

The uterus and the endometrium

Common and unusual pathologies

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HEY WACH

Lecture outline

- Definitions
 - Flexion
 - Version
- Normal appearances
 - Uterus
 - Cervix
- Dimensions
- Pathologies
- Uterine
 - Adenomyosis
 - Fibroids
- Endometrial
 - Polyps
 - Hyperplasia
 - Cancer
- Unusual Pathologies
 - Asherman's
 - Osseous metaplasia
 - Post ablation syndrome
- Not covering congenital uterine malformations

Definitions

2 terms are described to the orientation of the uterus in the pelvis

Flexion

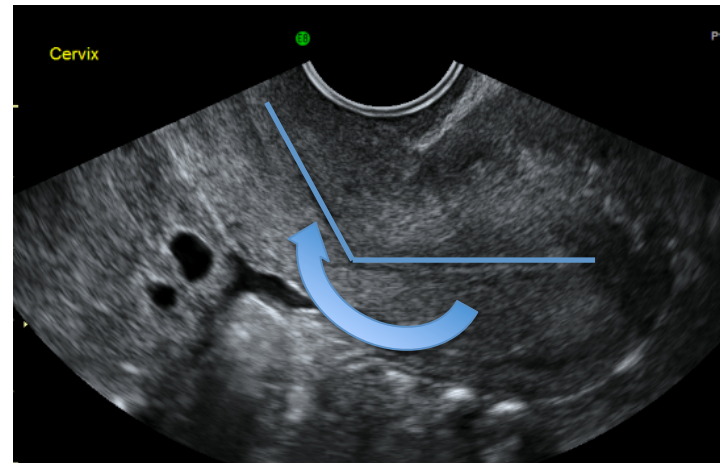
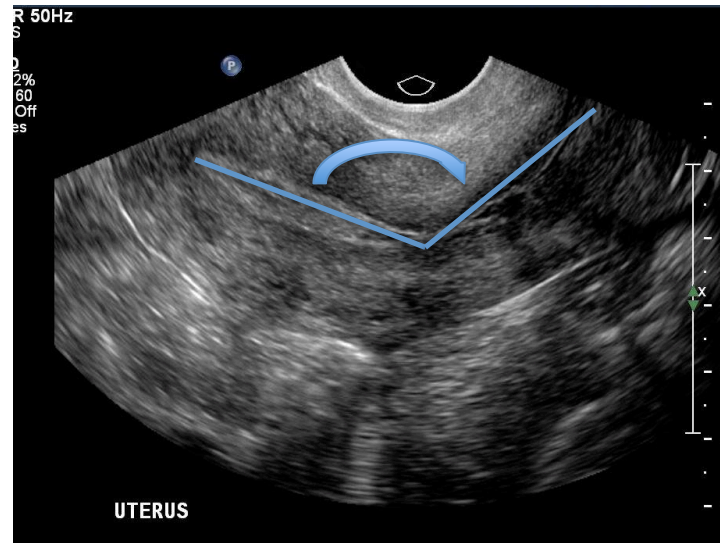
Version

Flexion is the bending of the uterus on itself and the angle that the uterus makes in the mid sagittal plane with the cervix i.e. the angle between the isthmus: cervix/lower segment and the fundus

Anteflexed < 180 degrees

Retroflexed > 180 degrees

Anteflexed



Retroflexed

Definitions

2 terms are described to the orientation of the uterus in the pelvis

Version

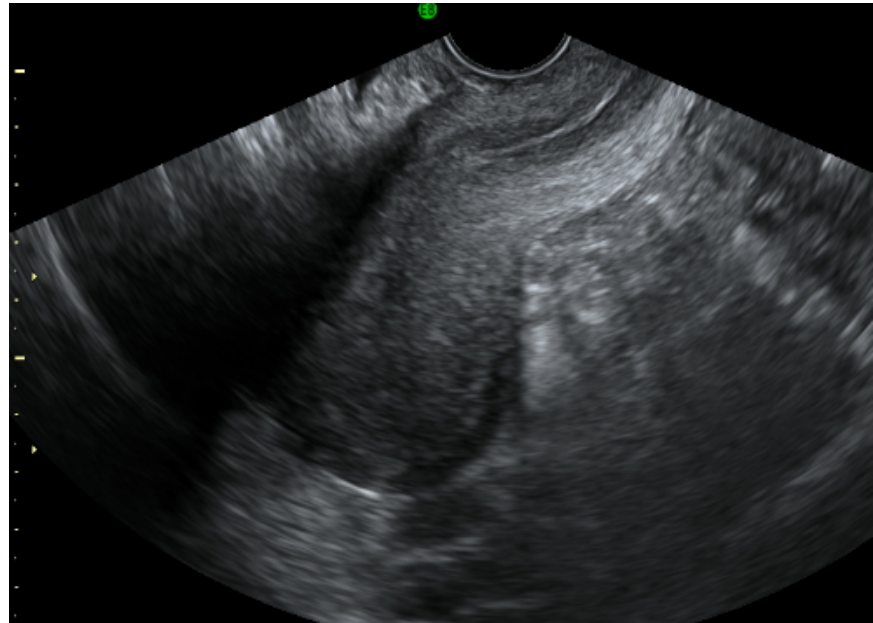
When there is NO angle between the uterus and the cervix the uterus is described in terms of version, which describes the displacement of the entire uterus either backwards or forwards

Anteverted

The fundus is close to the bladder

Retroverted

The fundus is close to the recto sigmoid



Retroflexed

Normal sonographic appearances

The uterus is a homogenous layer of smooth muscle and blood vessels and it is less echogenic than the adjacent endometrium

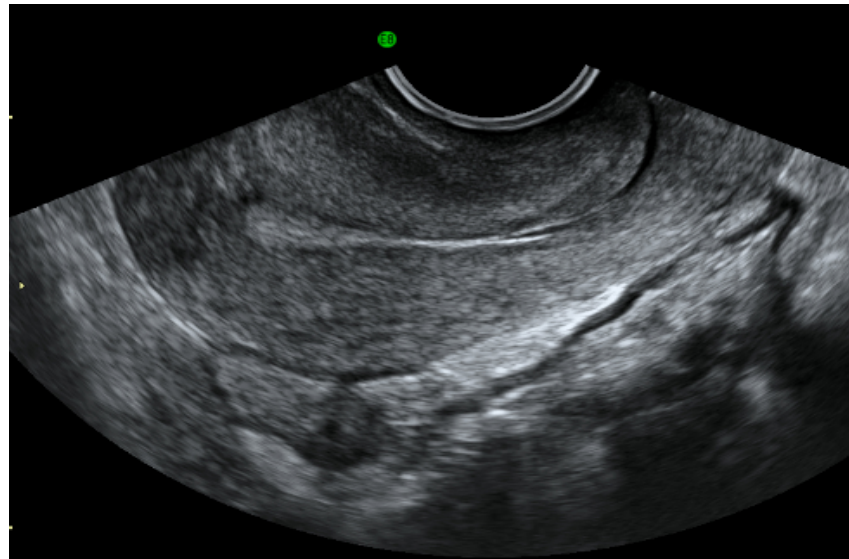
It is composed of three layers

Inner/junctional thin and hypo echoic

Middle thick and homogenous

Outer thin and hypo echoic

“arcuate vessels”



Normal sonographic appearances

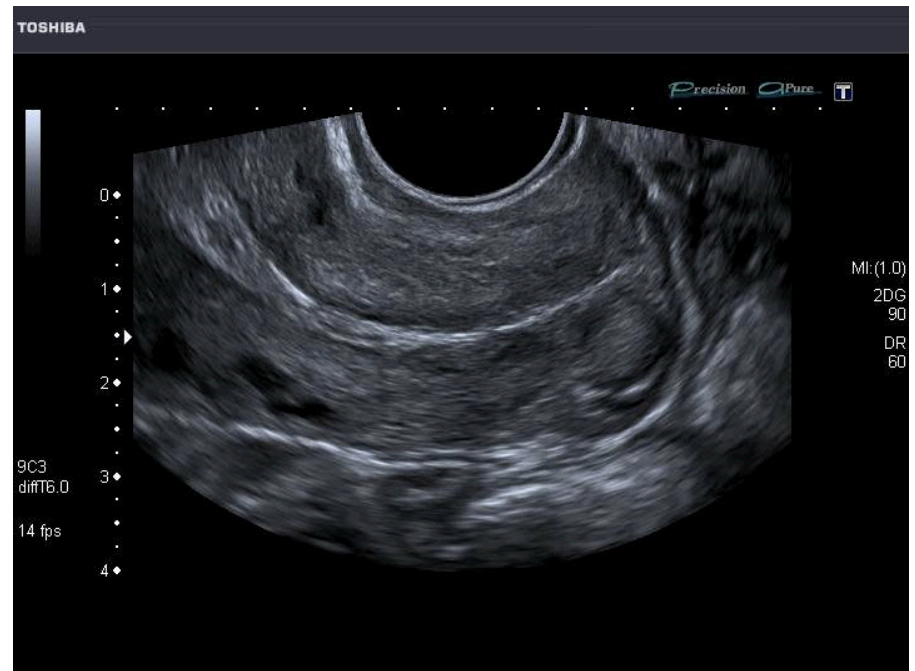
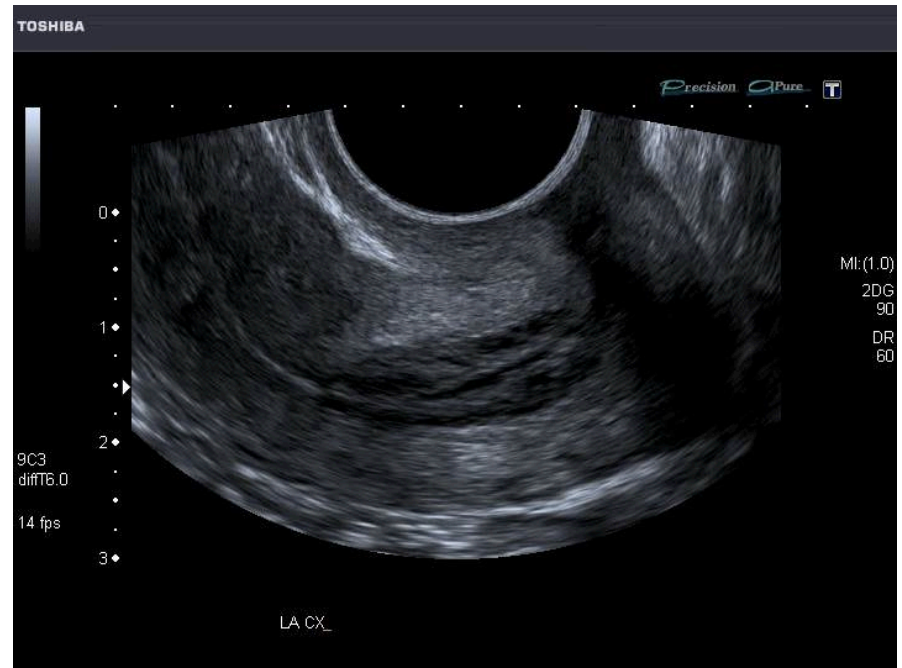
The cervix has 3 layers also

