Gynaecology: Imaging reporting guidelines in gynaecology for ultrasound practitioners

C58/2015

1. Introduction and Who Guideline applies to

This guideline is aimed at ultrasound practitioners in radiology scanning for suspected gynaecological problems. The guidelines are drawn from the Society and College of Radiographers (SCOR) and British Medical Ultrasound Society (BMUS) Guidelines for Professional Ultrasound Practice and will be provided in electronic format. In this document the word 'GP' can be used interchangeably with health care provider.

Related UHL documents:

- Imaging Referral – Gynaecology UHL Imaging Guideline C57/2015
- Ultrasound Probes - Decontamination UHL Policy B33/2016
- Ovarian or Adnexal Mass UHL Gynaecology Guideline C53/2015
- Menopause UHL Gynaecology Guideline C28/2019

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2. History and techniques for consideration

The type of examination carried out, i.e. using transvaginal (TV) and/or transabdominal (TA) techniques should be directed by the clinical presentation of the patient. A full explanation of the techniques should be given to the patient and appropriate verbal consent sought and documented in the report. The need for a chaperone should also be considered and again documented in the report.

The following should be considered:

- Obtaining information regarding the patient's previous medical and menstrual history including stage and cycle. This should be recorded in the report as how many days/weeks since last menstrual period rather than the date.
- Establishing information relating to any medication e.g. oral contraceptive pill, hormone replacement therapy, Tamoxifen.
- Unless contraindicated a TV scan should be performed in the following clinical referrals
    - Post-menopausal bleeding
    - Irregular or Intermenstrual bleeding
    - Post coital bleeding
    - Any ovarian pathology seen TA
    - Women referred with infertility/subfertility
- Using colour and/or power Doppler in appropriate clinical presentations *if available* e.g. the assessment of myometrial vascularity, ovarian angiogenesis, endometrial vascularity.

3. Gynaecological structures for examination on US.

The anatomical structures that should normally be examined in accordance with the clinical information given are as shown in the table below.

Structure	**Evaluation**
Uterus	Position (anteverted /axial / retroverted), size, shape, appearance of myometrium
Endometrium	Appearance and thickness
Ovary	Position, shape, appearance, number of ovarian cysts, size of ovary or ovarian cyst(s) (L x W x AP x 0.5)
Adnexae	Presence or absence of mass(es). Appearance and size when present + Doppler
Fallopian tubes	Assess where visible
Pouch of Douglas	Presence or absence of fluid and/or masses +/- Doppler

4. Reporting information required on the assessment of gynaecological structures.

Uterus

Position: Anteverted/anteflexed vs retroverted/retroflexed.

The normal uterus assumes a number of positions depending on the degree of distension of the urinary bladder. The positions are described in relation to the angle of the long axis of the uterine body to the long axis of the cervix (flexion) and the long axis of the uterus to the long axis of the vagina (version). The most common position is in anteversion or anteflexion. When the uterus is positioned in retroversion or retroflexion, it may be difficult to image transabdominally and may be better imaged transvaginally. The position of the uterus can change even during the scan and should not be considered to be in a fixed position. However, in rare cases a retroverted uterus can become entrapped under the sacral promontory especially in the early second trimester of pregnancy or where there are fibroids present.

Size:
Normal uterine size varies with patient age and parity.

In patients of reproductive age: The mean dimensions of the normal uterus are approximately 8 cm long, 4 cm high, and 5 cm wide, with the multiparous uterus being larger than the nulliparous uterus by as much as 1 cm in each dimension (1).

In post-menopausal patients: The most rapid decline in uterine size occurs within the first 10 years after menopause, with a more gradual decline thereafter. The uterus ranges from 3.5 to 7.5 cm in length and from 1.2 to 3.3 cm in anteroposterior diameter in patients older than 65 years with the wide ranges reflecting variations in patient parity, the number of years since the onset of menopause, and the presence of pre-existent uterine disease such as fibroids (2).

Shape:

In patients of reproductive age: The uterus is typically pear shaped, with the body approximately twice the size of the cervix. The outer contour of the uterine fundus is normally flat or slightly convex superiorly, and the inner myometrial contour facing the endometrial canal is normally flat. The normal shape of the uterine cavity, best displayed in the mid coronal plane at three- dimensional US, is approximately triangular. After caesarean delivery, the uterus typically is more elongated, and there is variable deformity or thinning at the site of the lower uterine incision.

