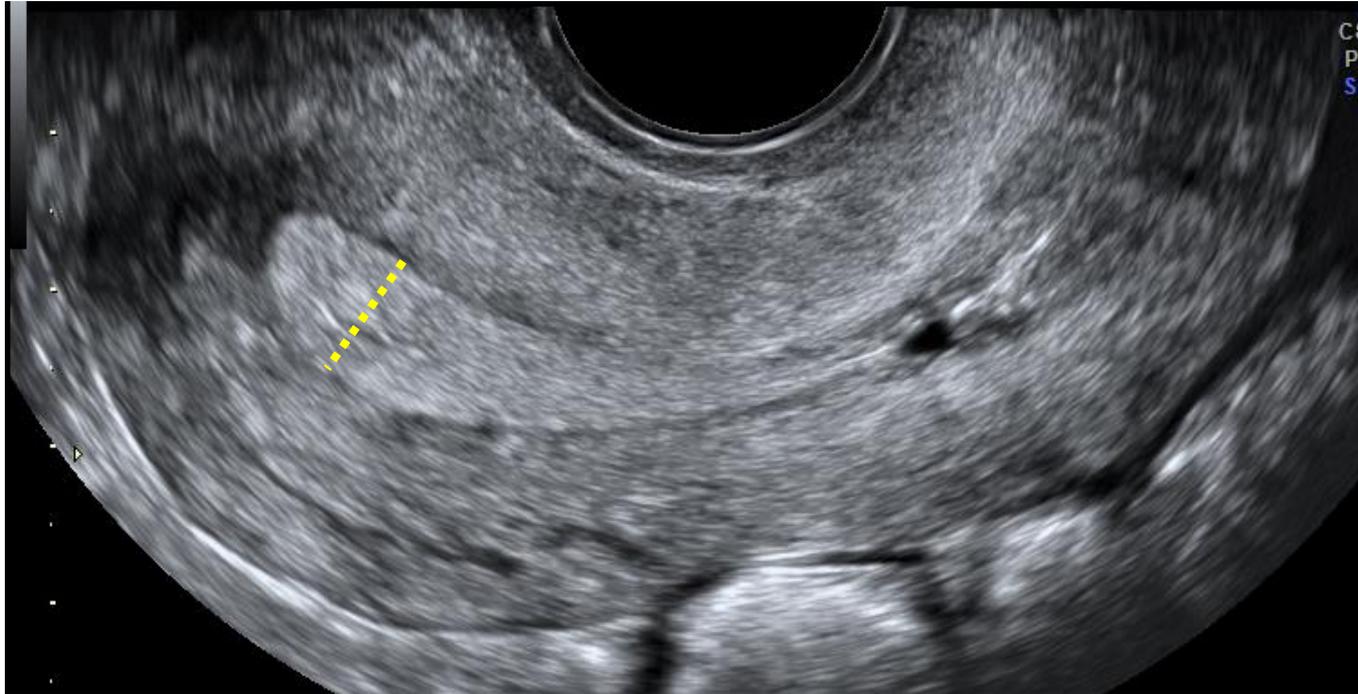


Cervical cancer

- Heterogeneous mass involving the cervix
- May show increased vascularity on color Doppler
- Ultrasound can be useful to evaluate:
 - Size (<4 cm or \geq 4 cm)
 - Parametrial invasion
 - Tumor invasion into the vagina
 - Tumor invasion into adjacent organs
 - Hydronephrosis (implies stage IIIB tumour)