Ectocervix

Endocervix

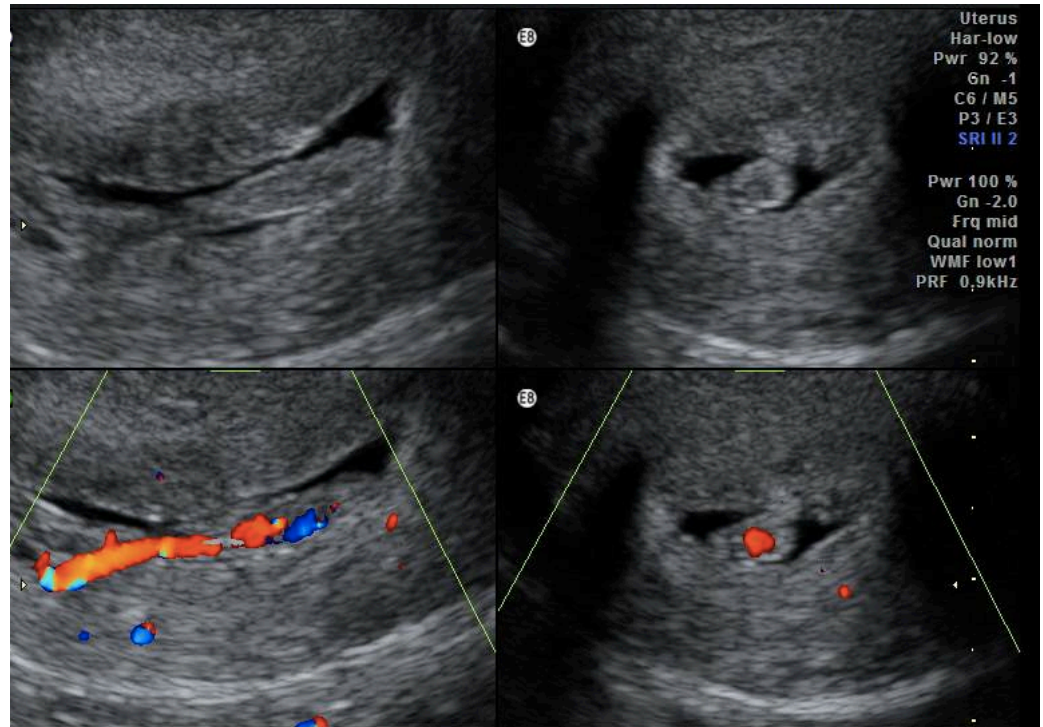
Endocervical canal

The cervical stroma is the same echogenicity as the myometrium



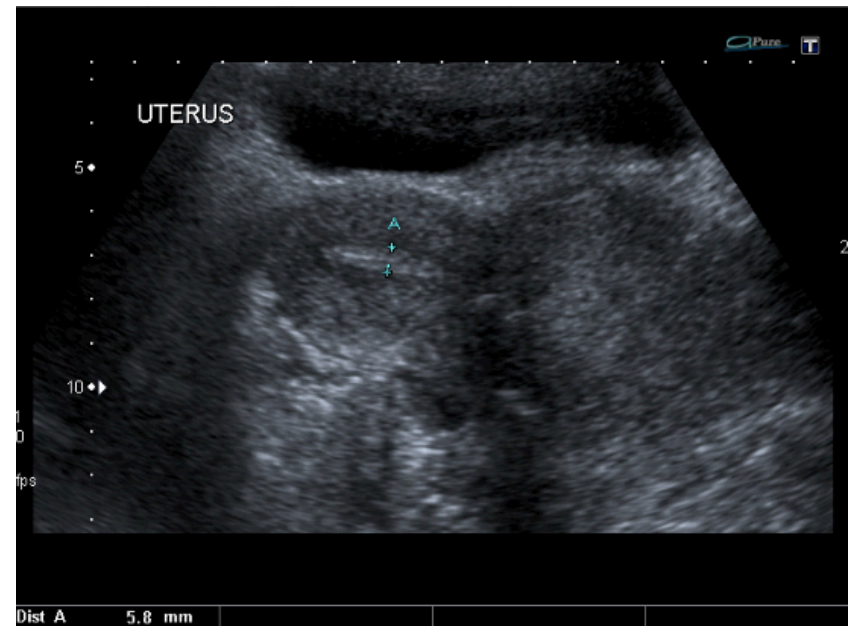
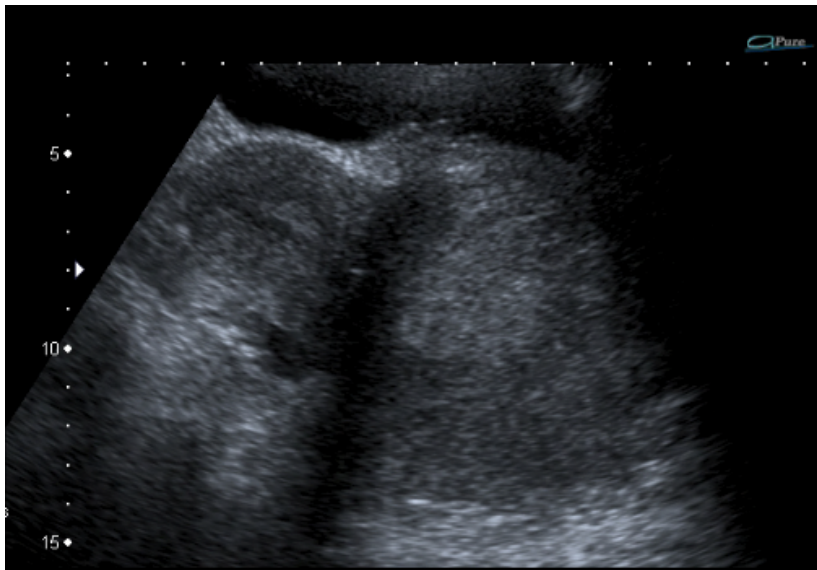
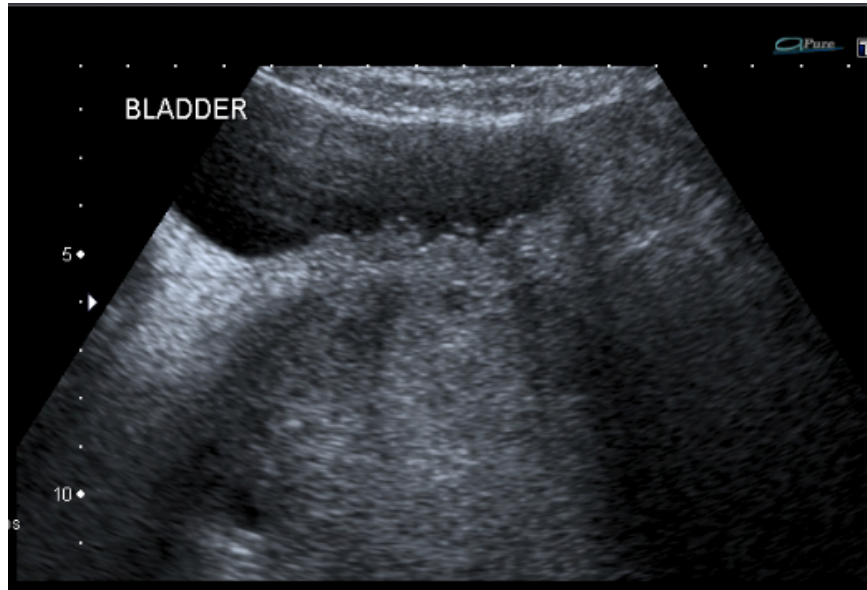
Cervical Lesions

Cervical polyp



Cervical lesions

Cervical cancer



Size does matter

Uterine size

Actual dimensions versus a subjective appreciation?

Who knows?

Who remembers?

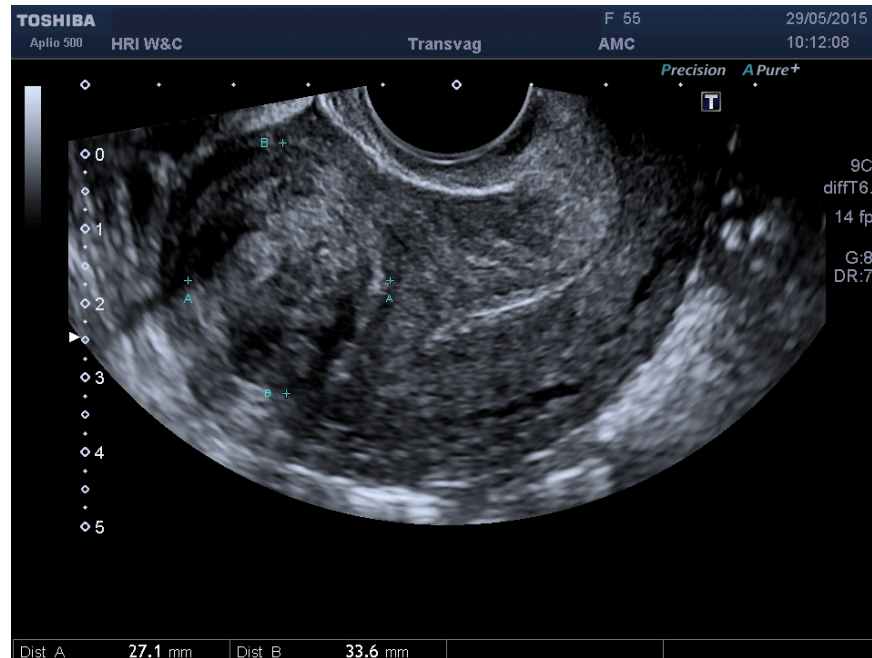
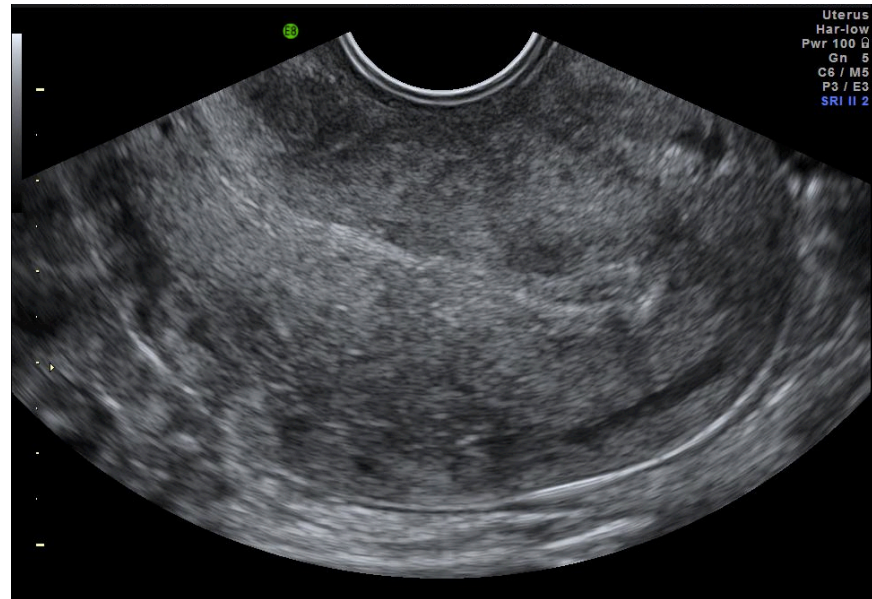
Importance is to say why it is enlarged

- Fibroids
- Adenomyosis
- Haematometra

Dimensions that do matter

Maximum true AP in the sagittal plane to include fibroid pathology

Maximum true TS to include fibroid pathology



Normal sonographic appearances

The ever-changing endometrium

4 different appearances

Normal sonographic appearances

The ever-changing endometrium

The endometrium undergoes significant changes during the menstrual cycle

2 anatomical layers

- Inner functional layer that grows and sloughs during the menstrual cycle
-
- The outer basal layer that abuts the myometrial junctional layer

Normal sonographic appearances

The ever-changing endometrium

Sonographically

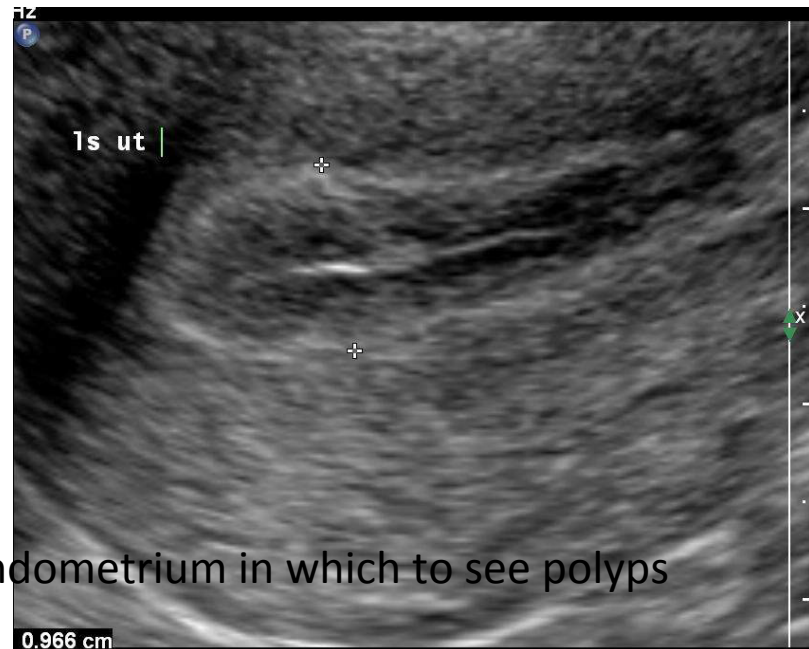
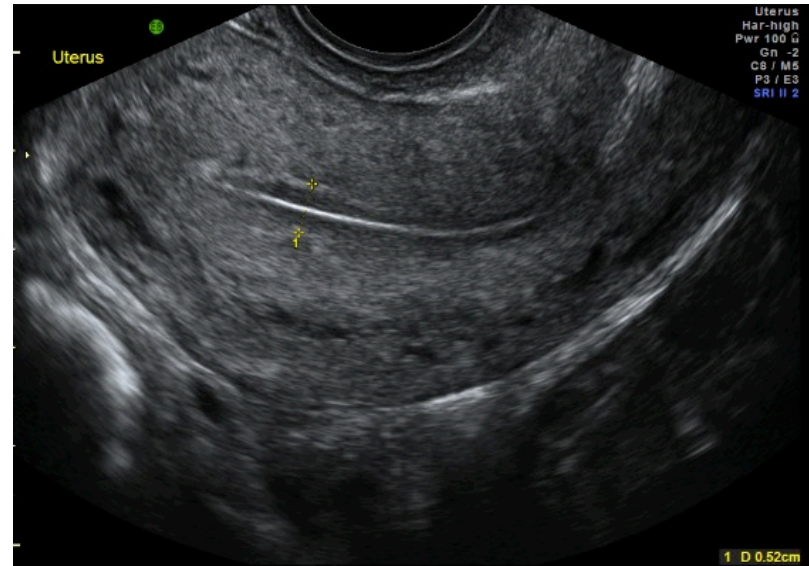
Immediate post menstrual phase

The endometrium is a thin echogenic line measuring between 3 and 8 mm

As the level of oestrogen rises due to secretion by ovarian follicles the endometrium proliferates and thickens into the so called trilaminar layer

This appearance is at its most prominent in the peri ovulatory phase of the cycle when it will measure 8 to 12mm in thickness

During the late proliferative period under the influence of progesterone secreted by the corpus luteum the endometrium loses its tri laminar appearance and becomes uniformly echogenic