In post-menopausal patients: the uterine body-to-cervix ratio approaches 1:1.

Myometrium

In patients of reproductive age: the normal myometrium has homogeneous echogenicity with smooth outer margins at US.

In post-menopausal patients: The myometrial appearance is often more heterogeneous. Calcified uterine arcuate vessels are commonly noted in elderly postmenopausal women, especially those with diabetes, vascular disease, hypertension, or hypercalcemia.

Coarse echotexture: this terminology is ambiguous and has no clinical consequence. It is best avoided.

Fibroids: Fibroids usually arise in the myometrium but may occasionally be found in the cavity, cervix, broad ligament or ovaries. These benign tumours are hormone dependent, responding to both oestrogen and progesterone. They often increase in size during pregnancy and usually decrease in size after menopause.

Typically, fibroids appear as well-defined, solid masses with a whorled appearance. These are usually of similar echogenicity to the myometrium, but sometimes may be hypoechoic. They cause the uterus to appear bulky or may cause an alteration of the normal uterine contour. Even non-calcified fibroids often show a degree of posterior acoustic shadowing, although this is more marked in calcified fibroids. Degenerate fibroids may have a complex appearance, with areas of usually central cystic change. Colour Doppler typically shows circumferential vascularity; however, fibroids which are necrotic or have undergone torsion may show absence of flow although this is not diagnostic.
Submucosal fibroids are usually visible separate from the endometrium at TV ultrasound, but can be difficult to differentiate from polyps. The distortion of the contour of the endometrium defines the fibroid as submucous – varying in grade from grade 0 (entirely in the cavity) grade 1 (<50% in myometrium) to grade 2 (>50% in myometrium).
Large fibroids can occasionally cause obstruction of the ureters, with secondary hydronephrosis. Therefore, consideration may be given to extending the examination to assess the kidneys if a large pelvic mass is identified.
The diagnosis of fibroids on US is usually reasonably straightforward although focal adenomyosis can mimic a fibroid and a pedunculated uterine fibroid can sometimes be mistaken for an adnexal mass. When there is doubt about the origin of a pelvic mass at US, further evaluation with MRI should be recommended.

Please state size, position and type of fibroid in the report. Only the largest dimension of the fibroid in mm needs to be reported unless it is submucosal in which case its overall size should be reported. Fibroid relations to the endometrial cavity are extremely important.

Adenomyosis: Adenomyosis is the presence of heterotopic endometrium within the myometrium and is associated with adjacent myometrial hyperplasia. Adenomyosis is

more common in multiparous women. US features include enlarged uterus (either asymmetrically or globally enlarged), focal or diffuse myometrial bulkiness, fan shaped shadowing, cysts in the myometrium, poorly defined endometrial-myometrial border. Adenomyosis may co-exist with fibroids.

Endometrium

Endometrial thickness is best assessed with transvaginal US and represents the sum of the thicknesses of the two endometrial layers. Any fluid in the endometrial cavity should be excluded from the endometrial thickness measurement.

The measurement should be taken in the longitudinal plane excluding the junctional zone where the endometrium is widest, usually near the fundus.
The measurement in mm must be included in the report. It is not sufficient to report the ET in descriptive terms such as "thickened" or "thin" as these terms are subjective . The central thin hyperechoic line represents the interface between the opposing anterior and posterior endometrial layers and should be continuous. Disruption of the central hyperechoic line, or heterogeneity of the endometrium, may indicate an underlying intracavitary lesion such as a polyp, fibroid, or adhesion.

Size

In premenopausal patients: Endometrial thickness and appearance vary with the phase of the menstrual cycle as outlined in the table below.

Days	Phase	Description	Width
1 - 4	Menstrual	Blood in cavity	2 - 6mm
5 - 13	Proliferative	Progressively thicker and hyperechoic endometrium	6 - 12mm
13 - 15	Ovulatory	'Striated' endometrium with inner layer that is relatively hypoechoic surrounded by more hyperechoic peripheral layer	8 - 13mm
16 - 28	Secretory	Endometrium becomes homogenously thicker and brighter	8 - 16mm

The appearance and thickness of the endometrium should be considered abnormal if they do not align with expectations for that phase of the menstrual cycle.

