Gynaecology (non-pregnant female pelvis): normal uterus

Preparation

1- Preparation of the patient：

The bladder must be full. Give 4 or 5 glasses of fluid and examine after one hour

Alternatively. fill the bladder through a urethral catheter with sterile normal saline.

2. Position of the patient:T.

the patient is usually scanned while lying comfortably on her back (supine).

3. Choice of transducer. Use a 3.5 MHz transducer for adults and 5 MHz transducer for children or thin adults.

4 . Setting the correct gain. Position the transducer longitudinally over the full bladder and adjust the gain to produce the best image.

Normal anatomy of uterus

The uterus has two different zones of echogenicity

1- The muscles in the uterine wall are hypoechogenic

2- endometrium :

a. In the first half of the menstrual cycle (post- menstruation) the endometrium is **thin and hypo echoic** .

b. In the second half, the premenstrual phase, the endometrium is **hyperechoic**

The long axis of the uterus is measured from fundus to cervix.

The normal post pubertal nulliparous uterus measures

4.5 - 9.0 cm in length

1.5 - 3 cm antero-posteriorly

4.5-5.5 cm in the transverse diameter.

Uterine dimensions increase by 1.0 - 1.2 cm with parity, and the body oft the uterus becomes more rounded.

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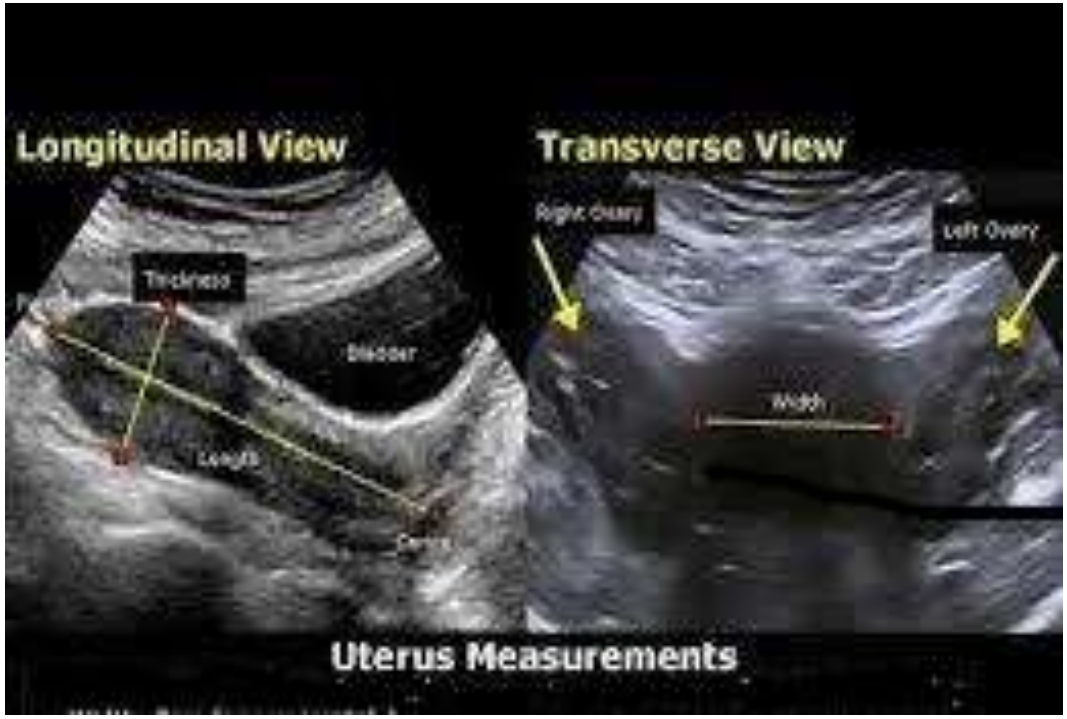


The pre-pubertal uterus

As the child grows, the ratio of the uterine cervix to the uterine body changes.

In childhood the body of the uterus is smaller than the cervix, but with increasing age, the uterine body grows larger and the endometrium is not demonstrated.

Intrauterine contraceptive device

An intrauterine contraceptive device (IUD) will appear as a linear or interrupted hyperechoic line within the endometrial cavity and may produce distal acoustic shadowing

Fluid in the posterior cul-de-sac

It is not unusual to find a small amount of fluid in the posterior cul-de- sac Following ovulation or menstruation. An echo-free cross- sectional diameter of less than 1cm is normal .