This is the best endometrium in which to see polyps

The best endometrium for 3D assessment of uterine anomalies

Normal sonographic appearances

The ever-changing endometrium

Sonographically

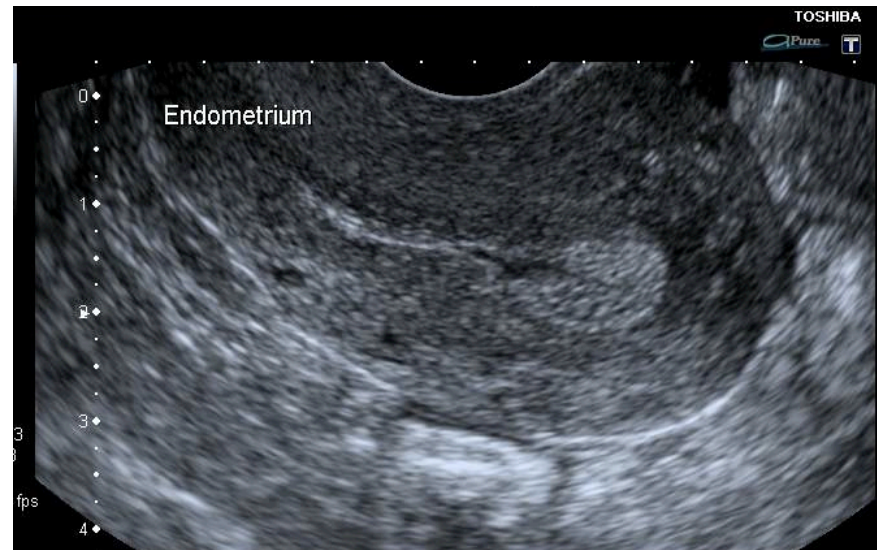
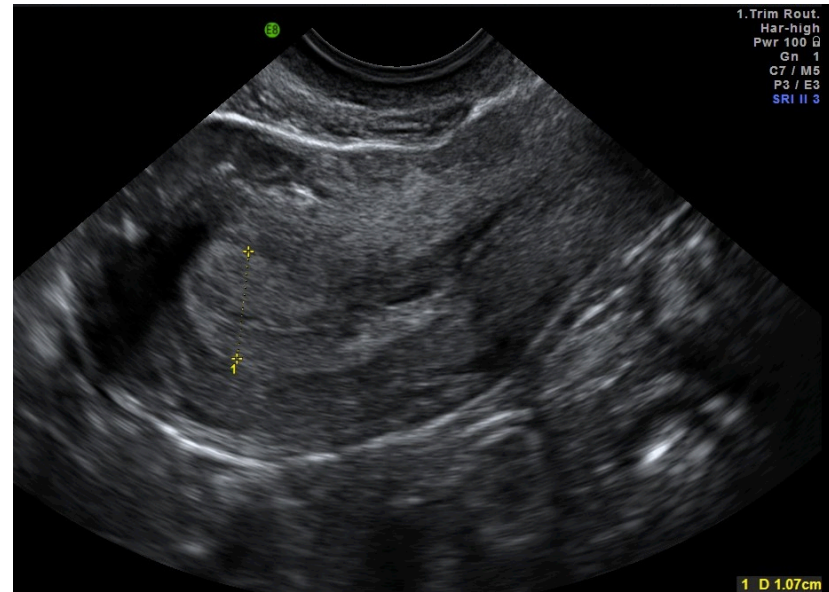
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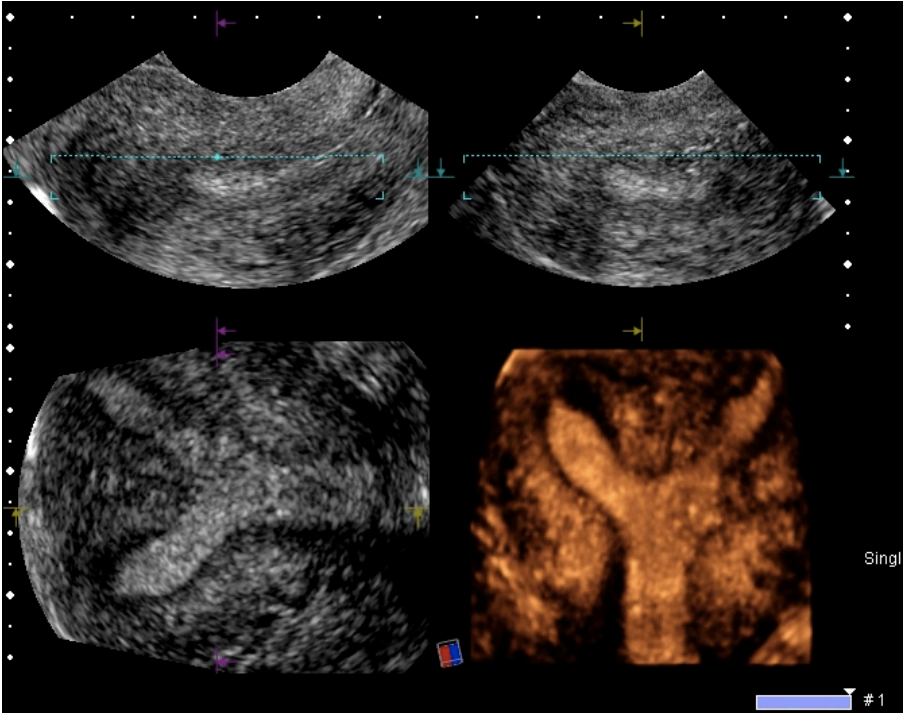
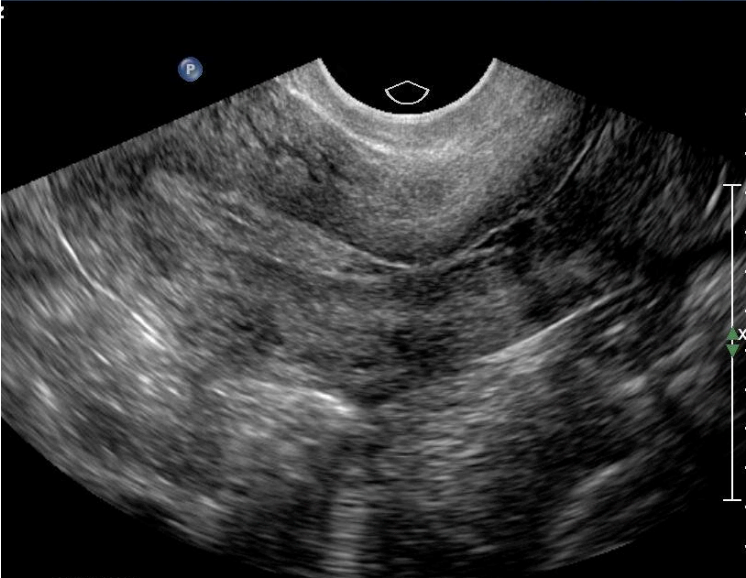
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The best endometrium for assessment of uterine anomalies



Common pathologies

Adenomyosis

Adenomyosis

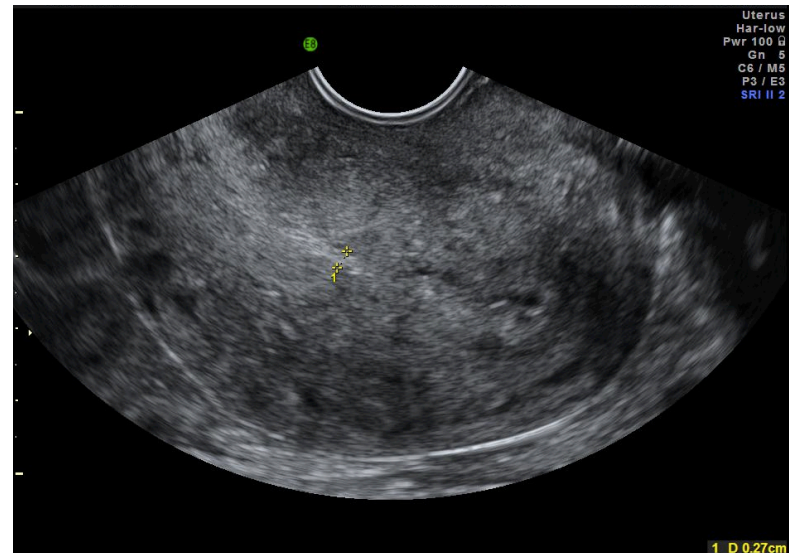
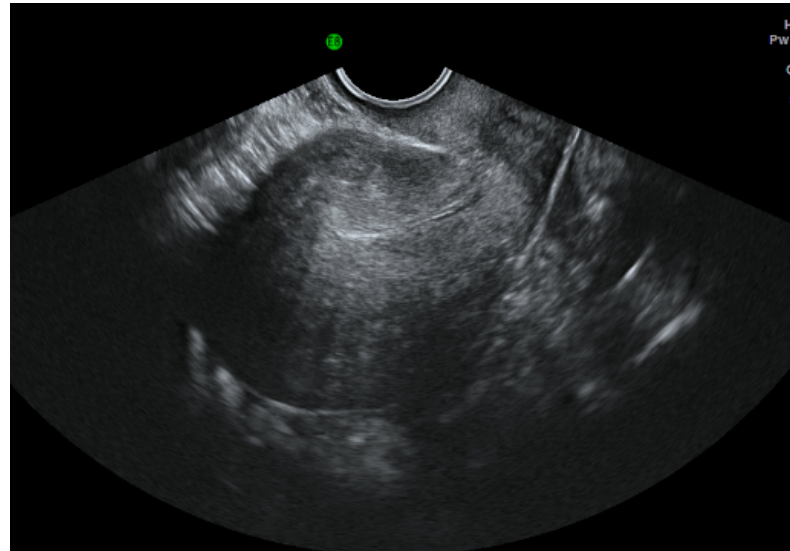
Defined as the presence of ectopic endometrial glands within the myometrium and the presence of these glands induces a hypertrophic and hyperplastic reaction in the myometrial tissue

NOT ALWAYS SYMPTOMATIC (VERY VERY IMPT WHEN IT COMES TO REPORT)

If symptomatic

- Dysmenorrhea
- Dyspareunia
- Chronic pelvic pain
- Menometrorrhagia

Usually a diffuse disease but a focal variant can occasionally be seen



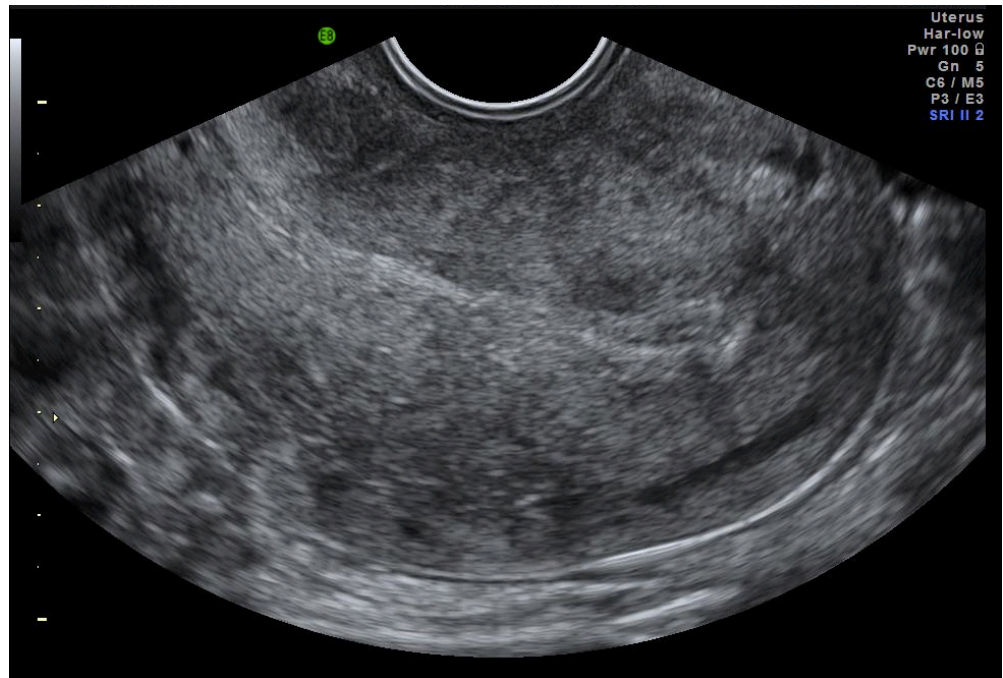
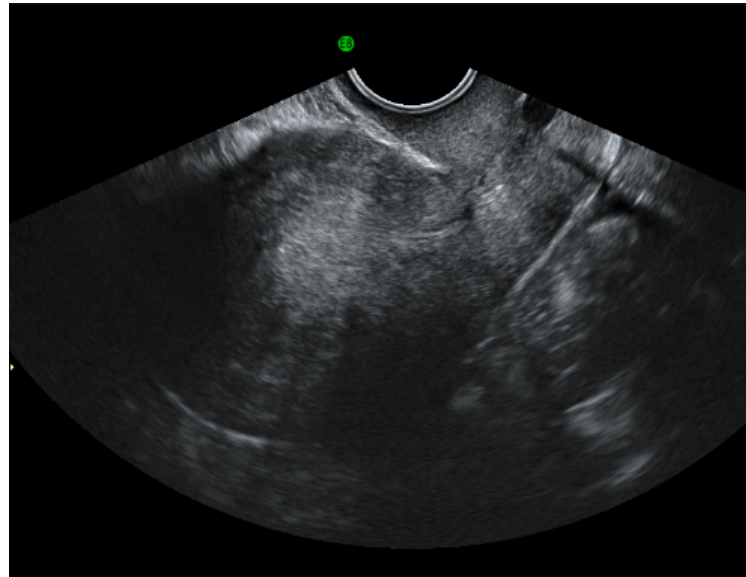
Common pathologies

Adenomyosis

Adenomyosis

Sonographic features

- Globular enlargement of the uterus
- Asymmetric anterior and posterior uterine wall thickening
- Anechoic spaces in the myometrium
- Heterogenous myometrial echo texture
- Sub endometrial linear striations (venetian blind appearances)
- Obscuration of the endometrial myometrial border
- Thickening of the transition zone



Common pathologies

Fibroids

Fibroids

Commonest benign tumour

30 % of women > 35 years

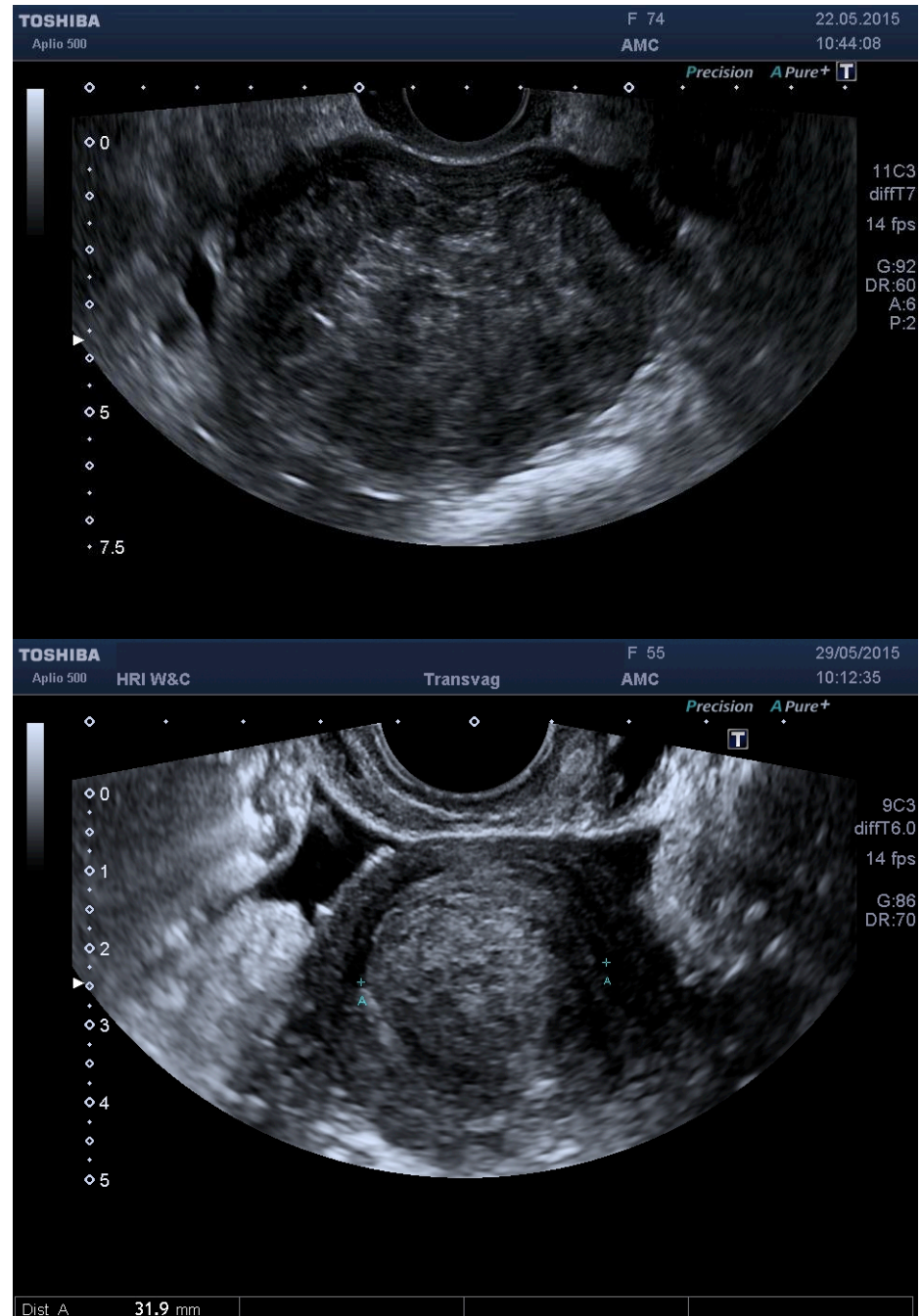
40% of women over the age of 40 years

They are composed of smooth muscle with various amounts of connective tissue and their growth is oestrogen dependent