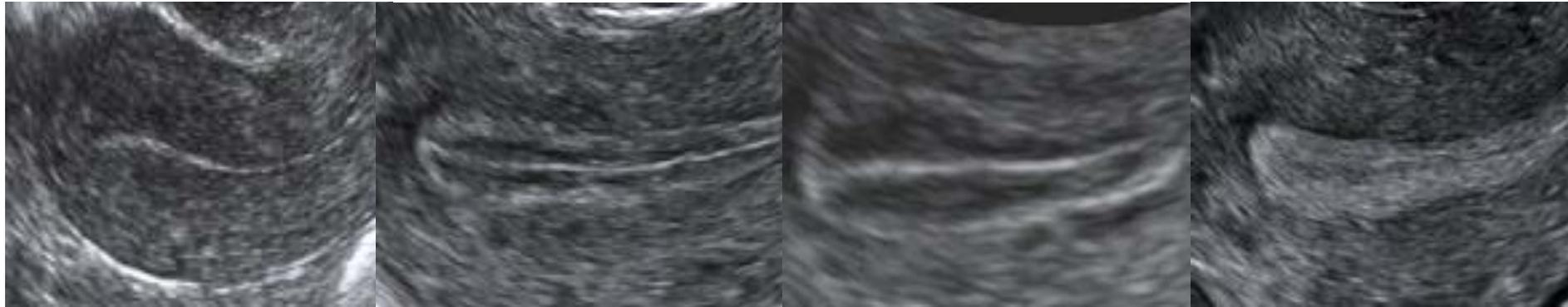
Endometrium



Normal ultrasound findings

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

The endometrium changes throughout the menstrual cycle



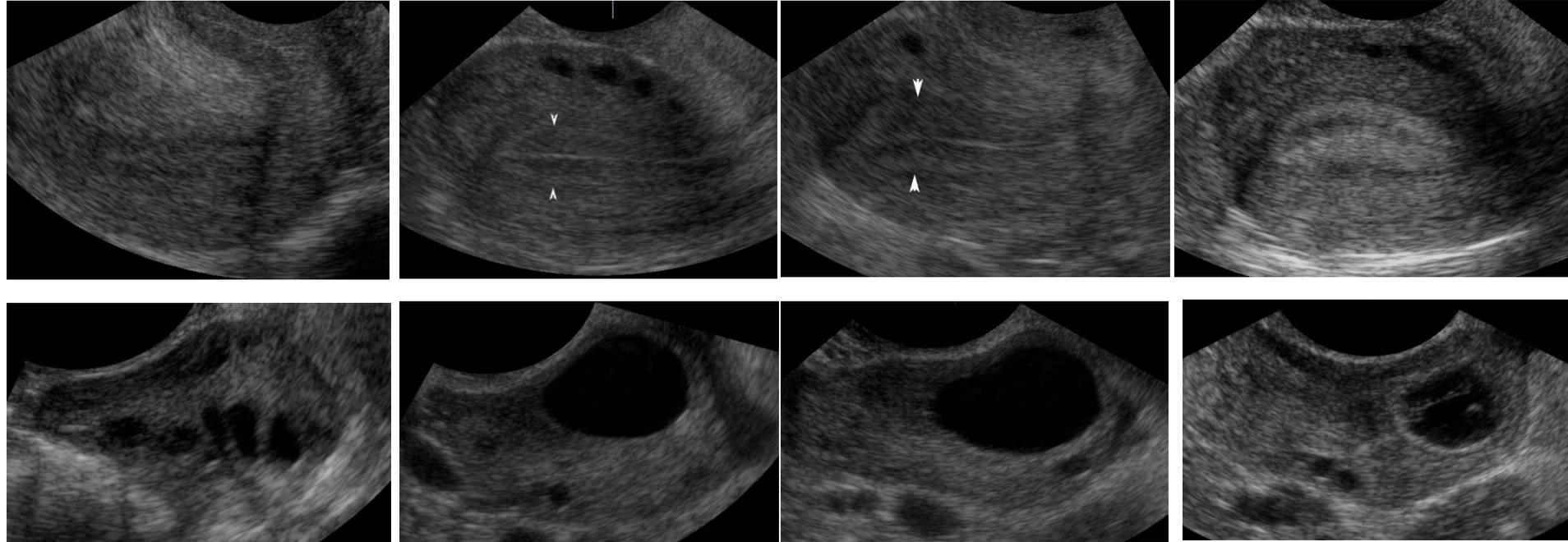
Shortly after menstruation

Proliferative phase

Proliferative phase

Secretory phase

Changes during menstrual cycle



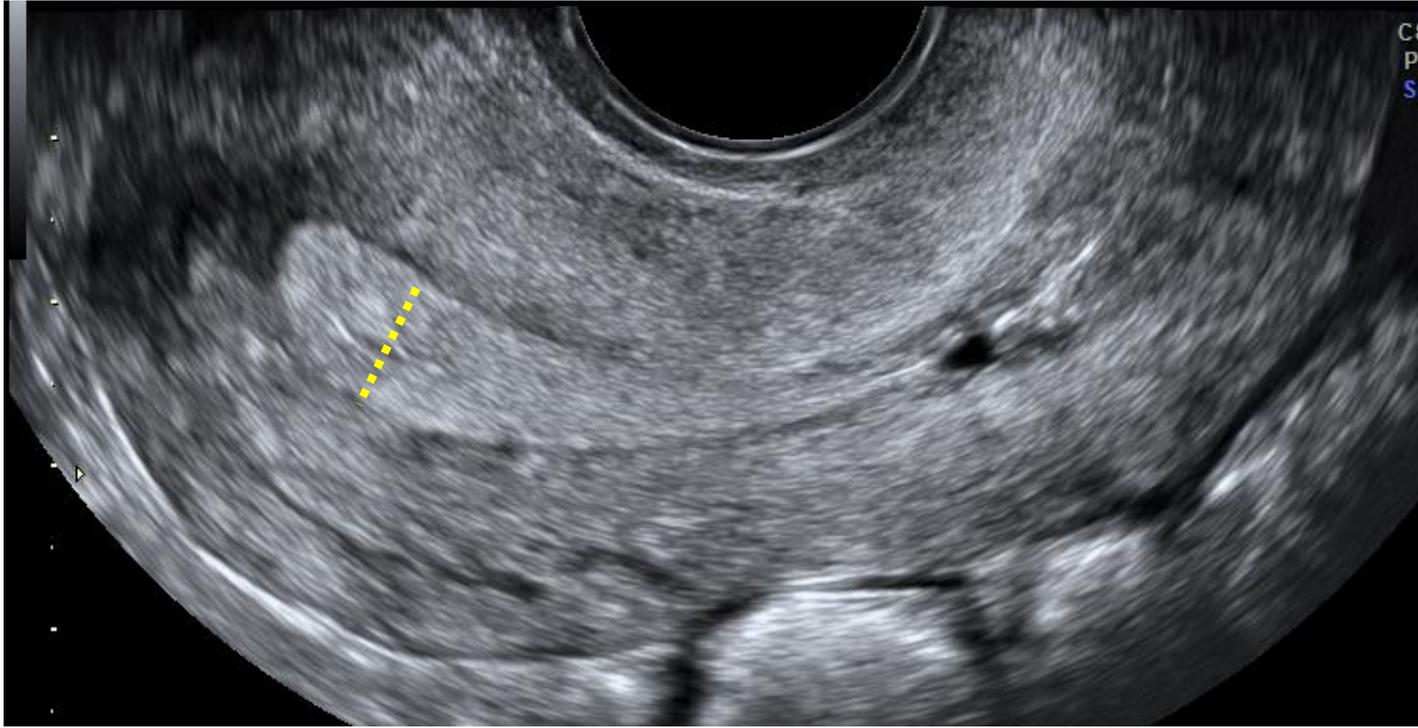
Shortly after menstruation

Proliferative phase
3 days before ovulation

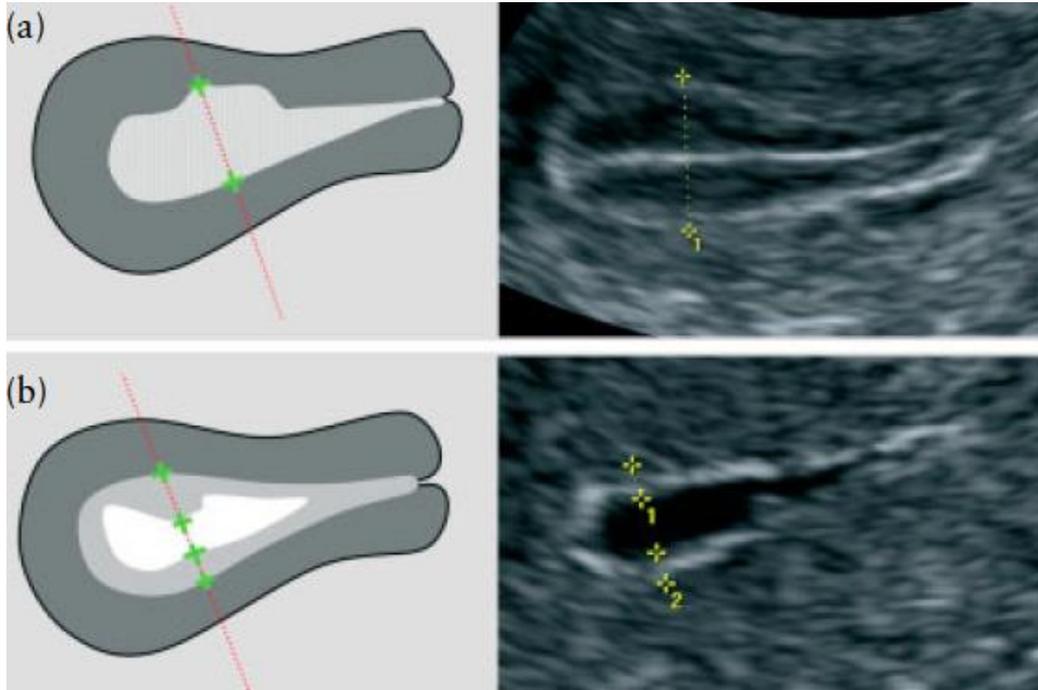
Proliferative phase
1 day before ovulation

Secretory phase
6 days after ovulation

How to measure endometrial thickness (ET)



How to measure endometrial thickness (ET)



1. When intracavitary fluid is present, measure thickness of both single layers and *add* together to give ET
2. When intracavitary pathology is present measure total ET *including* the lesion (unless it's a well defined myoma that can be measured separately)