Premenopausal women who have persistently heavy/prolonged/frequent periods or persistent IMB/PCB with an endometrial thickness of >12mm (or 10mm if additional risk factors for hyperplasia (e.g. Diabetes/ PCOS/ chronic anovulation/ Obesity/

Tamoxifen/Unopposed Oestrogen (+uterus in situ)/ Genetic predisposition (BRCA1, HNPCC, Cowden Syndrome)) should be referred to Gynaecology on the Suspected Endometrial Pathology (SEP) Pathway for hysteroscopic assessment of the endometrium.

*Please also refer to **Appendix A** - Normal endometrial appearances in premenopausal women.*

In post-menopausal patients:

The postmenopausal endometrium is typically atrophic because of the lack of oestrogen stimulation and appears as a thin hyperechoic line or band measuring up to 7mm in maximum AP diameter with a mean ET for a postmenopausal uterus of 3mm. The relatively vascular and compact inner myometrial layer, which surrounds the endometrium and appears hypoechoic, should not be included in the measurement. Incidental findings of ET above 4mm but less than 7mm should not be referred to as abnormal/thickened as these measurements are still within in the normal range. However, women with an ET ≥4mm AND postmenopausal bleeding or persistent vaginal discharge, warrant further hysteroscopic investigation and should be referred on the 2WW Endometrial pathway.

- Symptomatic women (postmenopausal bleeding or persistent vaginal discharge) with ET >/=4mm, warrants further investigations and should be referred on the 2WW endometrial pathway.
- Incidental thickened endometrium- if up to 7mm- do not need referral for further investigations.
- Incidental finding (asymptomatic) of fluid </=2mm in cavity, with otherwise normal uterus, no further action

A small amount of endometrial fluid, less than 2 mm in diameter, may be seen in a postmenopausal patient **without** history of postmenopausal bleeding and with an otherwise normal uterus, usually as a result of mild cervical stenosis. In the absence of postmenopausal bleeding or persistent vaginal discharge, further investigation is not required unless the ET is also ≥7mm.

Local practice is to use a standard cut off of endometrial thickness ≥4mm for offering hysteroscopy for PMB to limit the number of missed cancers. Reports should be worded 'The endometrial thickness _mm / fluid in the cavity is above the threshold for offering further investigation with hysteroscopy to exclude endometrial cancer. Please refer on the '2WW endometrial pathway'.

In a postmenopausal patient with incidental findings of:
Endometrial thickness ≥7mm OR ≥2mm fluid in the cavity OR polyp / vascularity / cystic spaces in the cavity or cervical canal
BUT NO BLEEDING or ABNORMAL DISCHARGE – advise GP to refer on the Suspected Endometrial Pathology Pathway (SEP).

In a postmenopausal patient with incidental finding of:
Endometrial thickness <7mm OR <2mm fluid in the cavity
BUT NO BLEEDING or ABNORMAL DISCHARGE – no referral or further investigation required.

Endometrial hyperplasia:

Diffusely thickened, irregular endometrium with potential cystic spaces within the endometrium may represent hyperplasia or a polyp.

Endometrial cancer:

Can mimic endometrial hyperplasia with diffusely thickened endometrium. Think cancer if irregularly thickened, inhomogenous echogenicity, increased vascularity on colour Doppler.or extending into the myometrium.

Endometrial polyp:

The spectrum of sonographic features includes:

- A stalk to the polyp which may be either thin- or broad-based.
- A single feeding vessel extending to the polyp on colour Doppler
- Cystic spaces corresponding to dilated glands filled with proteinaceous fluid may be seen within the polyp.
- Diffusely thickened endometrium, without visualisation of a discrete mass (mimicking endometrial hyperplasia).

Do not state that ‘a polyp cannot be excluded’ on US report if the endometrium is thickened. This statement results in unnecessary referrals to gynaecology for hysteroscopy and therefore should be avoided. Please state that no obvious polyp is seen if the referrer is querying presence of a polyp.