Leiomyomas have pseudo capsules, which are formed of compressed surrounding myometrium

Leiomyosarcomatous change is rare < 0.2%

Only 50% of leiomyomas actually grow in pregnancy



Common pathologies

Fibroids

Location is key to symptoms and management

- Intra mural
- Sub serosal
- Pedunculated
- Sub mucosal
- Intracavitary
-

Intra mural: no bulging into the endometrium or the serosa

Sub serosal: a significant portion of the leiomyoma is bulging into the serosal surface

Pedunculated: the leiomyoma is exophytic and attached to the uterus by a pedicle

Sub mucosal: a significant portion is bulging into the endometrial cavity > < 50 % is important

Intracavitary: the leiomyoma is within the endometrial cavity and it is attached to the myometrium by a pedicle

Common pathologies

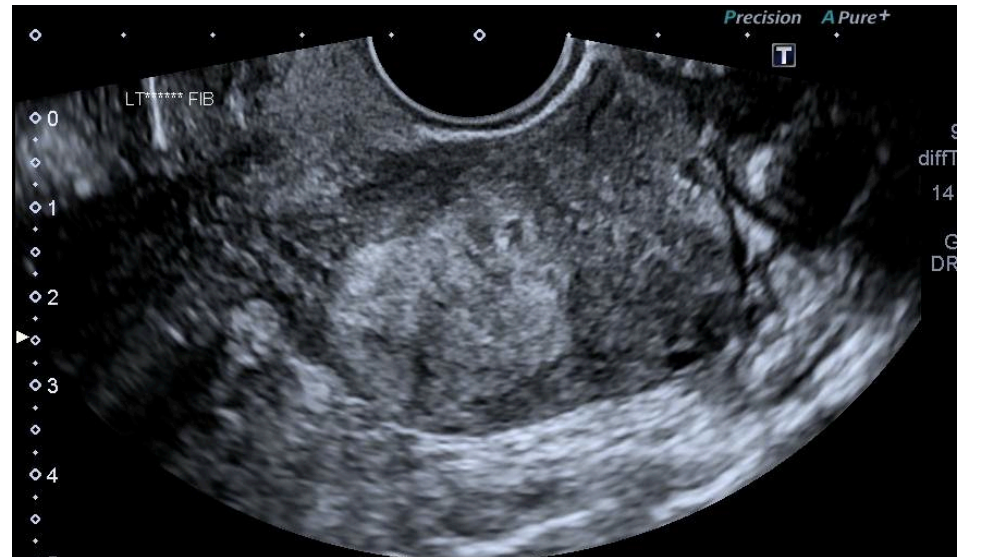
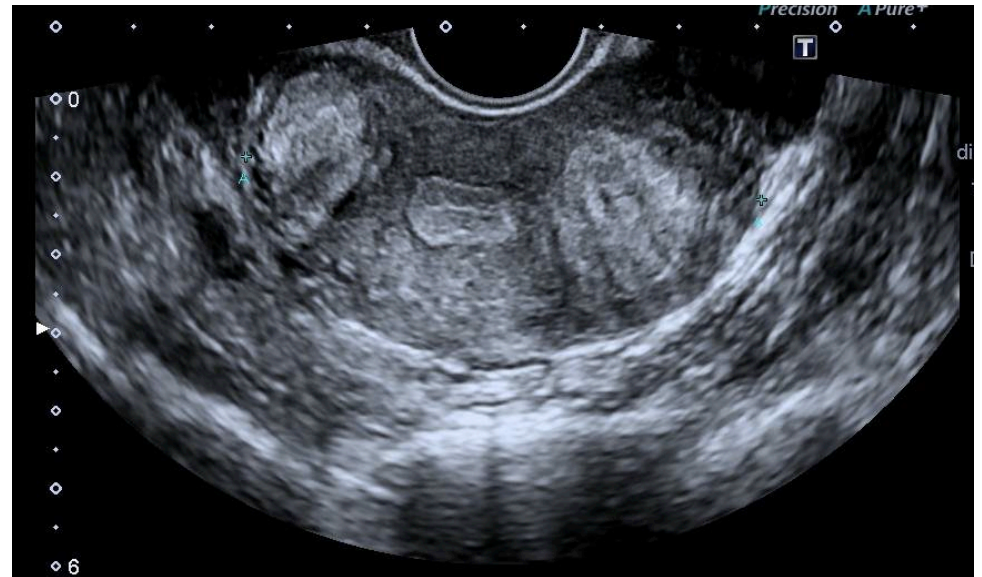
Fibroids

Fibroids

Location is key to symptoms and management

INTRA MURAL

Intra mural: no bulging into the endometrium or the serosa



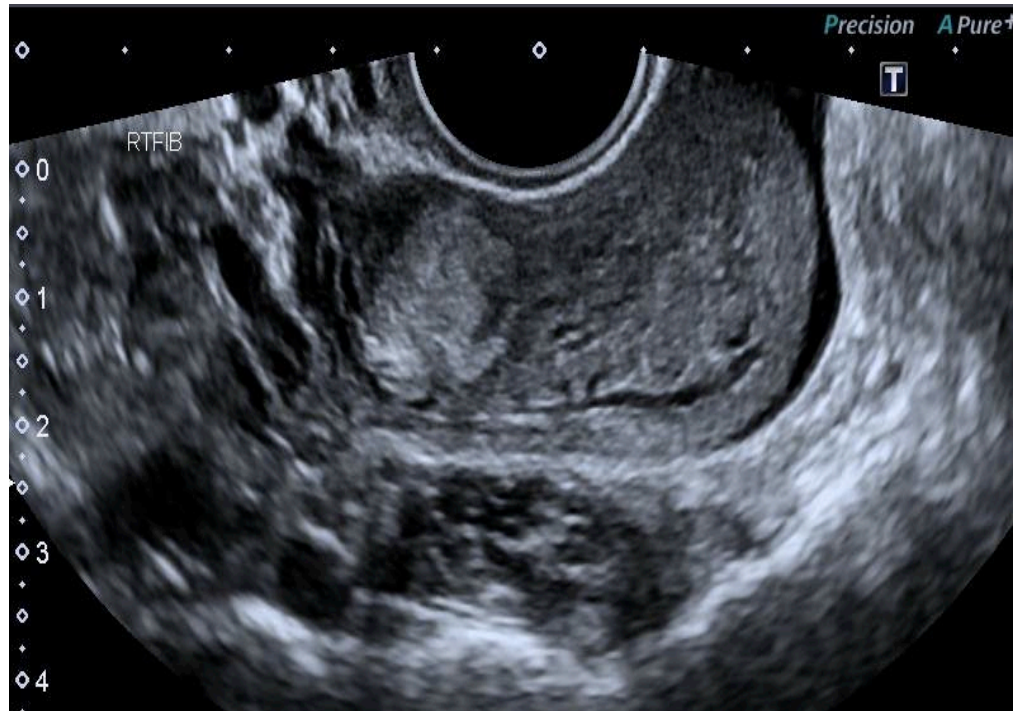
Fibroids

Fibroids

Location is key to symptoms and management

SUB SEROSAL

Sub serosal: a significant portion of the leiomyoma is bulging into the serosal surface

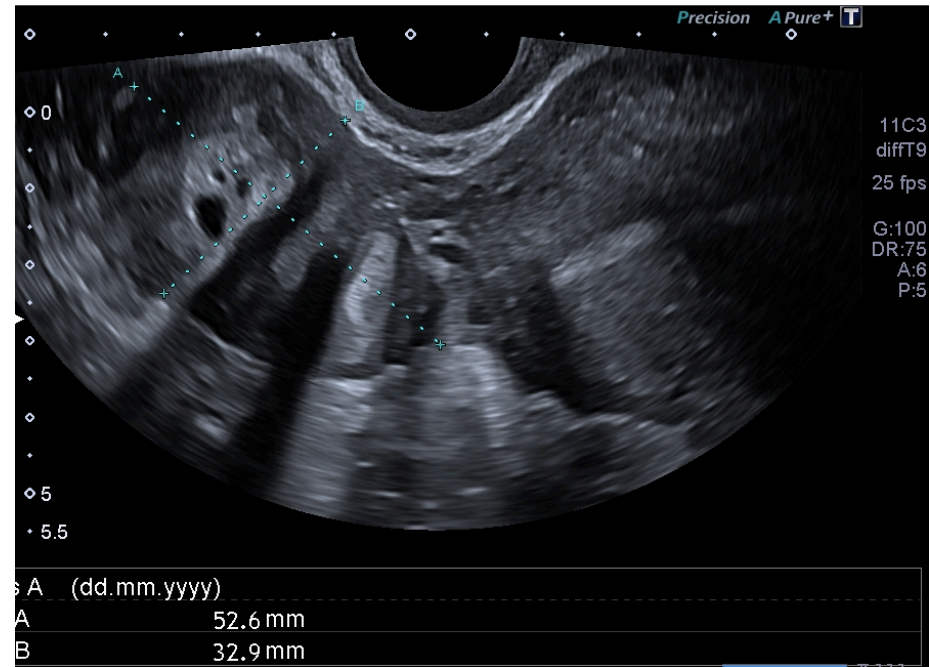
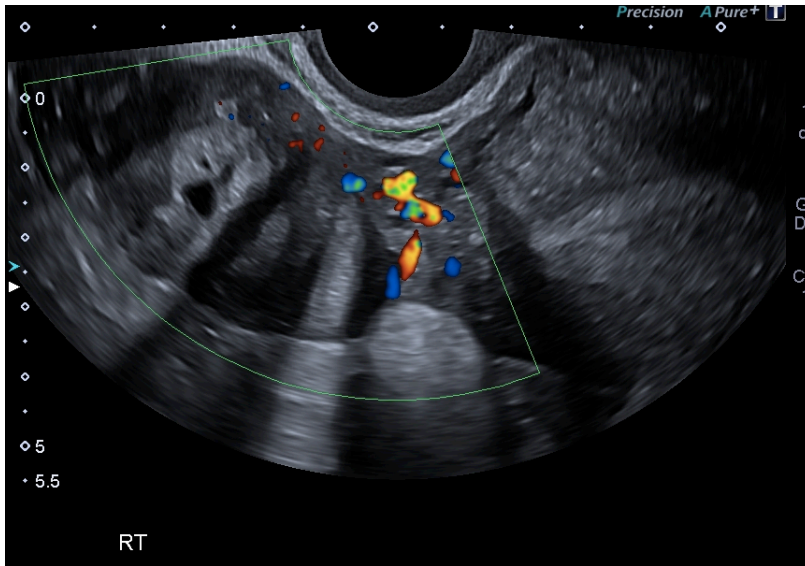
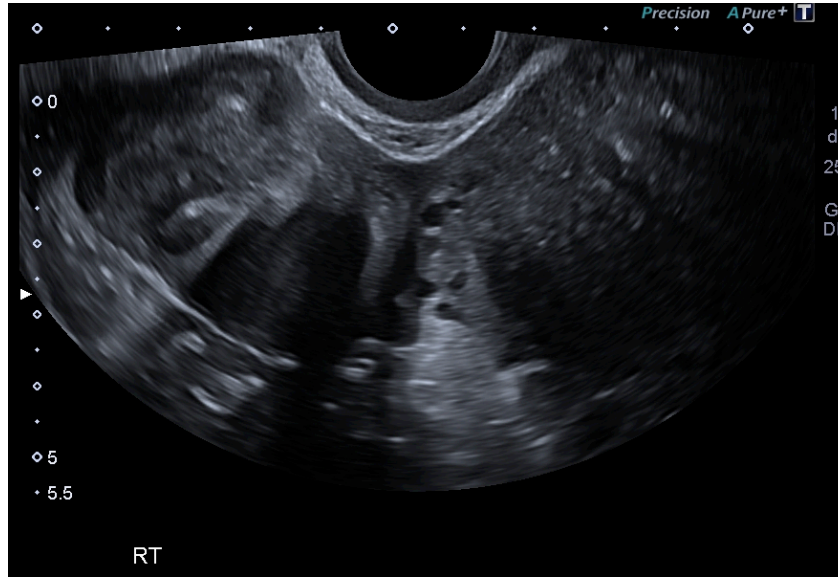


Fibroids

Location is key to symptoms and management

PEDUNCULATED

Pedunculated: the leiomyoma is exophytic and attached to the uterus by a pedicle



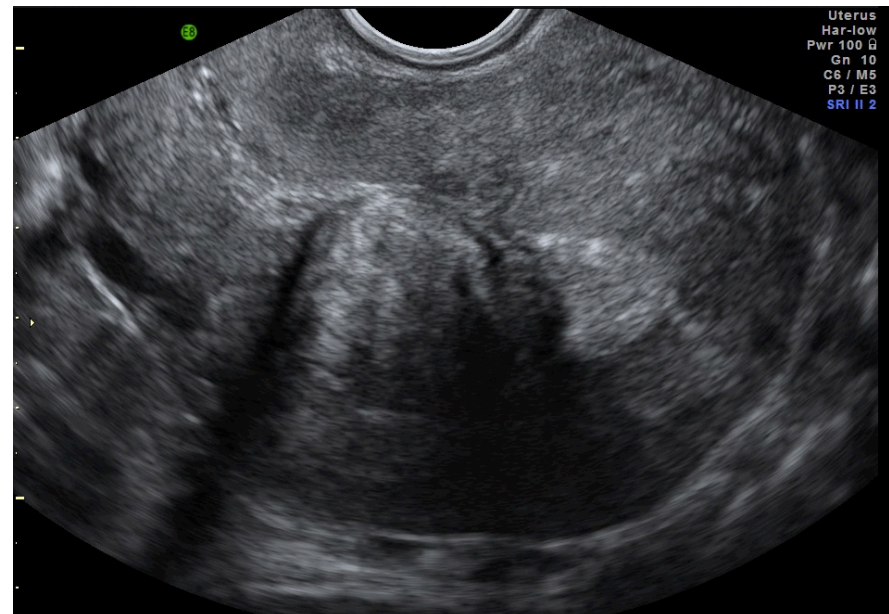
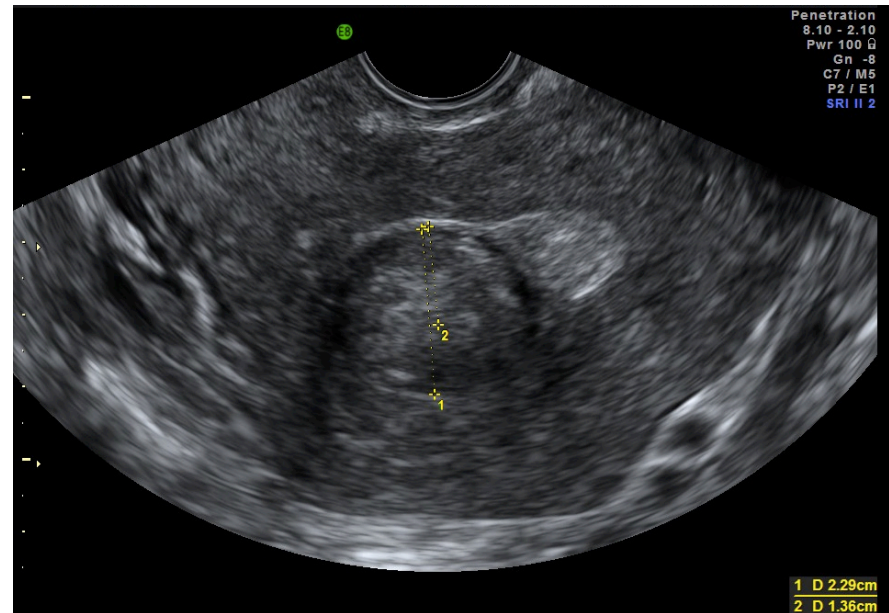
Fibroids