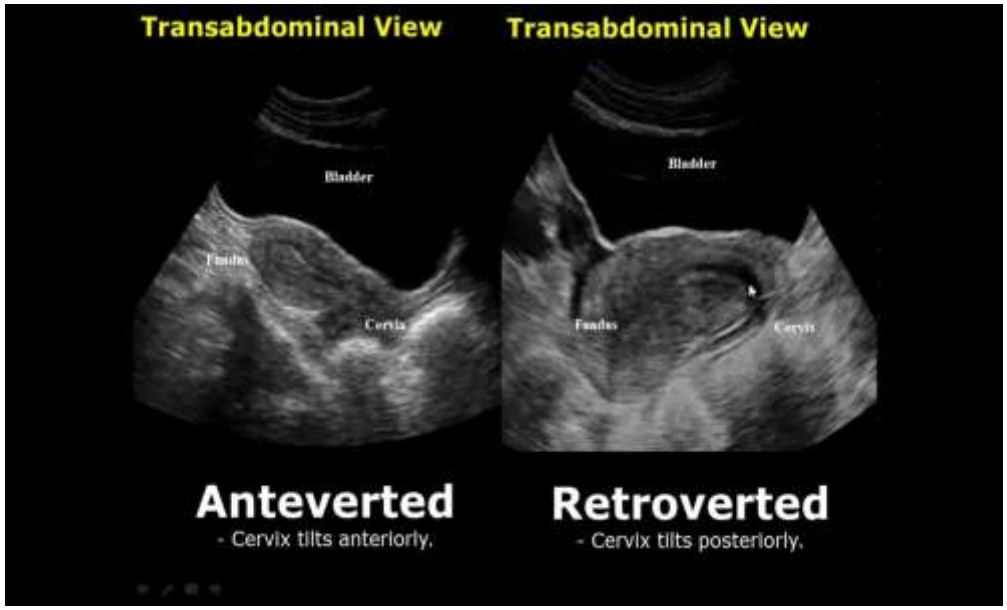
Uterine position

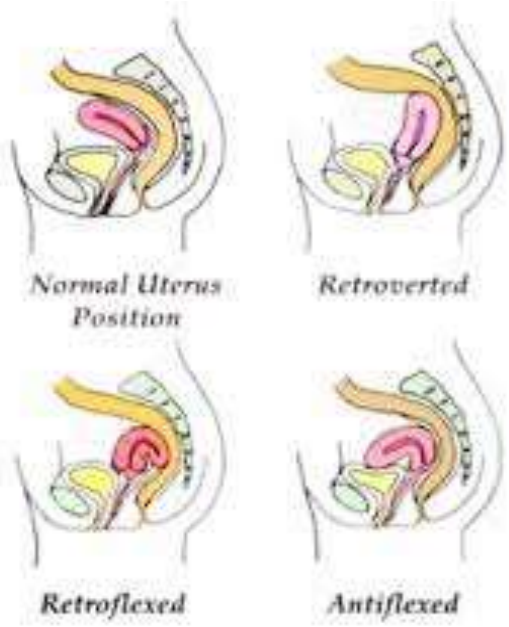
The uterus fundus of the uterus may be behind the cervix **(retroversion).**

It may also rotate forward (**antiversion).**

the body of the uterus bends forward at the cervix it is **antiflexed**.

When the uterus
When the uterus bends backwards at the cervix, it is **retro- flexed**.





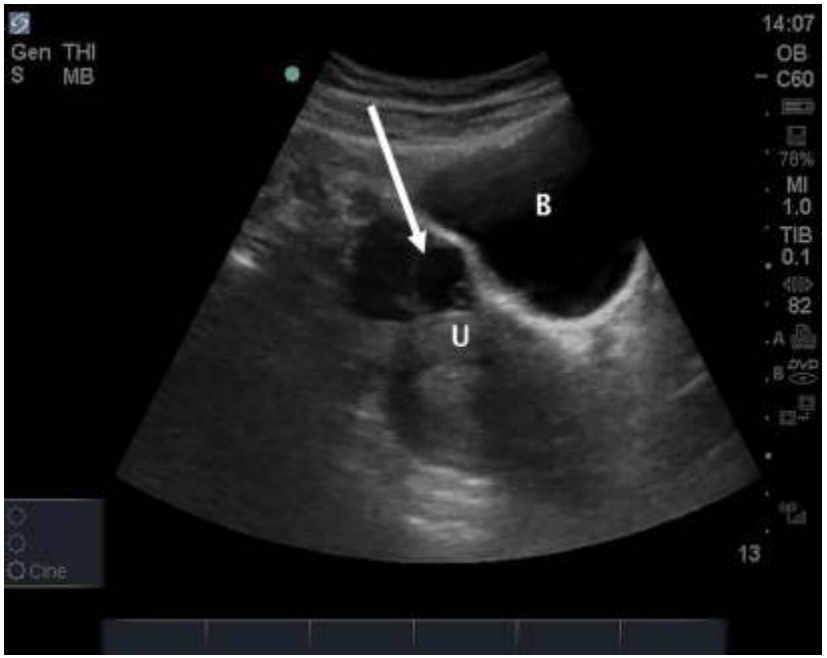
normal ovary

The ovaries are firm and ovoid in shape
measure approximately
1.5- 3.0 cm (length) × 1.5-3.0 cm (width) × 1.0-2.0 cm thickness) … (corresponding to a volume of 1.2-9.4 cm3).