Submucosal fibroid:

Solid tumour protruding into endometrial cavity with same echogenicity as myometrium with possible ring of colour on colour Doppler.

Asherman's syndrome (intrauterine adhesions):

Almost exclusively caused by injury to the basal layer of the endometrium. This most commonly occurs after uterine curettage for miscarriages, terminations or removal of retained products of conception.
Characteristically appears as “bridging bands” of tissue that distort the endometrial cavity.

Hormone replacement therapy (HRT):

Hormone replacement therapy affects the thickness of the endometrium.
Sequential oestrogen and progesterone therapy, often used in perimeno- pausal patients induces cyclical endometrial changes and symptoms similar to those

occurring in premenopausal patients. In such cases, US scans should be obtained early in the cycle or near the end of withdrawal bleeding, when transient physiologic thickening is not expected to be present.

The use of continuous oestrogen and progesterone regimens leads to endometrial atrophy; therefore, measurements of endometrial thickness in these patients are usually within the normal range. Unopposed oestrogen therapy is associated with an increased risk of endometrial hyperplasia or carcinoma and is prescribed only for post-hysterectomy patients.

If women on HRT present with new onset PMB advise GP they must be referred on the 2WW endometrial pathway if the ET≥4mm or if they have recurrent episodes of PMB or a persistent discharge despite a thin ET of <4mm.

If women have persistent unscheduled bleeding on HRT for more than 6 months after starting HRT they should be referred on the SEP pathway irrespective of the endometrial thickness.

Tamoxifen:

Tamoxifen has been proven effective for the treatment of breast cancer but is associated with increased incidence of endometrial disease among postmenopausal women because of its oestrogenic effect on the uterus. Women with breast cancer may also have underlying genetic alterations which predisposes them to Breast and ovarian cancer/endometrial cancer. Nearly half of all postmenopausal women undergoing tamoxifen therapy have an endometrial thickness greater than 8 mm, and most are asymptomatic, without abnormal vaginal bleeding. The most common histopathologic findings, including hyperplasia and polyps, are benign, with an approximate 1% risk of endometrial carcinoma (3,4).

Because endometrial thickening is commonly due to benign causes in patients receiving tamoxifen therapy, there is no consensus about a threshold thickness for recommending endometrial sampling in asymptomatic women. Screening the endometrium in asymptomatic women on Tamoxifen is not therefore useful and leads to unnecessary intervention.

Women can still have periods whilst taking Tamoxifen so ensure a clear history is taken and document on the report. However if these women present with PMB (bleeding after 12 months of amenorrhoea) advise referral on the 2WW endometrial pathway.

Ring pessary in situ:

This is the responsibility of the practitioner to assess whether to perform a TV US with ring pessary in situ. Generally it is possible to insert the probe using plenty of lubricant. There is a theoretical risk of a vaginal tear although this is very unlikely. TV US should not be performed if it is another type of pessary. Consider senior advice if

unsure. Transperineal or transrectal USS is an alternative option where transabdominal views are unhelpful with a pessary in situ.

Postpartum patients - US appearances (4 - 7):

Puerperium is the period 6–8 weeks after delivery when the uterus undergoes physiological involution and returns to the non-gravid state. The most rapid changes occur in the first few days after delivery. The uterus is approximately 20 cm in length and weighs about 1 kg immediately after childbirth but decreases by approximately 50% in the next 24–48 hours.

Beyond the first few days postpartum, the uterine involution is more gradual, with the uterus measuring 11.2 cm long at 3 weeks and 8.7 cm long at 6 weeks postpartum. The timing of the involution may be prolonged in multiparous women and shorter after preterm delivery, but it is not usually affected by infant birth weight or breast-feeding. Within the first few days after delivery, the remaining superficial decidual tissue becomes necrotic and is sloughed in the lochia. The deeper decidual layer proliferates and restores the endometrium by 3–6 weeks postpartum.