Location is key to symptoms and management

SUB MUCOSAL

Sub mucosal: a significant portion is bulging into the endometrial cavity > < 50 % is important

Intracavitary: the leiomyoma is within the endometrial cavity and it is attached to the myometrium by a pedicle

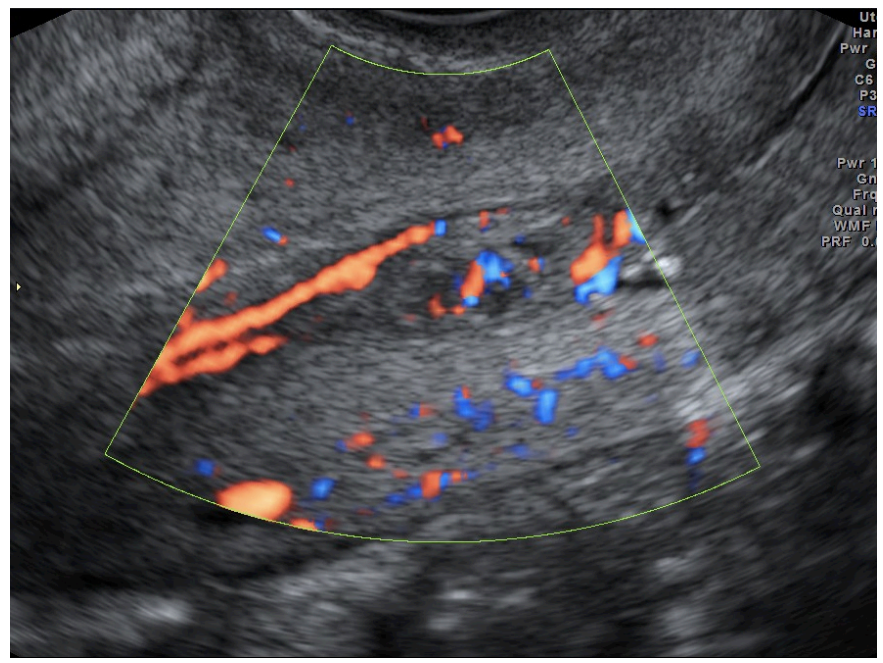
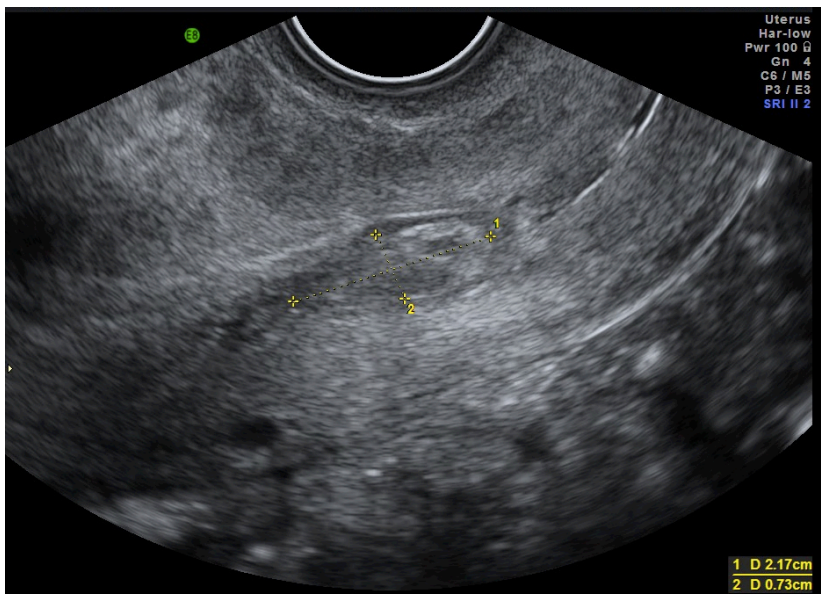
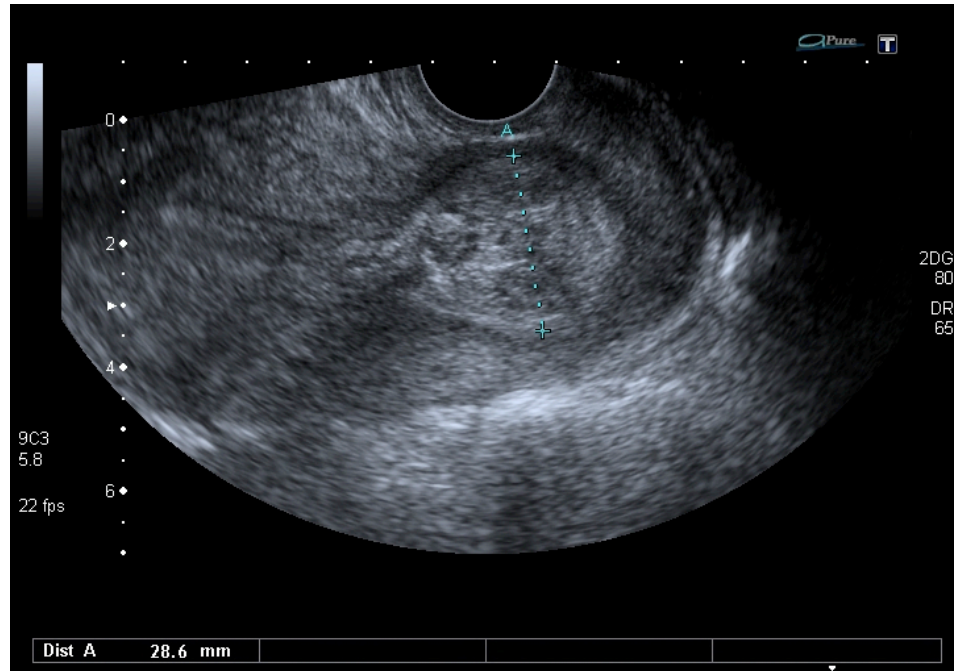


Fibroids

Location is key to symptoms and management

INTRA CAVITARY

Intracavitary: the leiomyoma is within the endometrial cavity and it is attached to the myometrium by a pedicle



Common pathologies

Fibroids

Sonographic features

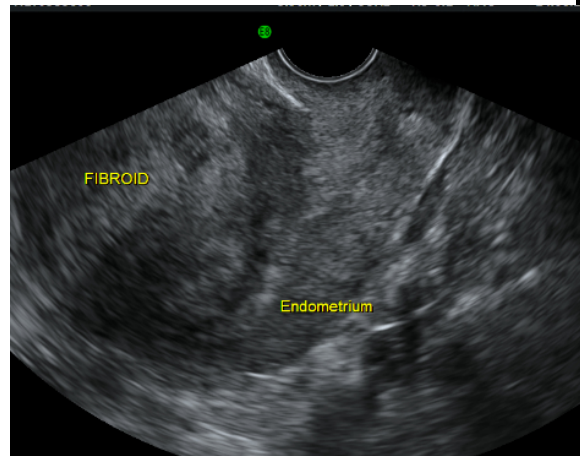
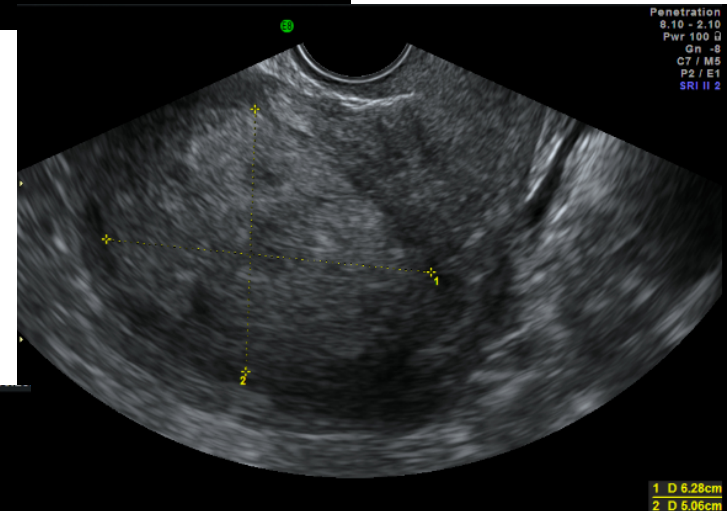
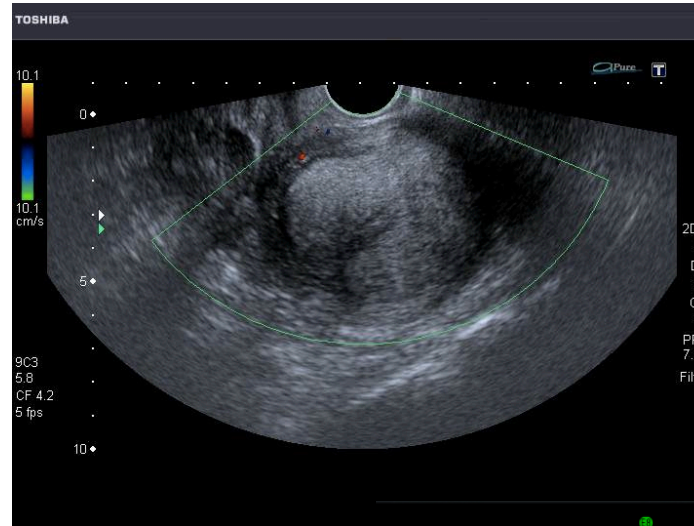
Solid echogenic mass