double in size in pregnancy.

ovary typically weighs 2-8 g

Scan the tissues on the left and right close to the uterus.
Angle the transducer as required to locate the ovary, which will appear as an ovoid (egg- shaped) structure, less homogeneous than the uterus.
Ovaries always lie behind the bladder and the uterus.
They are most commonly found in the adnexal space laterally



When the ovaries cannot be identified, the following techniques may be helpfull:

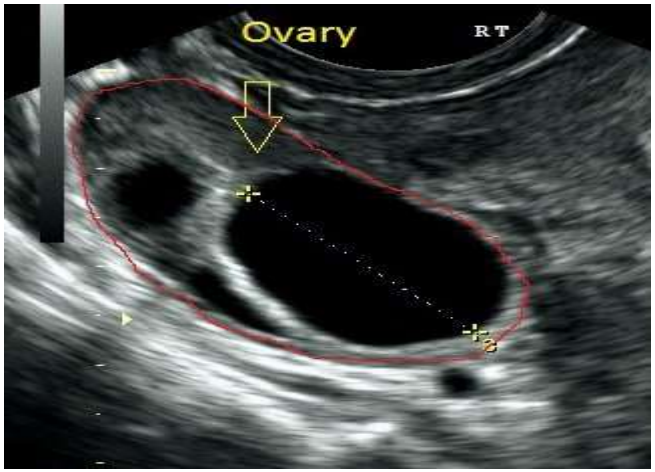
1-Turn the patient obliquely and scan the opposite ovary through the full bladder.

2-Reduce the gain settings.

3- when the urine is too little ask the patient to drink more water.

If the bladder is over filled, it will push the ovaries against the uterus or laterally

When the ovaries have been found:
1- Check the normal echo pattern
,2- check for follicles, the follicle may be up to 25mm
3 - Measure the size of each ovary



Abnormal uterus

1- Myomas (fibroids)

a. well defined, homogeneous or heterogeneous , hypochoic, nodular masses, either subserosal, submucosal or interstitial

There may be bright echoes from calcification

Uterine myomas can indent the posterior wall of the bladder

myomas are almost always multiple and frequently distort the normal contours and the endometrial canal of the uterus