Leone et al. UOG, 2010, 35: 103–112

Average endometrium measurements throughout the menstrual cycle



Menstrual phase
2-4 mm



Proliferative phase
4-8 mm



Proliferative phase
4-8 mm

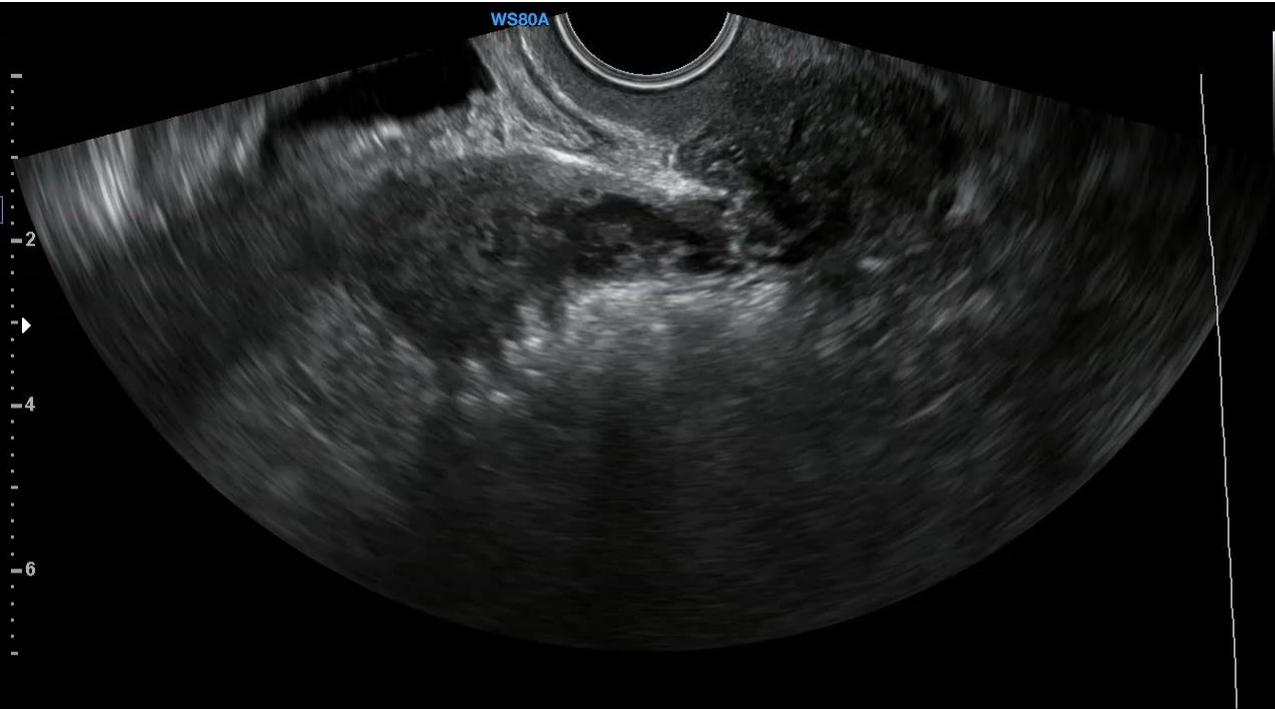


Secretory phase
7-14 mm

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- Gynecology
- Adnexa
- General
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- OB
- 1st Trimester**
- Urology
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Set Exit

- P1 Cine/Send
- P2 Rec/Send
- U1 Application Change
- U2 Exit
- U3 None
- U4 Volume Save

The endometrium in postmenopausal women



- Median ET = 3mm
- 10th & 90th percentile: 2 – 5mm
- ET >5mm is NOT necessarily pathological

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-2

-4

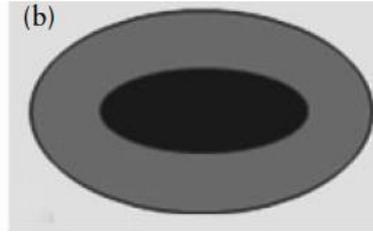
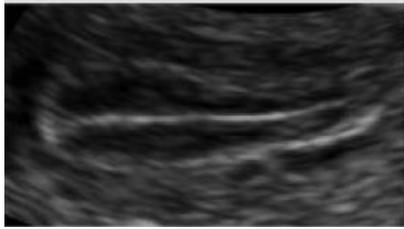


Control panel with buttons:

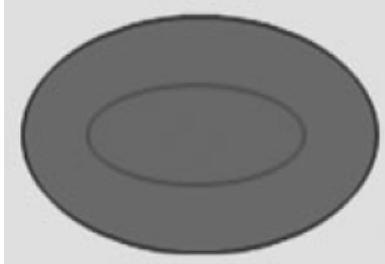
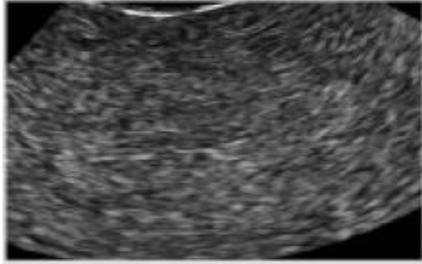
- Set
- Exit
- P1 Cine/Send
- P2 Rec/Send
- U1 Application Change
- U2 Exit
- U3 None
- U4 Volume Save



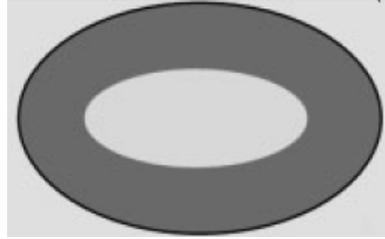
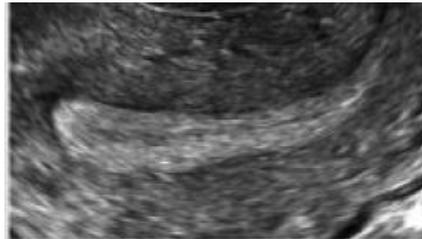
Describing the endometrium



Hypoechoogenic



Isoechoogenic

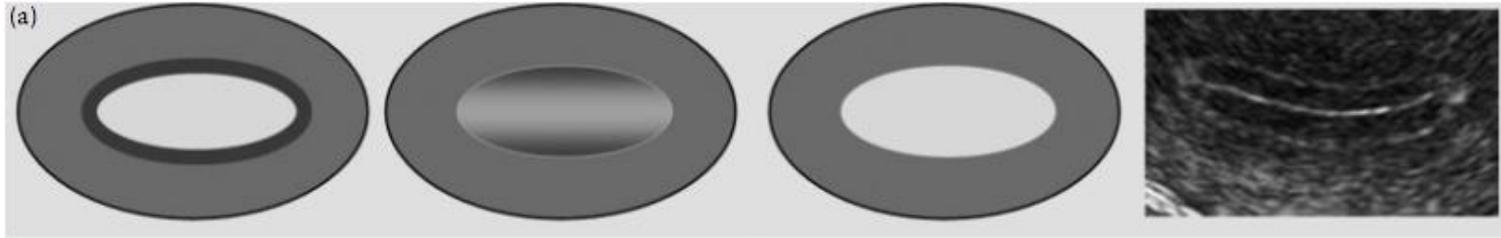


Hyperechoogenic

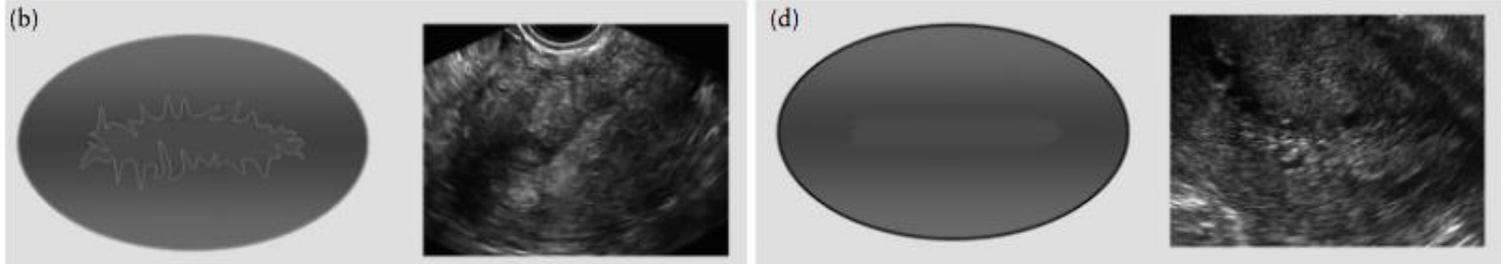
Leone et al. UG, 2010, 35: 103–112

Endometrial-myometrial junction

Regular

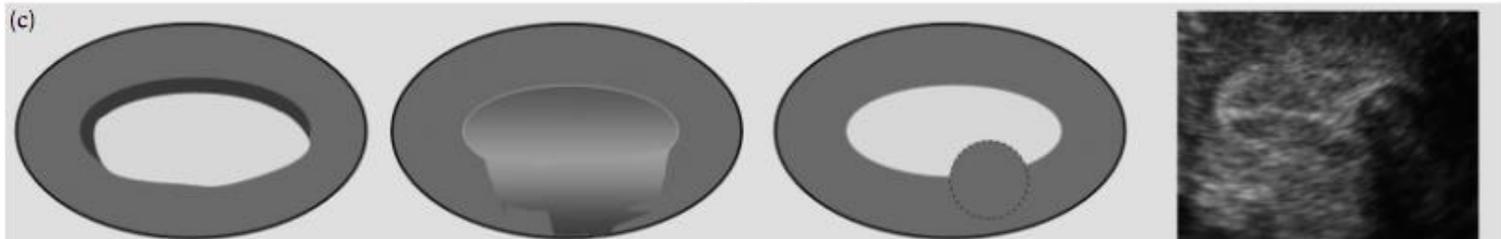


Irregular



Not defined

Interrupted



Leone et al. UOG, 2010, 35: 103-112

The IETA consensus statement

How to describe

- Endometrial echogenicity
- Endometrial midline
- Endometrial-myometrial junction