Well-defined contour

Significant attenuation of the
ultrasound beam

Unusual variants

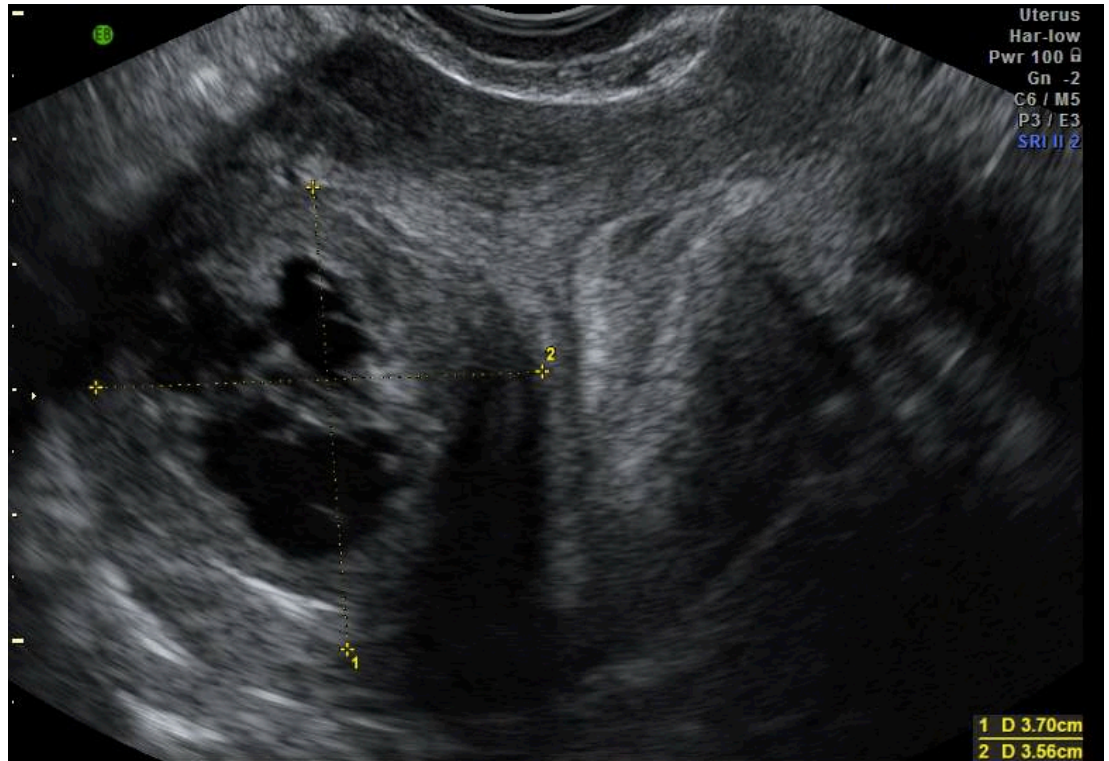
- 1) Lipomatous
- 2) Cystic change

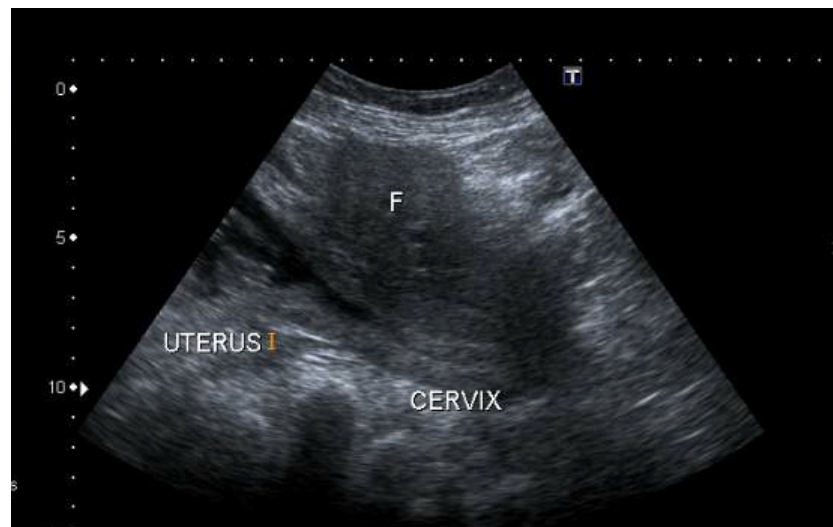
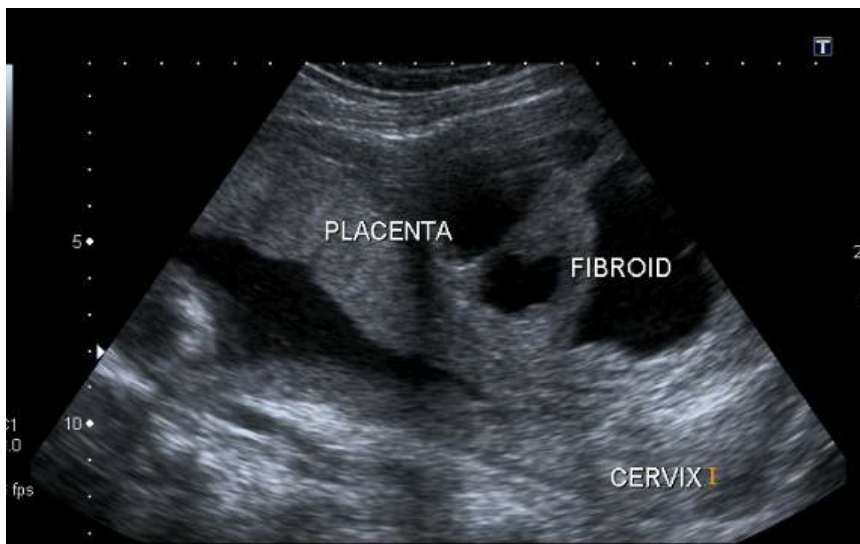
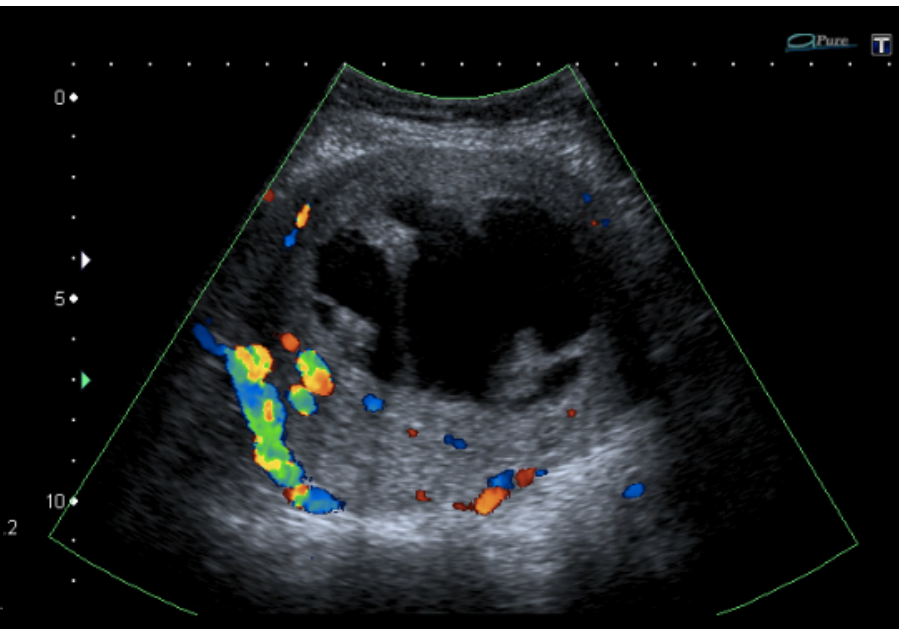
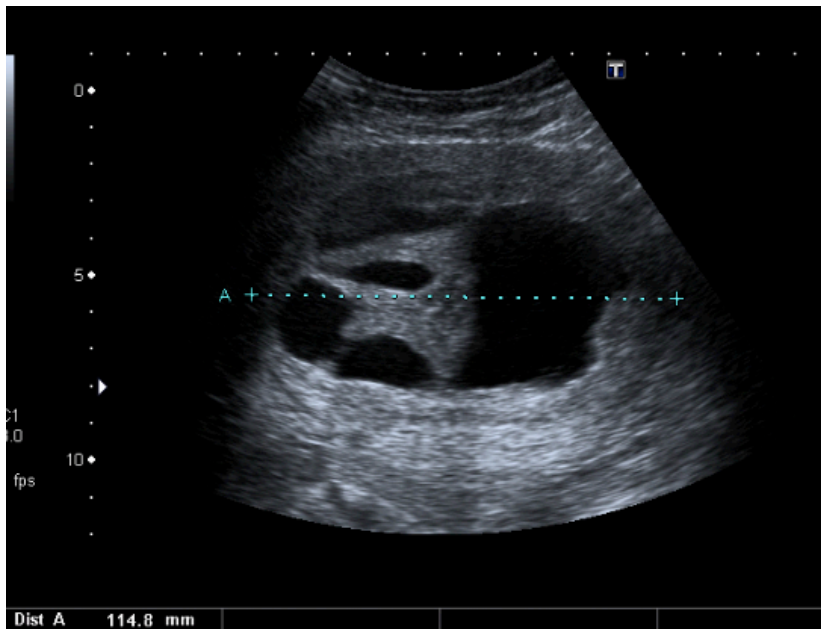


Common pathologies

Fibroids

Cystic change is NOT always a feature of malignancy and it is due to hyaline degeneration





Abnormal uterine bleeding

AUB abnormal menstrual flow in women of reproductive age

Classification

Acronym: PALM-COEIN

- Polyps
- Adenomyosis
- Leiomyomas
- Malignancy
- Coagulopathy
- Ovarian dysfunction
- Endometrial iatrogenic
- Not yet classified

Common pathologies

Endometrial

Polyps

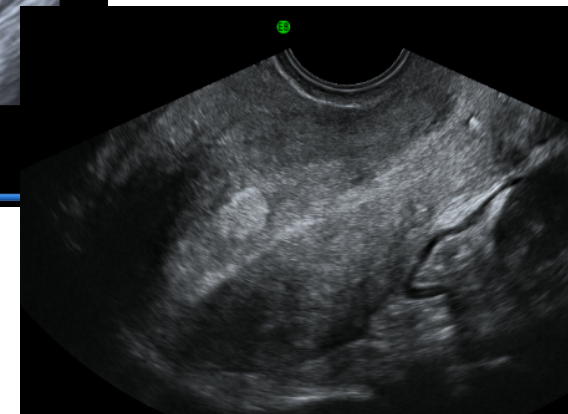
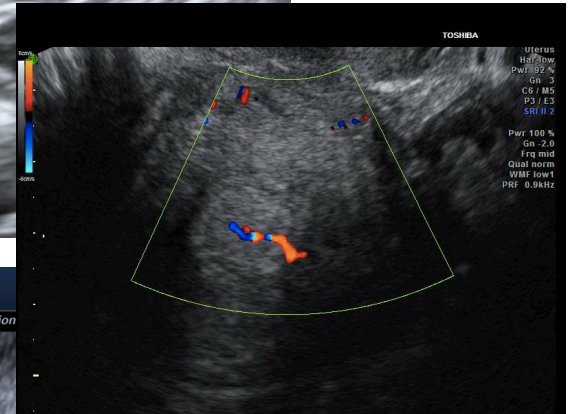
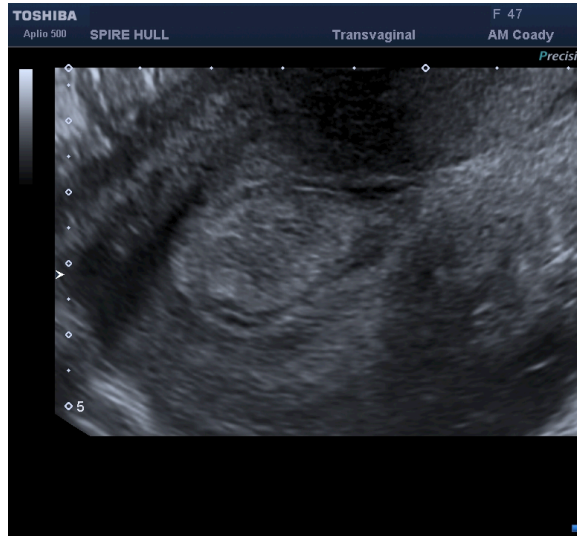
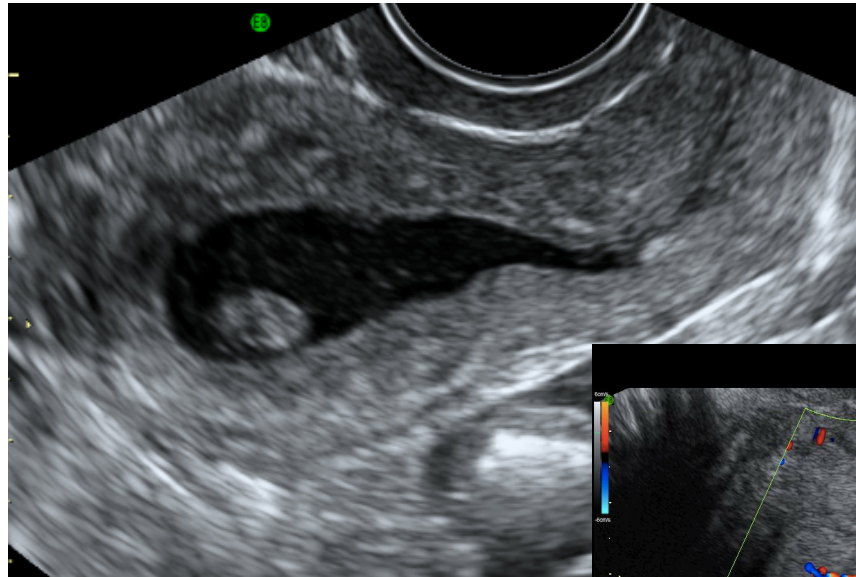
30% of cases of post menopausal bleeding

Echogenic

Completely contained in the endometrial cavity with NO extension into the myometrium

Homogenous usually but occasional cystic changes within

Narrow base of attachment, which may have a vascular pedicle within



Common pathologies

Endometrial

Polyps versus Intra cavity fibroids

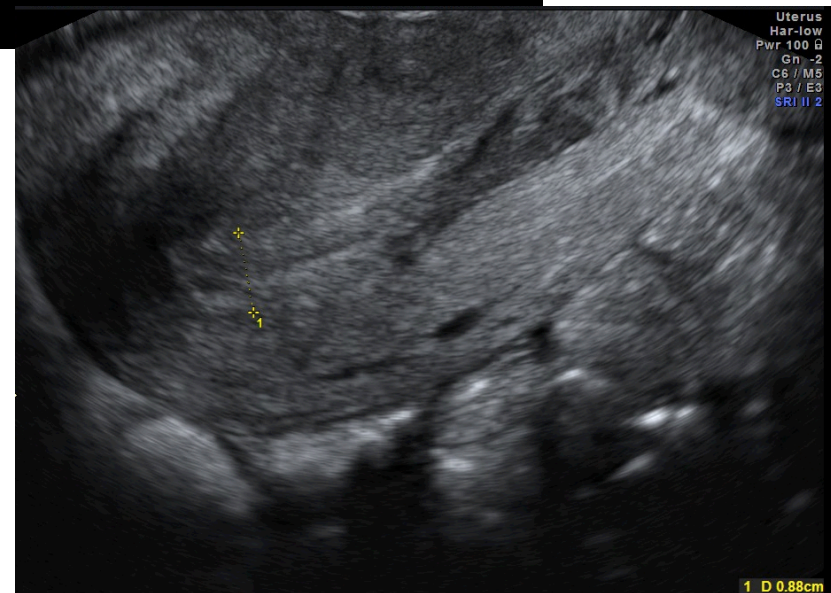
Fibroids

Less echogenic than the endometrium
with attenuation of the US beam

Broad based

Lift the surrounding endometrium

Portion extends into the myometrium



Common pathologies

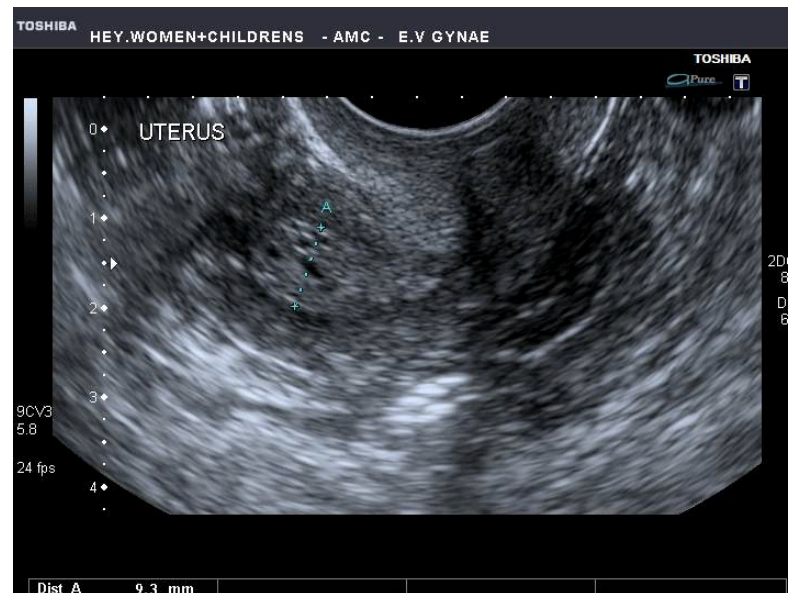
Endometrial

Endometrial hyperplasia and cancer

Endometrial cancer most common gynaecological cancer

Endometrial hyperplasia can be diffuse or focal and differentiating this from a polyp can at times be difficult

Endometrial cancer has similar sonographic characteristics to hyperplasia or an enlarged polyp with of course the exception of myometrial invasion



Endometrial hyperplasia

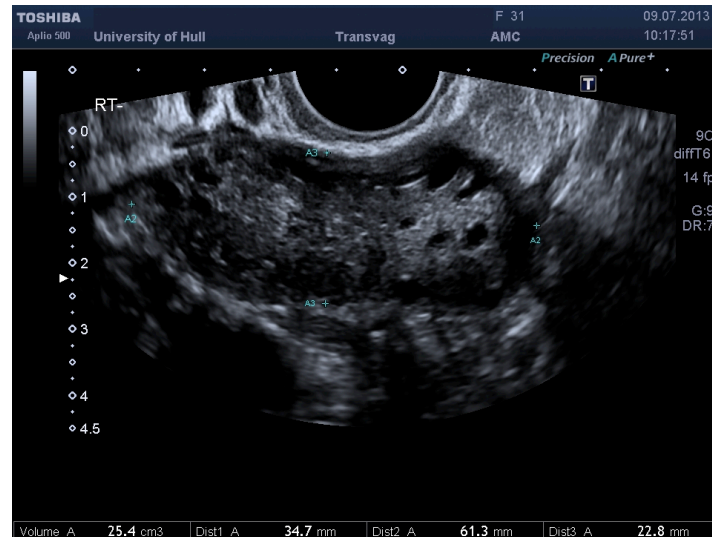
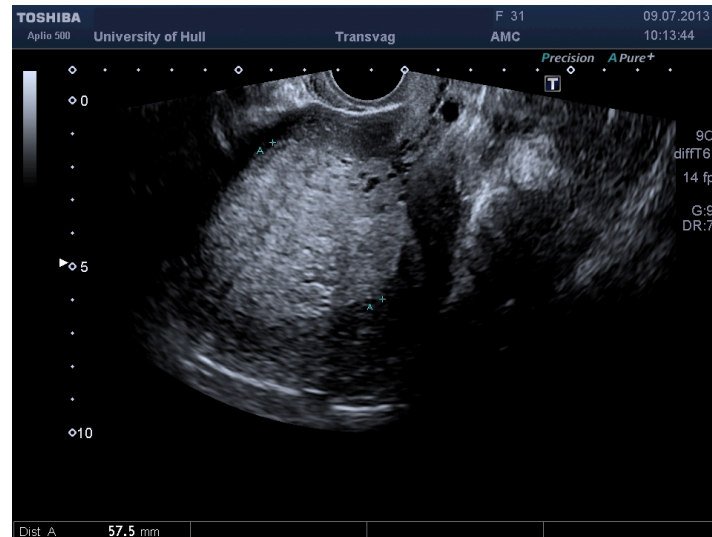
Endometrial hyperplasia is an abnormal proliferation of endometrial stroma and glands and represents a spectrum of endometrial changes

A definitive diagnosis can be made only with biopsy, imaging cannot reliably allow differentiation between hyperplasia and carcinoma.