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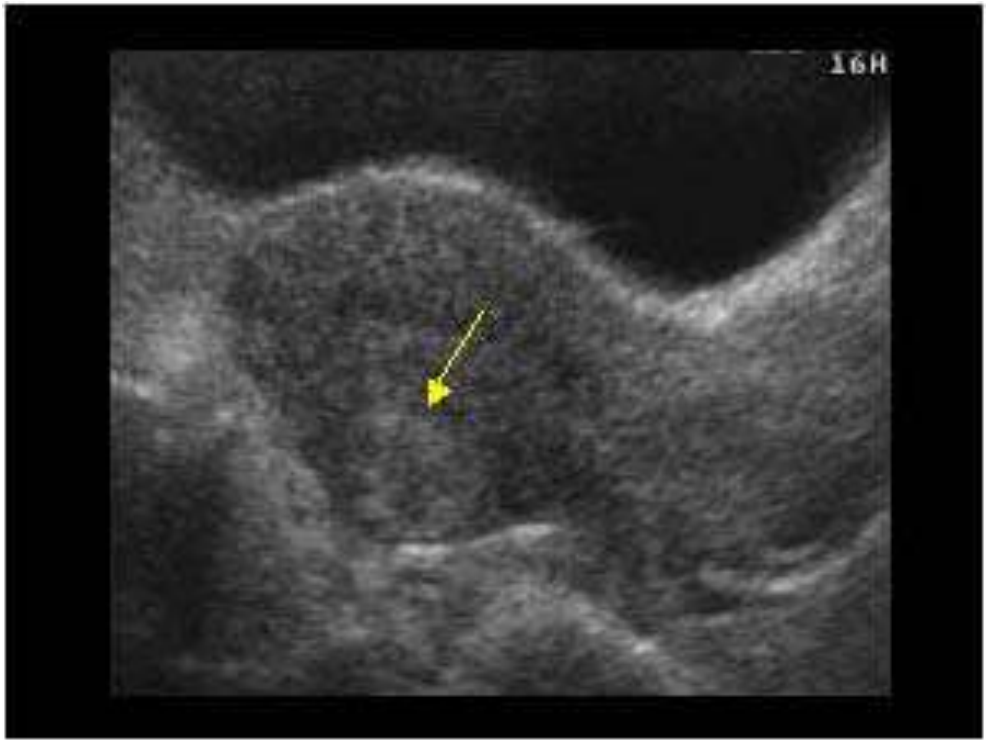
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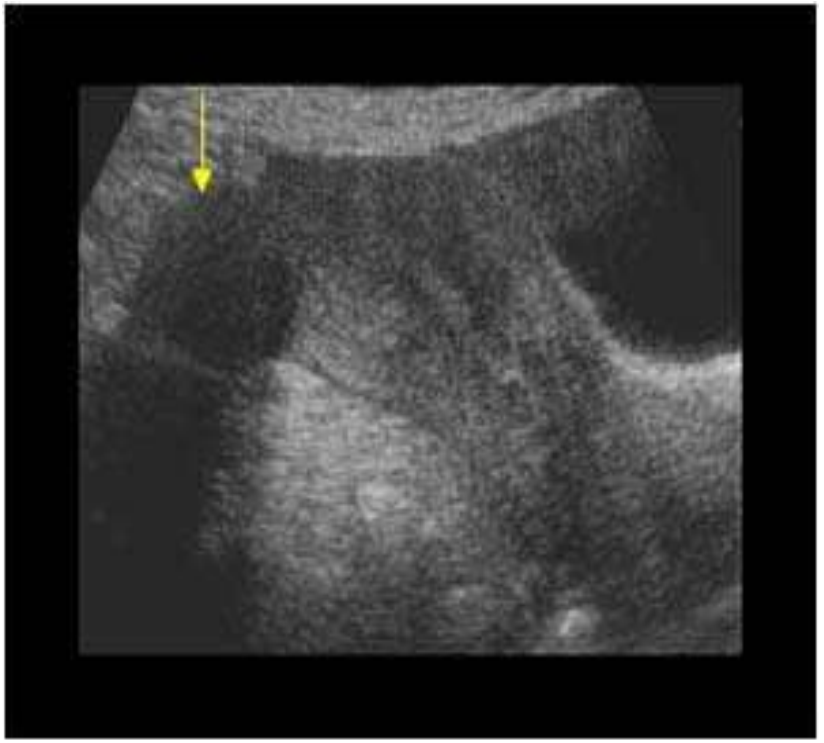


The endometrium (lining of the uterus)

The normal pattern varies with the stage of the menstrual cycle.

In the secretory phase (at the beginning of the cycle) the endometrium appears thin and hypoechoic .

In the proliferative phase (mid-cycle) the central part of the endometrium becomes hyperechoic and is surrounded by a hypochoic rim.

The endometrial canal may be filled with pus from infection (pyometria). This will appear hypoechoc with internal echoes

Malignant disease

poorly defined mass within the uterus may be malignant and is usually endometrial carcinoma.

The hypochoic tumor may spread into the myometrium
When the tumor is advanced, there may be necrosis.

Uterine endometriosis

In uterine endometriosis the myometrium seen with either focal or diffuse thickening and multiple hypoechoic spaces mainly near endometrium

Abnormal ovary

Ovarian cysts

*follicle is a physiological ovarian cyst which normally disappears during the second half of the menstrual cycle.

*If the follicle fails to rupture in mid-cycle, it will become a follicular cyst,

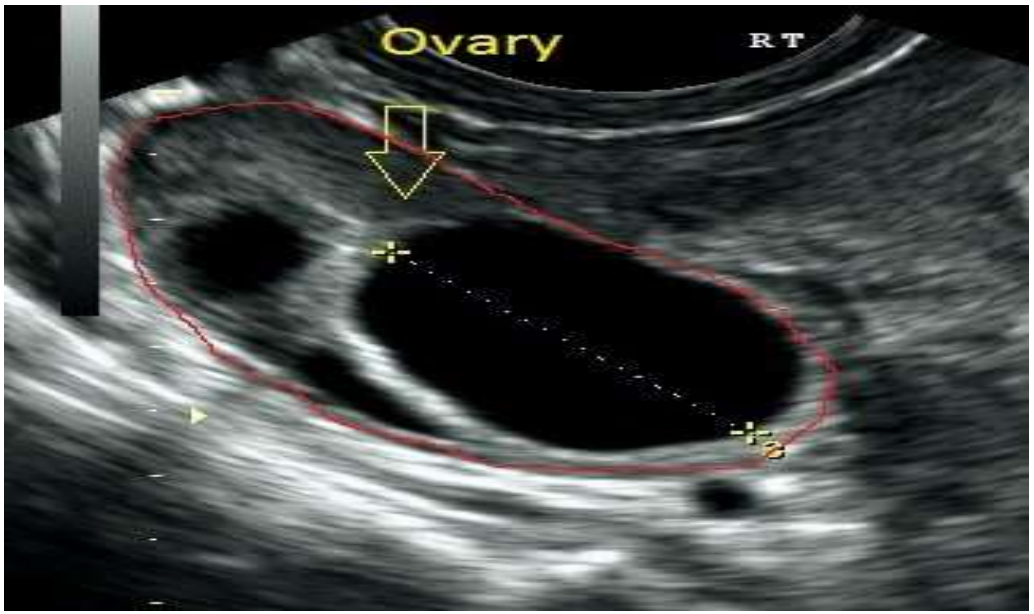
*these may be over 3cm in diameter. Immediately after rupture there may be a little fluid in the cul-de sac