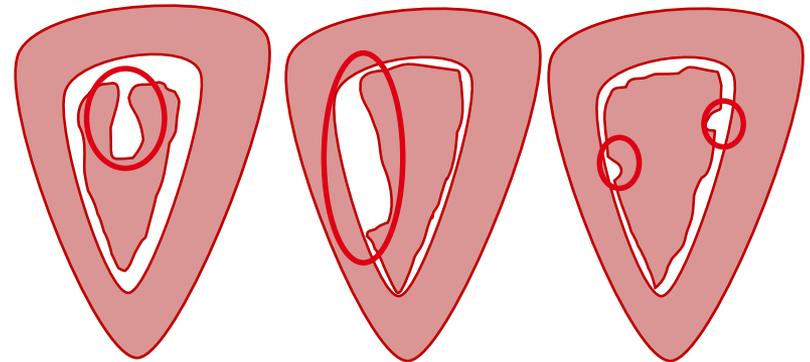
If fluid in the cavity

- Fluid echogenicity
- Endometrial outline
- Intracavitary lesion

On colour/power Doppler

- Colour content
- Morphology of endometrial vessels

Anything that protrudes into a fluid-filled uterine cavity

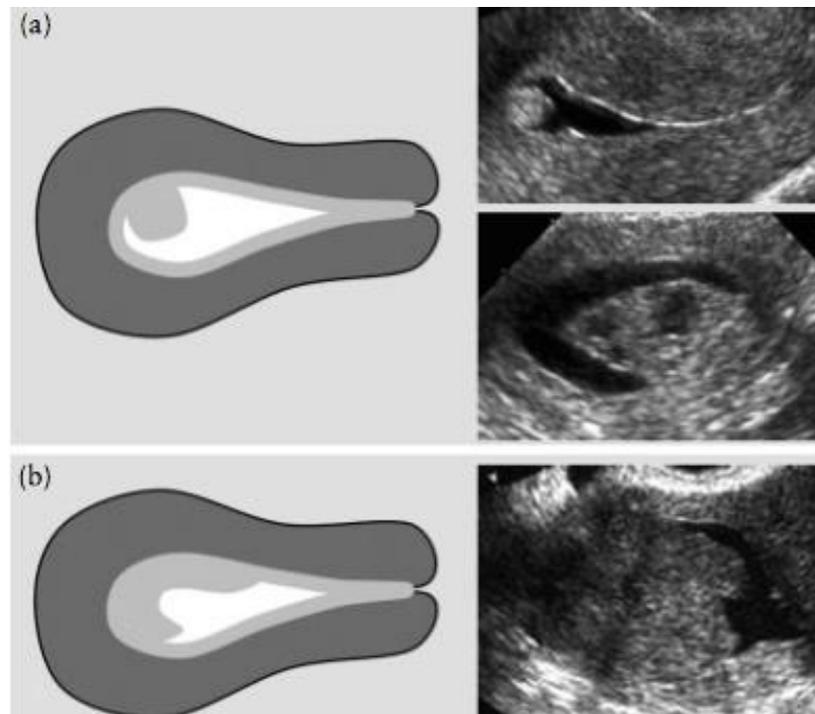


Pedunculated

Sessile

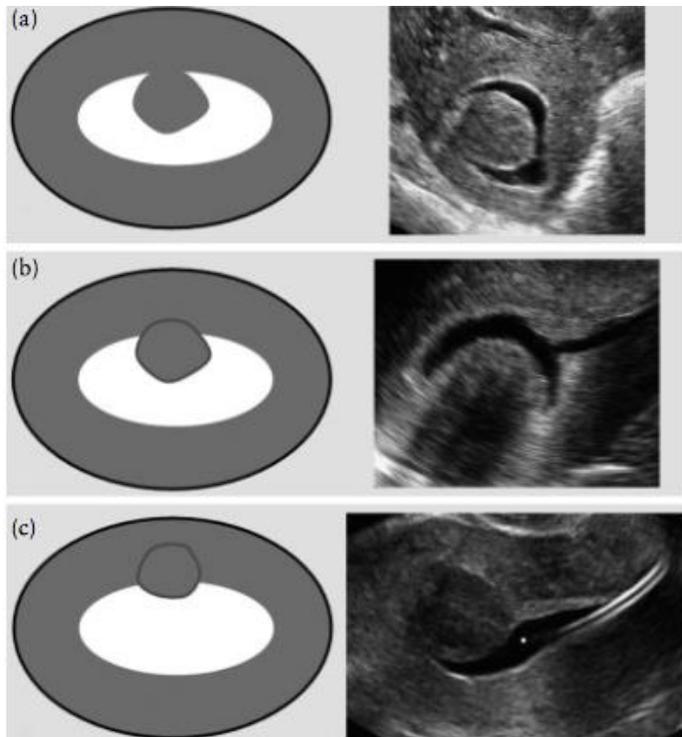
Describing intra-cavity lesions

- Measurement
- Endometrial lesion or arising from myometrium (e.g. fibroids)?
- Subjective assessment: extent of endometrial lesion = % of total endometrial surface involved
 - a. 'Localised' if <25%
 - b. 'Extended' if endometrial abnormality involves >25%
- Echogenicity: uniform or non-uniform
- Outline: irregular or irregular
- Colour Doppler