Up to one-third of endometrial carcinoma is believed to be preceded by hyperplasia.

All types of endometrial hyperplasia can cause diffusely smooth endometrial thickening

Far less commonly, hyperplasia produces focal hypo echoic endometrial thickening.



Endometrial carcinoma

Endometrial Adenocarcinoma

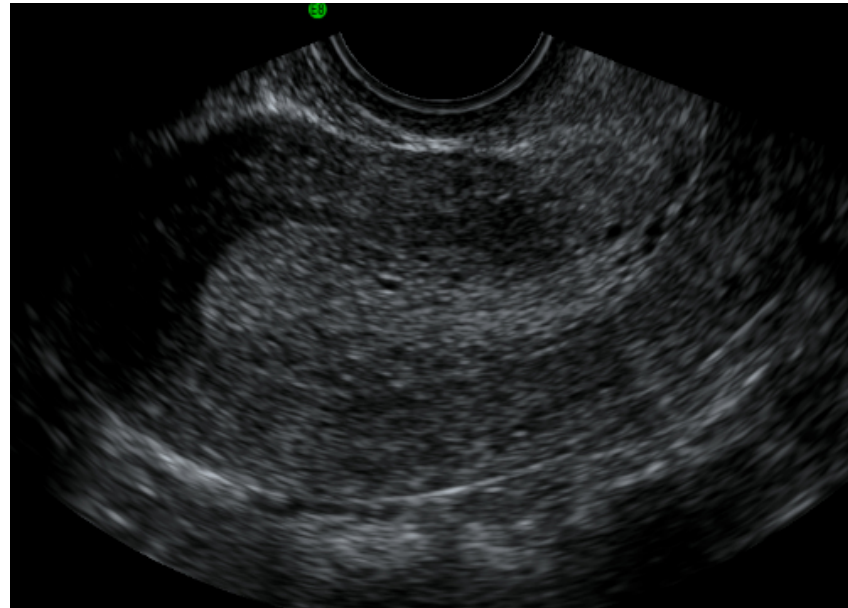
Endometrial adenocarcinoma is the most common invasive gynaecologic malignancy, but thanks to early detection and treatment, it is not a leading cause of cancer deaths.

US signs of endometrial carcinoma include heterogeneity and irregular endometrial thickening.

These signs are nonspecific and can be seen in endometrial hyperplasia as well as polyps, leading to biopsy of almost any irregularity in the setting of PMB.

Polypoid tumours tend to cause more diffuse and irregular thickening than a polyp and more heterogeneity than endometrial hyperplasia.

A more specific US sign is irregularity of the endometrium-myometrium border, a finding that indicates invasive disease.



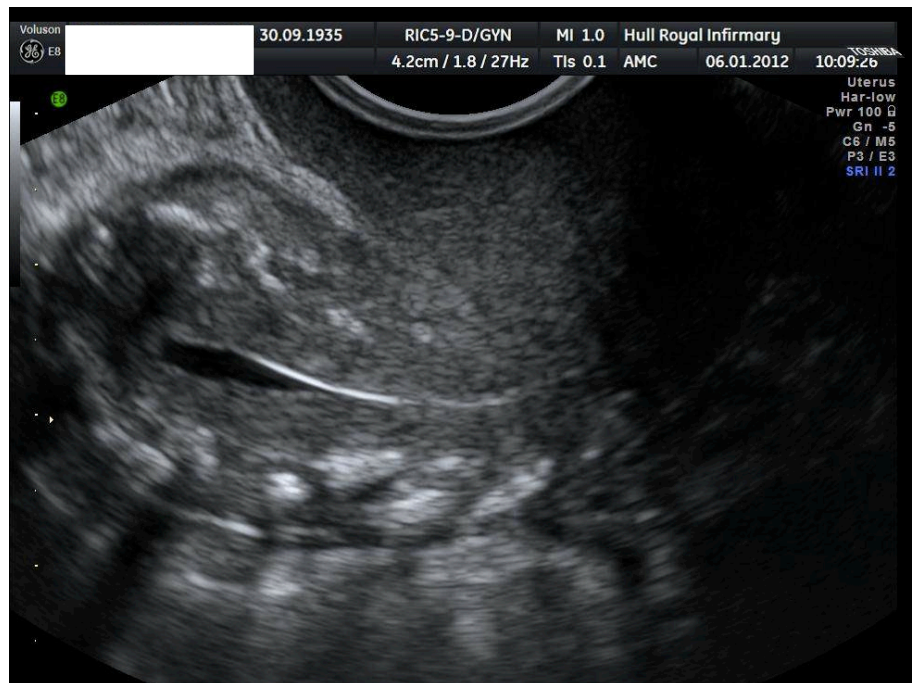
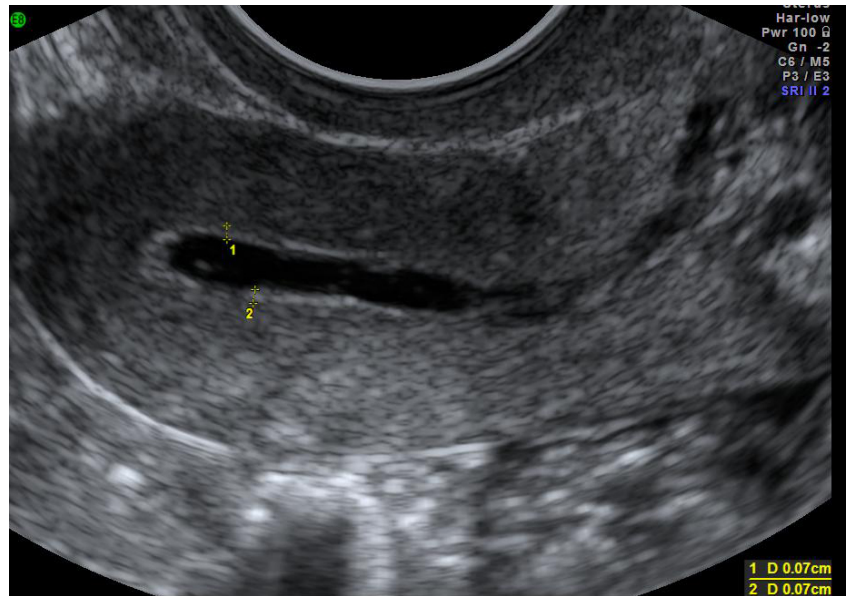
Endometrial cavity fluid

A small amount of fluid in the endometrial canal is likely related to benign cervical stenosis and does not require further evaluation.

Remember the bi layer measurement of the endometrium in that situation

An intrauterine fluid collection in a postmenopausal patient, although possibly related to cervical stenosis, should raise concern for endometrial (or cervical) carcinoma.

An obstructing tumour must be excluded even when cervical stenosis has been identified clinically.



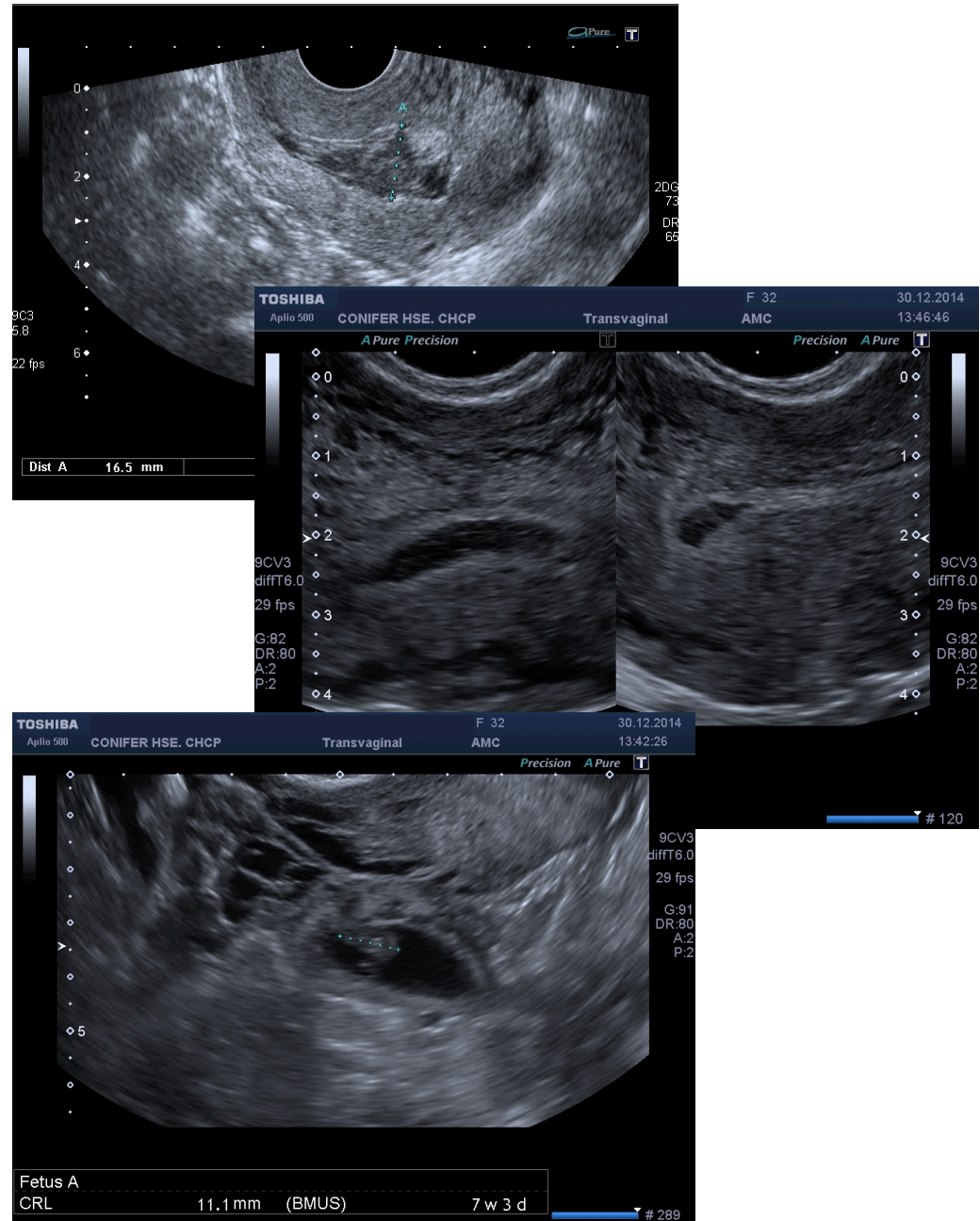
Intra uterine fluid collections

Importance depends on the age of the patient

In premenopausal patients, fluid collections are most commonly associated with

- menstruation,
- early IUP,
- the pseudogestational sac in an ectopic pregnancy

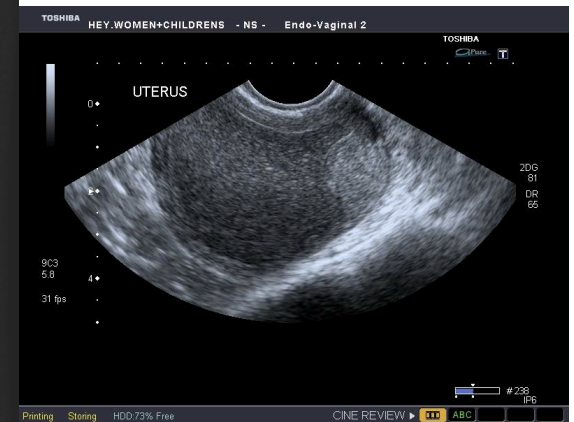
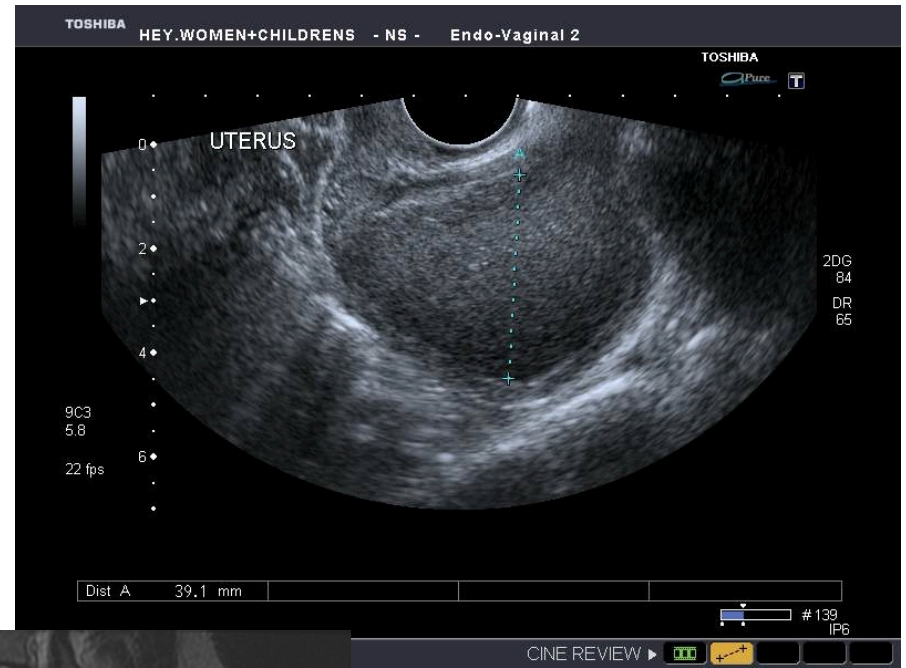
Other benign causes of obstruction leading to intrauterine fluid production include polyps, infection and submucosal fibroids.