*A simple cyst has smooth walls, no internal echoes, good distal wall enhancement

Cystic masses in the pelvis of postmenopausal women are probably malignant.

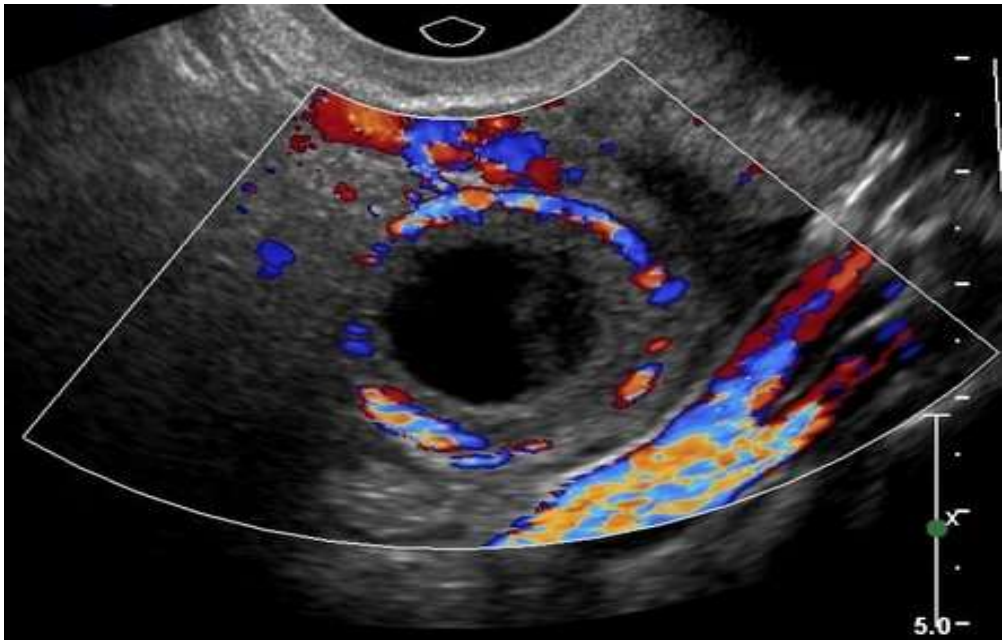
Follicular cysts

- Follicular cysts occur as a result of failure of ovulation, They .are commonly seen at ultrasound
- The typical appearance is of a unilocular cyst with no internal echoes, a thin smooth wall, and posterior acoustic enhancement