Leone et al. Ultrasound Obstet Gynecol 2010, 35: 103–112

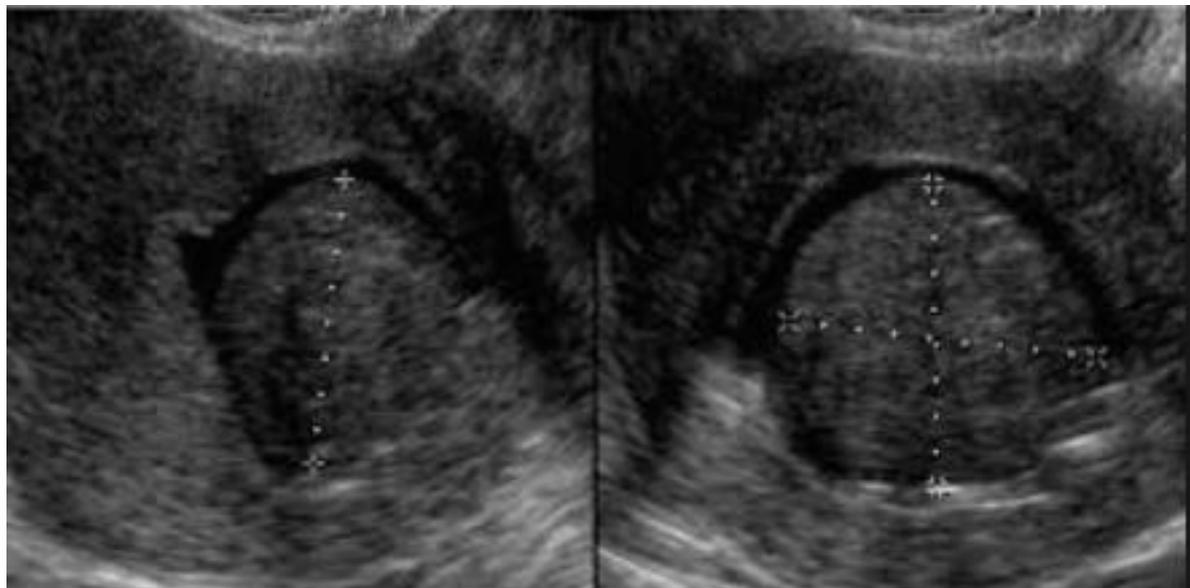
Degree of protrusion into cavity



Proportion of a myoma protruding into the uterine cavity at sonohysterography or when there is pre-existing fluid in the uterine cavity:

- a. 100%, Grade 0
- b. $\geq 50\%$, Grade 1
- c. $< 50\%$, Grade 2

How to measure intra-cavity lesions



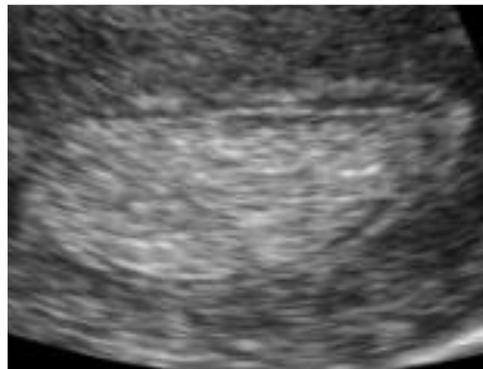
Measured in three perpendicular diameters in mm