Intra uterine fluid collections

Importance depends on the age of the patient

In prepubertal patients, fluid in the endometrial canal may be related to haematometrocolpos.



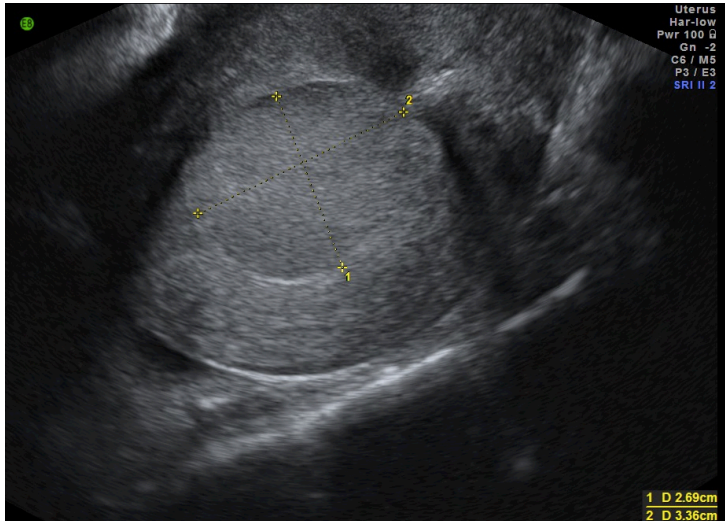
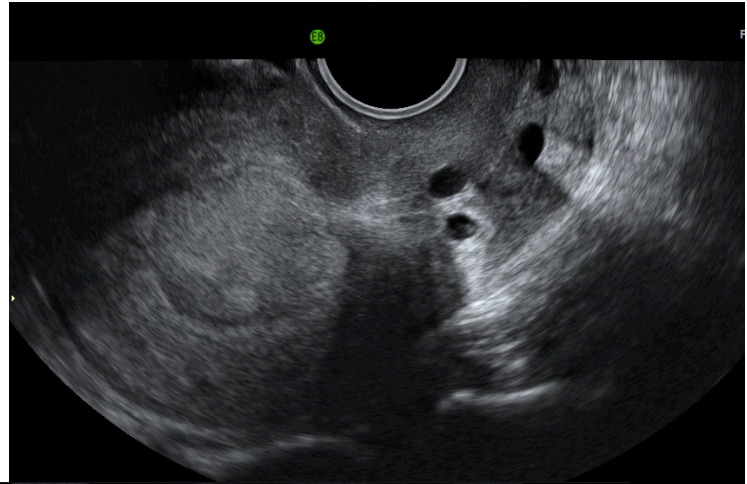
Intra uterine fluid collections

Rarity !!!

Importance depends on the age of the patient

The clue is in the history

TALK TO YOUR PATIENT!!!



Uncommon pathologies

Endometrial

- Endometrial adhesions
- AVM

Endometrial adhesions

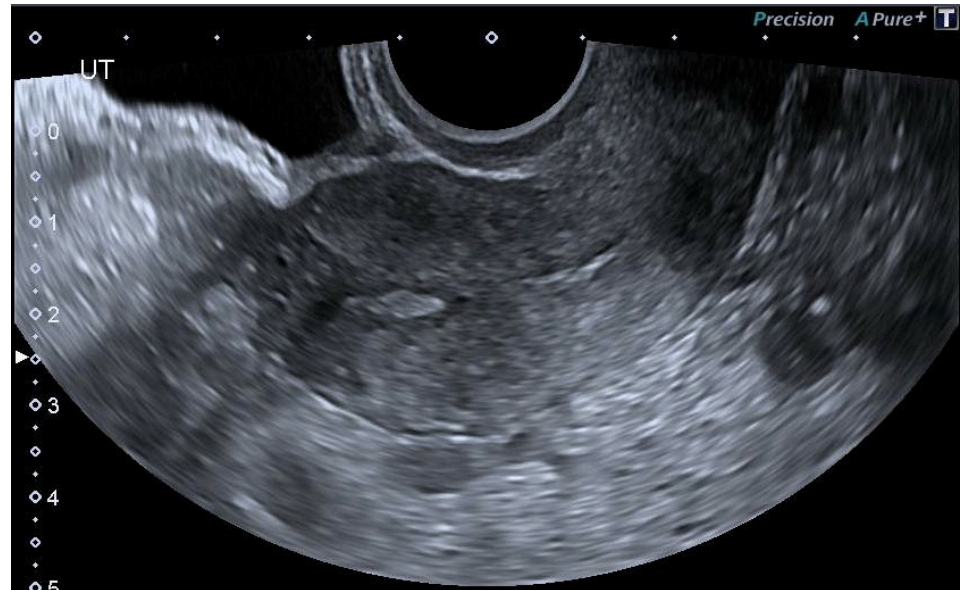
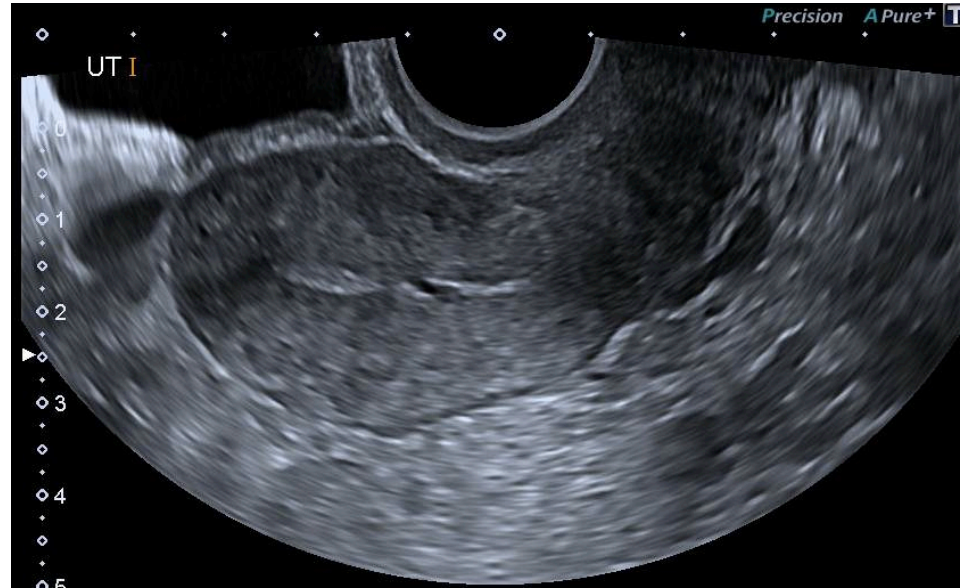
Endometrial adhesions are posttraumatic or postsurgical in nature and can cause Asherman syndrome, which includes infertility, recurrent pregnancy loss, and amenorrhea.

Adequate distention of the endometrial cavity seen at sonohysterography or HSG is necessary for radiologic diagnosis.

Sonohysterography may demonstrate synechiae as echogenic bands bridging the uterine cavity.

If the bands are thick and fibrotic, they may prevent complete uterine distention.

Hysterosalpingography will demonstrate similar findings, with incomplete filling of the endometrial cavity and numerous irregular filling defects.



Uncommon pathologies

Endometrial

AVM

These are actually very rare and typically arise following instrumentation of the endometrial cavity commonly in association with pregnancy loss or delivery

They can be associated with

- Malignancies
- Infections
- RPOCS
- Molar gestations

They can be congenital and these are even less common and less symptomatic than acquired variety

Symptoms

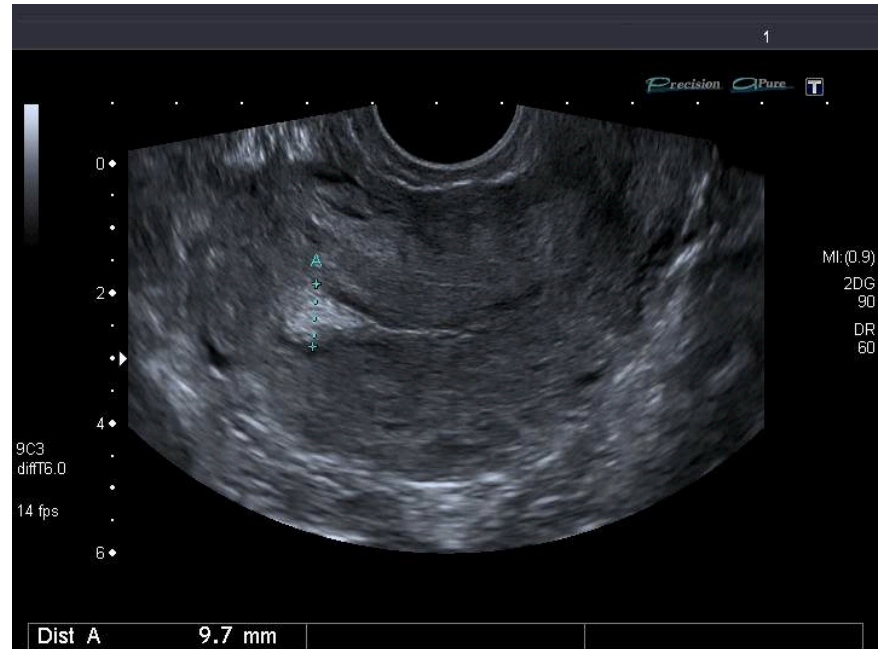
- Heavy bleeding
- Pelvic pain and dyspareunia

The diagnosis is made by TV ultrasound with colour and pulsed doppler

Grey scale ultrasound

Anechoic spaces with an irregular contour

Turbulent flow with aliasing and pulsed doppler demonstrates high velocity flow with low impedance



Uncommon pathologies

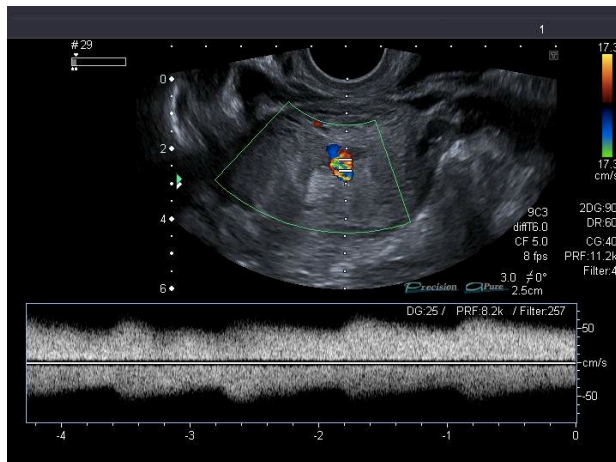
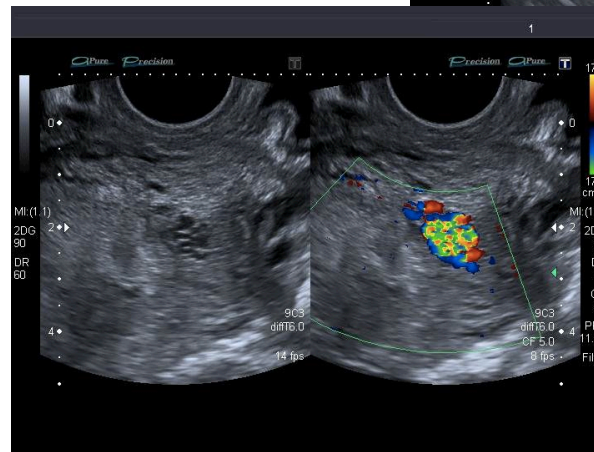
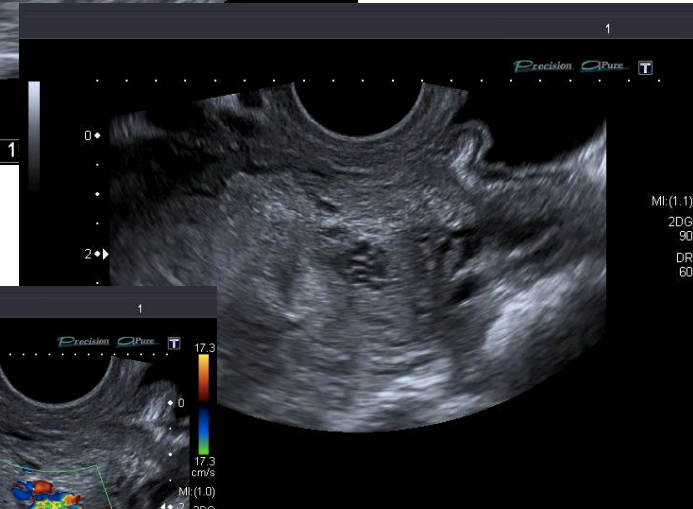
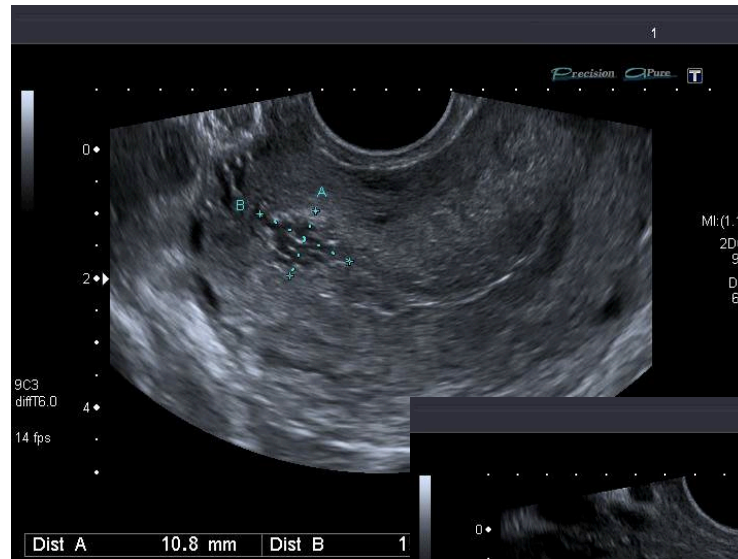
AV Malformation

The diagnosis is made by TV ultrasound with colour and pulsed doppler

Grey scale ultrasound

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Uncommon pathologies

Endometrial

Osseous metaplasia

Endometrial ossification is a rare disease, and its aetiology and pathogenesis are controversial.

It is often misdiagnosed.

Most reported cases are related to pregnancy

It has also been related to transformation of uterine tissue to bone in response to inflammation and the reparative process induced by abortion

Osseous metaplasia has been associated with secondary infertility and dysmenorrhea and has mimicked a retained intrauterine device

It can be successfully treated with hysteroscopic resection.