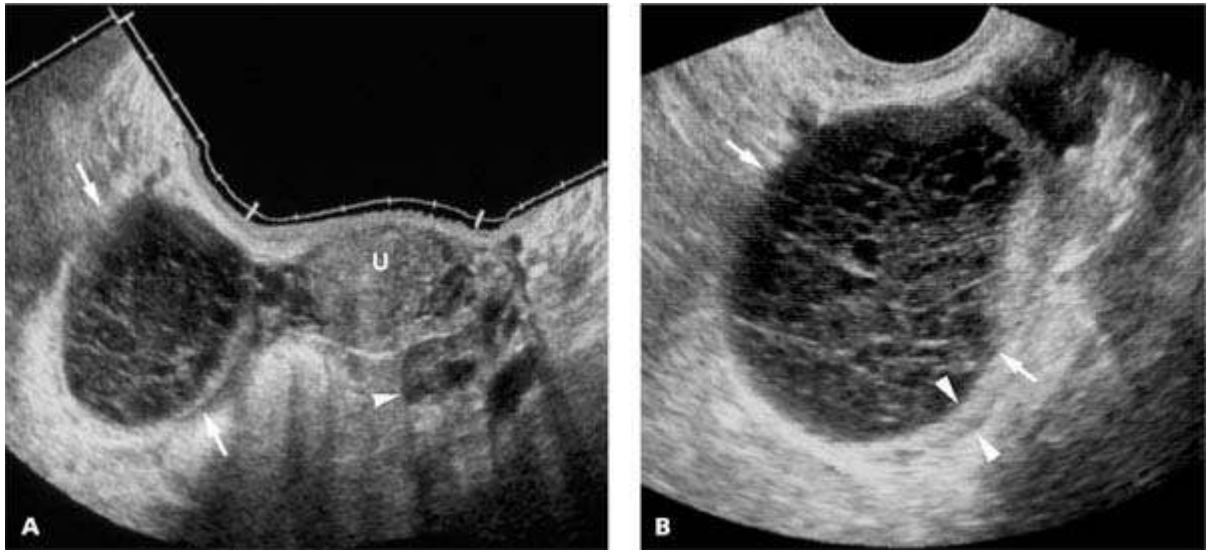
Corpus luteal cysts

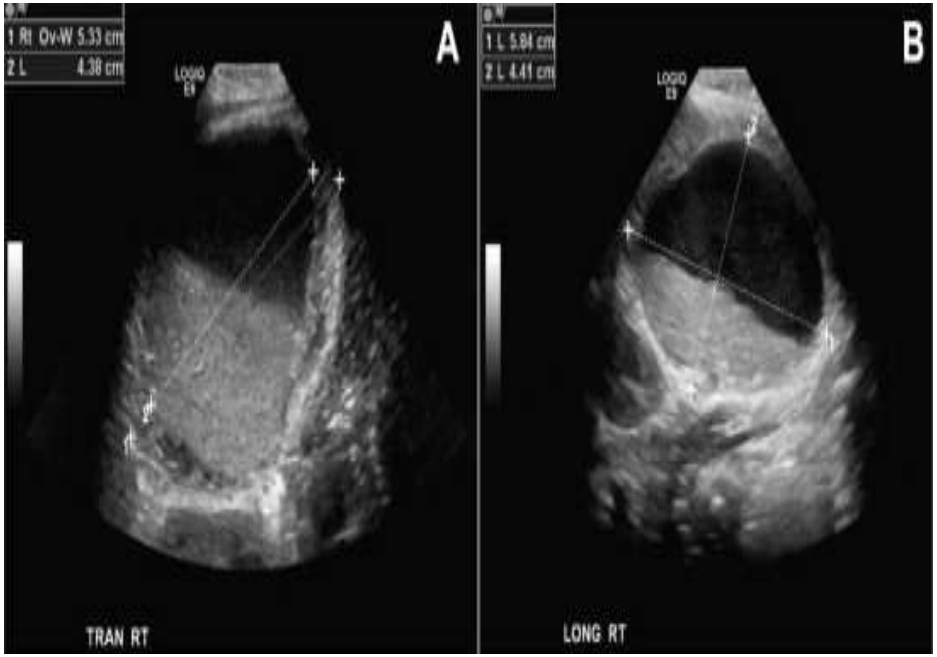
- Corpus luteal cysts result from failure of involution of the corpus luteum, tending to be more symptomatic than follicular cysts.
- Complex luteal cysts can mimic malignant lesions

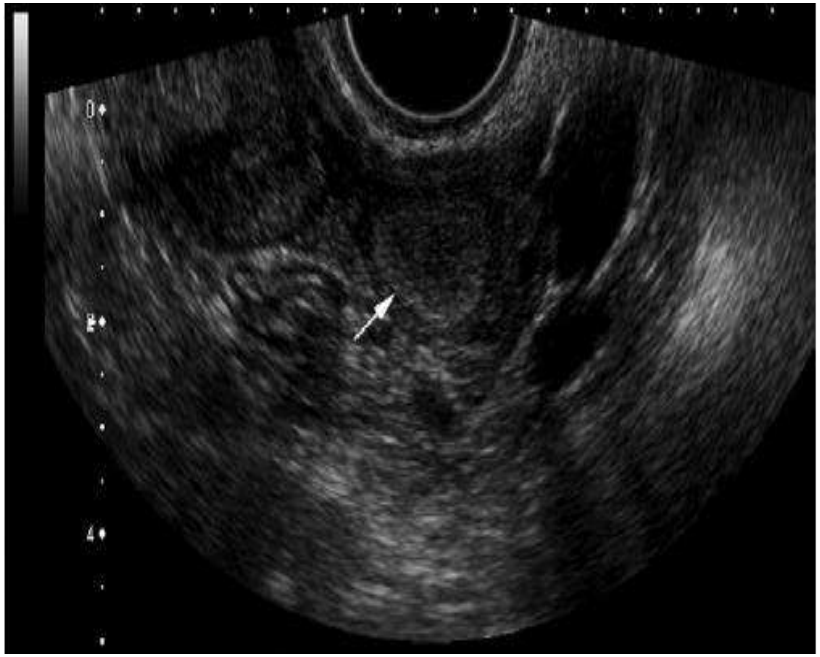


Haemorrhagic cysts

Hemorrhage may occur in both types of functional cyst, although it is more common with corpus luteal cysts