On US images, the immediate postpartum myometrium often appears heterogeneous and has higher echogenicity than the myometrium of a non- gravid uterus. Increased diffuse and focal myometrial vascularity at the placenta insertion site has been described in the absence of abnormal postpartum bleeding. Intracavitary fluid, blood products, and small amounts of gas are commonly noted in asymptomatic women after delivery and therefore are not necessarily indicative of a postpartum complication. Fluid and echogenic material are noted in the endometrial cavity of 20% of asymptomatic women in the first few days after vaginal delivery, and these findings are even more common at 1 week postpartum, being present in approximately half of women examined. The amount of blood products diminishes over the ensuing weeks, but complex fluid may still be present in 6% of women 3 weeks after vaginal delivery. Hyperechoic foci on US images, likely representing intracavity gas, have been noted in asymptomatic women as late as 3 weeks after vaginal delivery and are noted after both vaginal and caesarean deliveries.

If within 4 weeks of delivery – should go back to Maternity for review if symptomatic (ongoing bleeding/infection) and ET >20mm.
If >4 weeks of delivery and ongoing PVB and ET>20mm – advise GP to refer to GAU.
If post TOP /miscarriage – and PT positive >3/52 or ongoing PVB >3/52 or either of the above– advise GP to refer to GAU to exclude RPOC, molar pregnancy and AVM. Assess endometrial thickness for cystic appearances (molar), heterogeneous appearance (RPOC) including with Doppler to look for AVM

Mullerian duct anomalies.

The different types of congenital uterine malformation are as stated below.

Without 3D ultrasound, it is difficult to distinguish between the different types. In these circumstances, write septate uterus suspected and let GP decide on further management.

Septate uterus:
This results from partial or complete failure of resorption of the uterovaginal septum after fusion of the mullerian ducts. The echogenic endometrial stripe is separated at the fundus by a septum. The septum extends to the cervix in a complete septate uterus. The external uterine fundal contour may be convex, flat, or mildly (< 1 cm) concave.

Arcuate uterus:
An arcuate uterus is characterised by a mild indentation of the endometrium at the uterine fundus. It occurs due to a failure of complete resorption of the uterovaginal septum, and is the most common mullerian duct anomaly.

Bicornuate uterus:
There is a partial failure of fusion of the mullerian ducts, resulting in a uterus divided into two horns.
External uterine contour is concave or heart shaped. Uterine horns are widely divergent. Fundal cleft > 1cm deep. Intercornual distance widened.

Didelphys:
Results from failure of fusion of the mullerian ducts. Complete duplication of the uterine horns and cervices (and rarely vagina).

Unicornuate:
Failure of one mullerian duct to develop. Can be difficult to detect on ultrasound. The uterus may be seen tapering to one side.

Intrauterine Contraceptive device.

A copper containing IUCD On longitudinal view will show as very bright echogenic line within the endometrium +/-posterior acoustic shadowing. With non-copper IUS it is often only possible to see the posterior shadowing. A malpositioned IUCD/IUCD where the device is in the cervical canal or >1cm below the upper edge of the cavity may not be an effective contraceptive and the woman should be advised to use additional contraceptive precautions and seek the advice of her GP/Gynaecologist.

Free peritoneal fluid.

Not necessarily pathological when small in amount and simple in appearance, especially in reproductive female and in early menopause. **Free fluid in established**

menopause i.e. amenorrhea for 12 consecutive months from date of last menstrual flow is abnormal. If measured, then state single deepest pool.

Ascites is when free fluid extends above the uterine fundus and could be related to a variety of conditions not just intraperitoneal malignancy but also cardiac, renal or liver disease. Please get patient review from senior radiologist regarding further management and document in the report.

Peritoneal disease/omental cake can be seen in gynaecological (ovarian) or other intraabdominal malignancy. Advise referral to gynaecology cancer MDT.

Ovaries

Premenopausal:

Normal ovarian volume decreases after the age of 30 years. On average this is up to 10ml. If the ovary is of normal size there is no need to report the dimensions in your report. The normal ovary has a variable appearance over the course of the menstrual cycle. Developing and immature follicles can be seen throughout the entire cycle and appear as fluid-filled, unilocular, sharply marginated cysts with diameters of 2–9 mm.

In the first half of each menstrual cycle, one or more dominant follicles will grow to a diameter of approximately 20–25 mm and then rupture at ovulation, releasing the oocyte. After ovulation, the corpus luteum, a remnant of the mature follicle, undergoes a process of cellular hypertrophy and increased vascularization. Therefore, a corpus luteum is typically visible in the secretory phase of the menstrual cycle and persists into the first trimester of pregnancy.