Leone et al. UOG, 2010, 35: 103–112

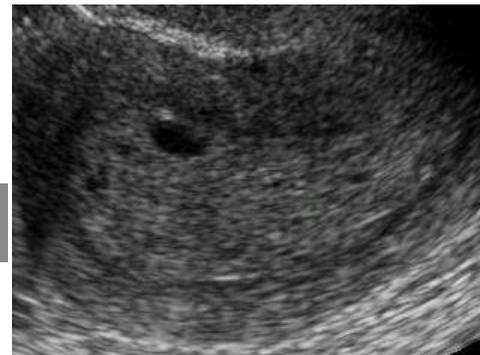
Most common endometrial pathology

- Polyp
- Submucous myoma
- Endometrial thickening
- Cancer

Typical ultrasound features of endometrial polyp



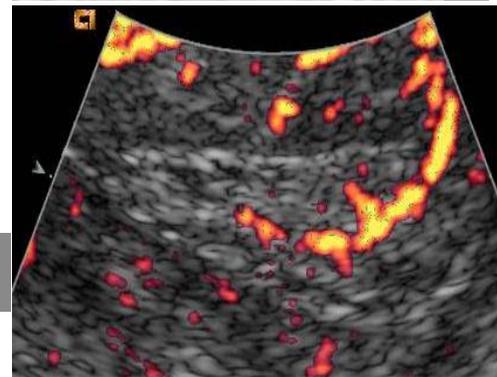
Bright edge



Regular cysts



Hyperechogenic

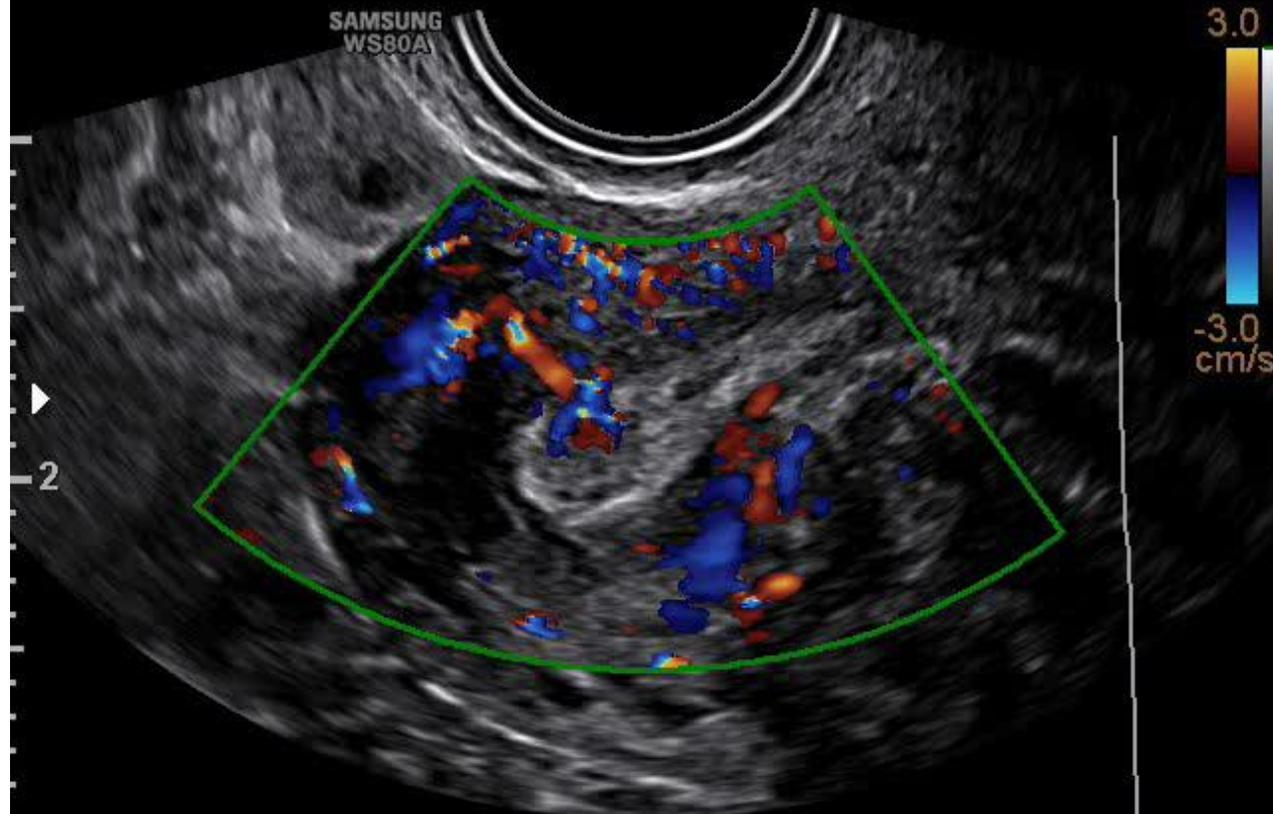


Feeding vessel

2D G25/DR110/FA10/P90/Frq Gen./4.0cm

C G50/0.40kHz/F1/FA8

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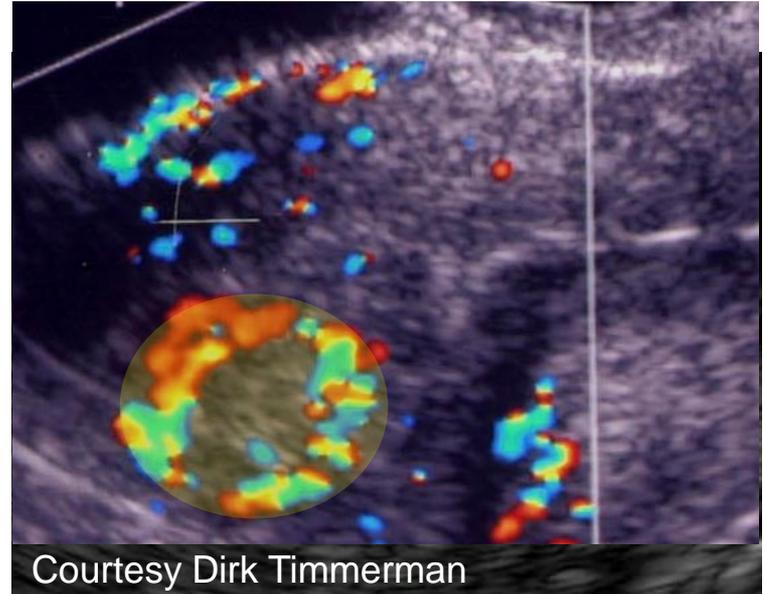
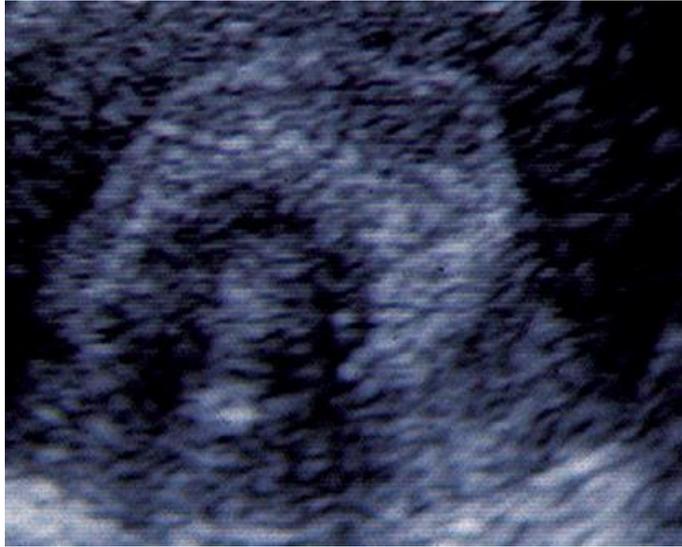




SAMSUNG
WS80A



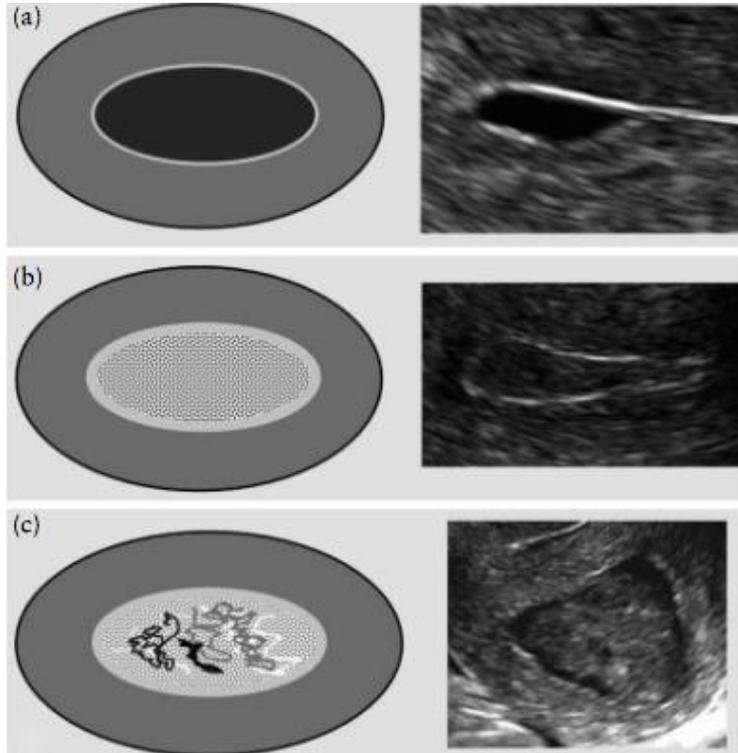
Typical ultrasound features of submucuous myoma



Courtesy Dirk Timmerman

- Solid tumor protruding into uterine cavity
- Same echogenicity as myometrium
- Colour Doppler: ring of colour