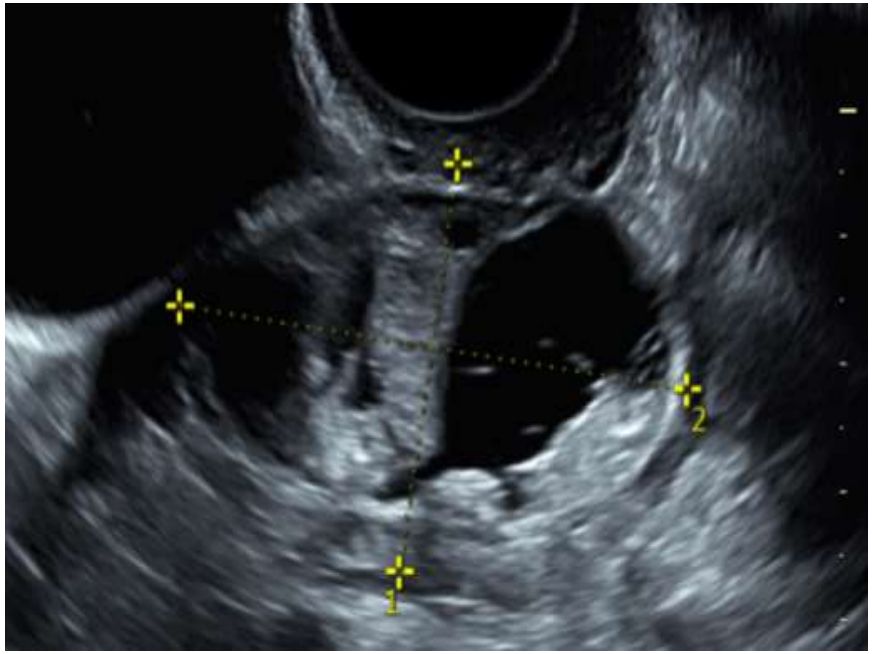



1 Rt Ov-W 5.33 cm
2 L 4.38 cm
A
TRAN RT
1 L 5.84 cm
2 L 4.41 cm
B
LONG RT



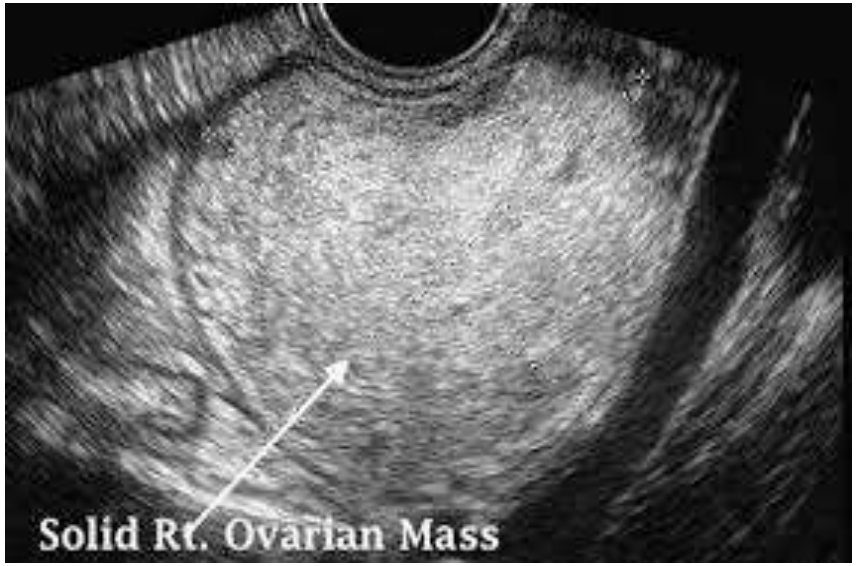
Dermoid cysts (cystic teratomas)

- appear as solid or complex masses with areas of acoustic shadowing due to calcification