Corpus luteal cyst:

On US images, the corpus luteum has a hyperechoic wall that may be slightly irregular in contour, with circumferential low-resistance blood flow with colour Doppler. Centrally, the corpus luteum may contain echoes representing internal haemorrhage, but there is usually evidence of increased through- transmission because of the fluid content, and always a lack of central vascularity. Typically the corpus luteum is less than 3.0 cm in its maximal dimension.

Follicular Physiological cysts:

In a small number of women, a mature follicle sometimes fails to ovulate and continues to enlarge into the next menstrual cycle, occasionally growing larger than 5 cm; these follicles are most often discovered incidentally in asymptomatic women with a clinical history of menstrual irregularity. A follicular cyst appears as a simple unilocular or minimally complicated cyst with thin walls, sharply defined borders and no internal vascularity.

If cyst is less than 30mm, report as a dominant follicle; this is important if the patient is being investigated for infertility.

If cyst is 30 - 50mm, then report as a unilocular follicular cyst that does not require follow up unless symptomatic. This includes haemorrhagic cysts.

Physiological cysts are a normal part of menstrual cycle and are usually accurately diagnosed with ultrasound and do not require follow up scans. **Please do not advise rescan in 6 weeks for any cysts.**

If cyst >50mm, then advise gynaecology referral or Advice and Guidance

Polycystic Ovaries:
Latest recommendations from the international society guidelines along with the European Society of Human Reproduction and Embryology (ESHRE) for the assessment and management of polycystic ovary morphology (PCOM) (8) state that:-
Using endovaginal US transducers with a frequency bandwidth that includes 8 MHz, the threshold for PCOM should be on either ovary, a follicle number per ovary of > 20 and/or ovarian volume > 10mls, ensuring no corpora lutea, cysts or dominant follicles are present.
If the referral is querying PCOM then the volume of the ovaries must be measured and reported. If there is a corpus luteum or follicular cyst then the ovarian volume cannot be accurately assessed and cannot be reported. This could lead to inaccurate reporting of polycystic ovarian morphology.
Ultrasound findings should not be used for the diagnosis of PCOM in those with a gynaecological age of less than 8 years (less than 8 years after menarche) due to the high incidence of multi-follicular ovaries in this life stage.

If polycystic ovaries identified, please use phrase 'polycystic ovarian morphology (PCOM) seen; in the right clinical and biochemical setting this would support a diagnosis of polycystic ovarian syndrome (PCOS)'

Dermoid cyst:
The spectrum of sonographic features includes:

- Diffusely or partially echogenic mass with posterior sound attenuation owing to sebaceous material and hair within the cyst cavity.
- An echogenic interface at the edge of mass that obscures deep structures: the tip of the iceberg sign.
- Mural hyperechoic Rokitansky nodule: dermoid plug.
- Echogenic, shadowing calcific or dental (tooth) components.
- The presence of fluid-fluid levels.
- Multiple thin, echogenic bands caused by the hair in the cyst cavity: the dot-dash pattern.
- Colour Doppler: no internal vascularity.

- Internal vascularity requires further workup to exclude a malignant lesion.
- The appearance of intracystic floating balls is rarely seen but is considered characteristic.

If there is a definite diagnosis of dermoid cyst on US, the patient does not require an MRI. Advise gynaecology referral.

Endometrioma:
The appearances of endometriomata can be quite variable (8). The classical example is a unilocular cyst with acoustic enhancement with diffuse homogeneous **ground-glass echoes** as a result of the haemorrhagic debris. This appearance occurs in 50% of cases. The cysts may be up to 20cm in size but are usually smaller
Differential to this appearance would be a haemorrhagic cyst.
Less typical features include:

- Multiple locules (~85% will have <5 locules)
- Hyperechoic wall foci (present in 35%)
- Cystic-solid lesion (~15%) or purely solid lesion (1%)
- Anechoic cysts (rare; 2%)
- Postmenopausal cysts

If there is a definite diagnosis of endometrioma on US, the patient does not require an MRI. Advise GP to consider gynaecology referral depending on patient's symptoms.