Intra-cavity fluid



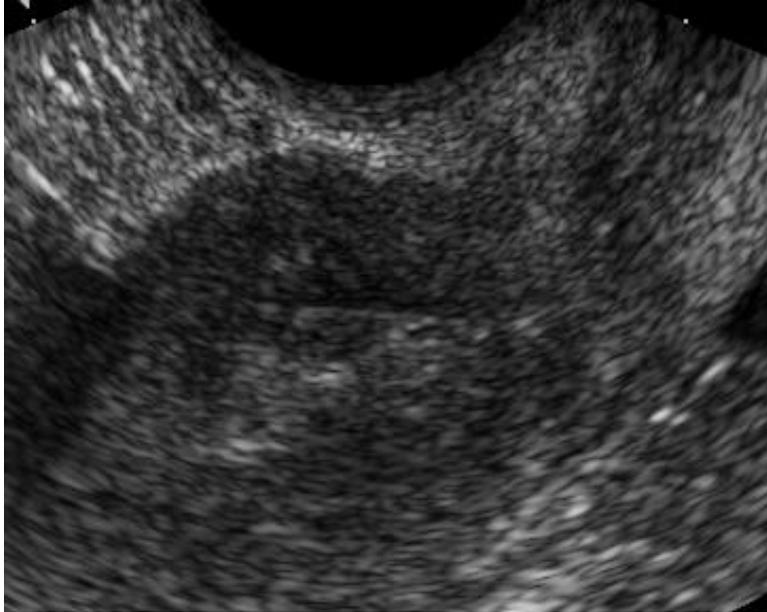
Measured in three perpendicular diameters in mm

The amount of intracavitary fluid is defined by its largest measurement in the sagittal plane.

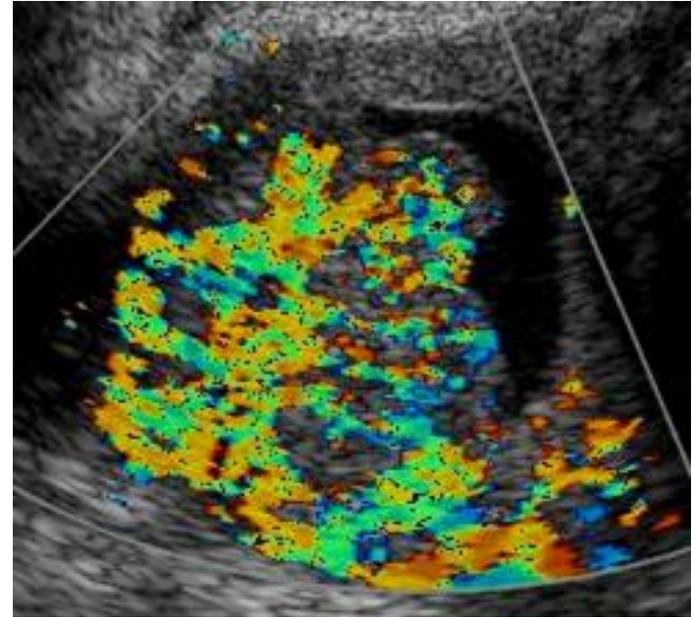
Intracavitary fluid is described as:

- a. 'anechoic' or 'low-level' echogenicity
- b. 'ground glass'
- c. 'mixed' echogenicity

Typical ultrasound features of endometrial cancer



- Thick endometrium
- Inhomogenous echogenicity



- Richly vascularised on colour Doppler

How to apply colour and power Doppler

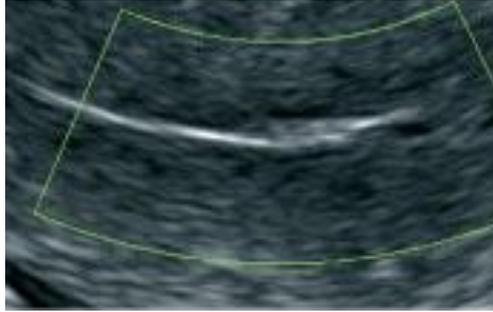
- Ensure color and power Doppler box includes endometrium with the surrounding myometrium
- Magnification and settings adjusted to ensure maximal sensitivity for blood flow
 - Ultrasound frequency at least 5.0 mhz
 - Pulse repetition frequency (PRF) 0.3 – 0.6 khz
 - Wall filter 30–50 hz
 - Colour power Doppler gain should be reduced until all colour artefacts disappear)
- Colour score is a subjective semi-quantitative assessment of the amount of blood flow present

Leone et al. UOG, 2010, 35: 103–112

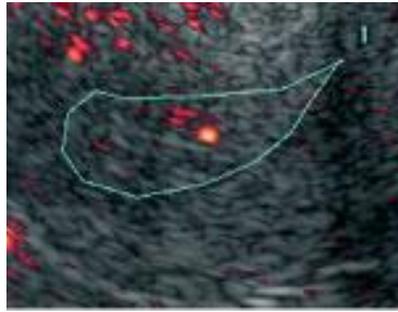
IETA consensus statement

Doppler ultrasound examination of the endometrium

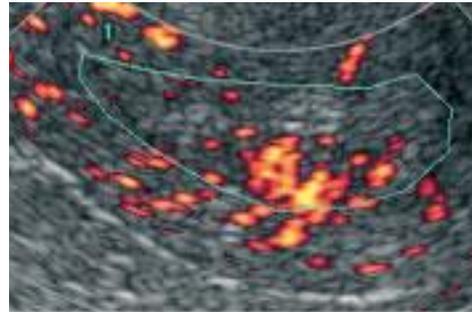
Quantification of the colour content of the endometrial scan



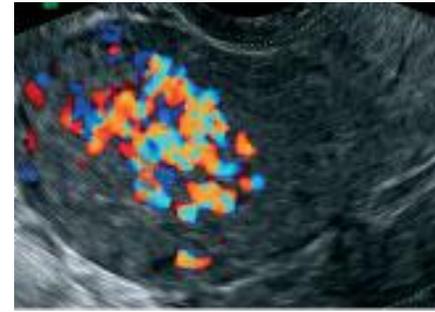
Colour score **1**
= no colour



Colour score **2**
= minimal colour



Colour score **3**
= moderate colour



Colour score **4**
= abundant colour

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

Leone et al. UOG, 2010, 35: 103–112

Benefits of fluid instillation



Leone et al. UOG, 2010, 35: 103–112

Intrauterine adhesions



Leone et al. UOG, 2010, 35: 103–112

Correct position of copper IUCD



Correct position of hormonal IUD



IUD and 3D ultrasound

Correct placement



Incorrect position of IUCD

Too low



Key points

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

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

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**



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