Solid ovarian masses

Solid masses are rare and have often undergone necrosis or internal hemorrhage



Pelvic inflammatory disease and pelvic abscess

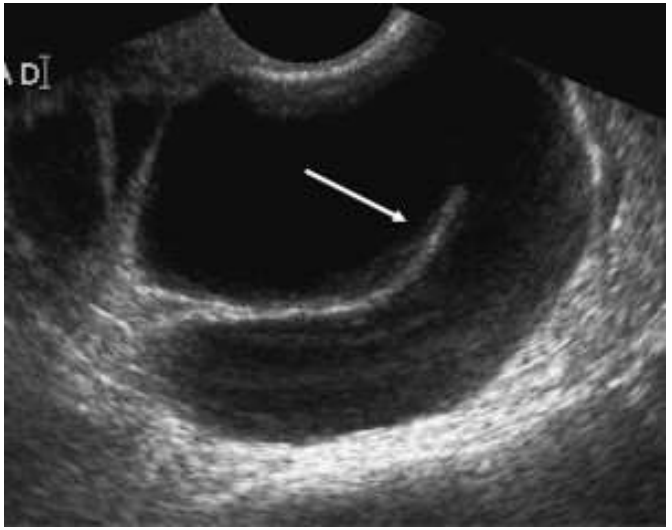
*ultrasound may be normal and clinical examination may be more accurate.

*A mass may be an abscess ,ectopic pregnancy, hydrosalpinx with fluid in cul-de sac.

*Any localized, complex pelvic mass may be inflammatory

* It is often impossible to be sure of the exact location or etiology of an inflammatory mass.

Tubo ovarian abscess



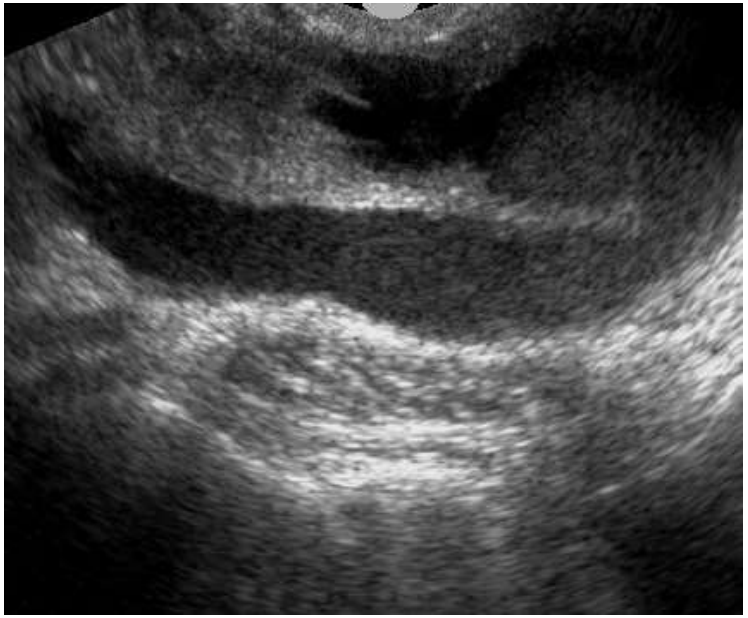
Hydrosaplix

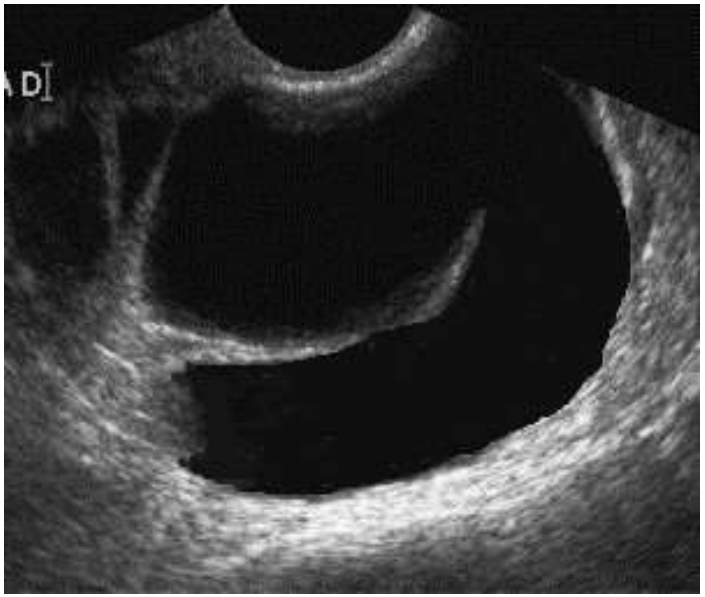
* It is not easy to demonstrate a normal fallopian tube with ultrasound.

* it is difficult to be seen unless there is a significant local change, for example, partial enlargement of the tube.

*If the tubes are fluid-filled, it may be difficult to differentiate bowel .

Any pyosalpinx (tuberculous or pyogenic) will appear very similar





Pelvic varices

Ultrasound will demonstrate multiple echo-free, tubular structures around the uterus and occasionally between the uterus and the bladder.

There may be only a single dilated vein, which may be mistaken for a hydrosalpinx. Differentiation can be made by examining the patient tilted head downwards. A dilated vein will empty in this position, whereas a hydrosalpinx will not change

Thank you