Assessment of indeterminate ovarian cysts in the premenopausal patient.

This is for assessment of cysts which are not immediately recognisable as either functional cysts, dermoid, PCOS or endometrioma.
Assess the following features to help classify ovarian cyst into benign or malignant.

- Unilocular vs multilocular
- Size of cyst (measure in 3 orthogonal diameters).
- Presence and maximum size of any solid components. Solid component – structure that has echogenicity suggestive of tissue; will be non compressible and show colour flow. *The white ball of a dermoid is not solid tissue and blood clot or mucin is not solid tissue*.
- Presence and number of papillary projections. If protrusion > 3mm = papillary projection. If < 3mm = irregularity. Do not include cyst wall or septum in measurement of papillary projection.
- Shadowing.
- Internal vascularity.
- Cyst contents – anechoic, low level, ground glass, haemorrhagic or mixed.
- Ascites.

Using International Ovarian Tumour Analysis (IOTA) rules the report should clearly state presence or absence of any Benign (B) and or Malignant (M) features in its conclusion for premenopausal women. See **Appendix B** for IOTA group US rules to help classify presence of B or M US features and for advice to GP on further management.

Post-menopausal:

The normal postmenopausal ovary is less echogenic and smaller. As a result, the ovaries may be difficult to detect at both transabdominal and transvaginal US. The uterus is an important landmark, and the broad ligaments can often be traced to the ovaries, which are attached to the posterior aspect of the ligaments. Pelvic vessels or stationary bowel loops may be mistaken for postmenopausal ovaries, and using colour Doppler or exerting manual pressure on the abdominal wall to displace the bowel loops may improve visualization.

Small (1-3mm) punctate echogenic foci with no associated soft tissue mass may be seen in postmenopausal ovaries, most often in the periphery. These foci may represent dystrophic calcification in atretic follicles and surface epithelial inclusion cysts or may be tiny cystic spaces producing reverberation artefact. These are of no clinical significance.

Assessment of ovarian cyst in postmenopausal patient:

A U score should be assigned to enable the clinician to stratify patient into appropriate risk group and manage appropriately. See separate ovarian mass guideline.

USS features	**Multilocular**
	Solid areas
	Ascites
	Bilateral
	Metastases

U score (**0** if 0, **1** if 1, **3** if 2-5 features present)

For Information Only

RMI (risk of malignancy index) = U (0, 1 or 3) x M (3 post-menopausal) x Ca125 in u/ml

- Postmenopausal women with an RMI < 25 bear a < 3% risk of malignancy
- Postmenopausal women with an RMI > 50 and < 250 bear a 20% risk of malignancy
- Postmenopausal women with an RMI > 250 bear a >75% risk of malignancy

In report to GP, please advise management according to the Incidental finding of Adnexal Cysts in post-Menopausal Women flow chart in **Appendix C**.

Extraovarian adnexal pathology.

Hydrosalpinx:

This may be thin- or thick-walled (in chronic cases), elongated or folded, tubular, C-shaped, or S-shaped fluid-filled structure. It is distinct from the uterus and ovary. Longitudinal folds that are present in a normal fallopian tube may become thickened in the presence of a hydrosalpinx. The folds may produce a characteristic “cogwheel” appearance when imaged in cross section. These folds are characteristic of a hydrosalpinx.
Indentations on the opposite sides of the wall is referred to as "waist sign" which is a strong predictor of hydrosalpinx. The waist sign in combination with a tubular-shaped cystic mass has been found to be characteristic of a hydrosalpinx . Incomplete septae may also give a "beads on a string" sign.

Sometimes the dilated fallopian tube may not show longitudinal folds. If the elongated nature of these folds is not noted, they may be mistaken for mural nodules of an ovarian cystic mass. A significantly scarred hydrosalpinx may present as a multi-locular cystic mass with multiple septa (often incomplete) creating multiple compartments. These septa are generally incomplete, and the compartments can be connected. However, with more pronounced scarring, differentiation from an ovarian mass may not be possible.

Paraovarian cysts:

These are remnants of Wolffian duct in the mesosalpinx that do not arise from the ovary. They account for about 10-20% of adnexal masses. They typically occur in women at the ages of 20-40 years old.
A paraovarian cyst is easier to recognise if the ipsilateral ovary is demonstrated to be separate from it.

Sonographic appearances include:

- It is typically thin-walled and smoothly marginated.
- Usually unilocular 'simple' cyst (in ~ 66%); rarely multilocular (~ 4%).
- A soft tissue nodule in the cyst may indicate the development of a neoplasm (rare).

Peritoneal inclusion cyst:

They are usually caused by accumulation of ovarian fluid that is contained by a peritoneal adhesion. The normal peritoneum absorbs fluid easily. However, the absorptive capacity of the peritoneum is greatly diminished in the presence of mechanical injury, inflammation and peritoneal adhesions.

Peritoneal inclusion cysts range in size from several millimetres in diameter to bulky masses that may fill the entire pelvis and abdomen. Pathologically, the cyst results from non-neoplastic, reactive mesothelial proliferation.

Associations:

- Previous abdominal trauma
- Previous pelvic inflammatory disease

- Previous abdominal surgery
- Endometriosis

Sonographic appearances include:

- Ovoid or irregular, anechoic cyst but septations are not uncommon
- Conforms to the peritoneal space.
- Invagination of the surrounding structures into the cyst.
- Lack of a discrete limiting wall.
- No mural nodularity.
- Minimal internal debris.

Other features in relation to the ovary include:

- Spider web pattern (loculated fluid and adhesions around a normal appearing entrapped ovary)

Early Pregnancy.

Information should be recorded including:

- Presence and number of intrauterine (IU) sacs and their mean gestation sac diameter (MSD).
- Regularity of the outline of the sac and its location.
- Presence of a haematoma.
- Presence of a yolk sac.
- Presence of a foetal pole.
- Crown rump length measurement (CRL)
- Presence of foetal heart (FH) pulsation.
- Extra uterine observations: ovaries, adnexal mass, fluid in the pouch of Douglas.

Transvaginal Ultrasound appearance	Diagnosis
Intrauterine gestation sac and foetal pole with FH seen within	**Viable Intrauterine pregnancy**
GestationSac MSD <25mm – no foetal pole or yolk sac	State in US report 'there is a cystic area at the fundus of the endometrium with a MSD of …mm. No yolk sac or foetal pole seen. This may represent an early IU pregnancy but an ectopic cannot be excluded'. This is a pregnancy of unknown location (PUL).
MSD <25mm and yolk sac seen inside but no foetal pole	**Intrauterine pregnancy of uncertain viability (IUPUV)**
MSD >25mm – no foetal pole	**Probable / anembryonic miscarriage**
Fetal pole seen CRL <7mm on TV FH not seen	**Intrauterine pregnancy of uncertain viability (IUPUV)**
CRL >7mm FH not seen +/- bleeding	**Missed miscarriage:** Confirm the absence of foetal heart with a second sonographer or offer a confirmatory scan on another day
Empty uterus No adnexal abnormality No symptoms	**Pregnancy test negative** **Complete miscarriage** or never pregnant
	Pregnancy test positive **Pregnancy of Unknown Location (PUL)** possible early IU pregnancy or ectopic pregnancy or complete miscarriage
Empty uterus with Adnexal mass, +/- Fluid in POD and Pain	**Suspected ectopic pregnancy (*see below for additional updated NICE guidelines on US diagnosis of tubal ectopic pregnancy).**
Empty Uterus Endometrium/AP diameter **<20mm** Normal endometrium or mixed echoes	**Complete miscarriage** (if previous US showed IUP or POC seen)
	or **PUL** (if no previous US or previous US did not show intrauterine pregnancy)
Uterus containing mixed echoes with AP diameter >20mm	**Incomplete miscarriage if previous scan showed IU pregnancy. If no previous US – PUL.**
Heterogeneous, grape- like mass within the uterus	**Suspected trophoblastic disease (Complete molar pregnancy).** Partial molar pregnancy may be suspected with numerous cystic spaces within the trophoblastic tissue adjacent to an intrauterine gestational sac.

<u>*US diagnosis for tubal ectopic pregnancy</u>
- recent update in NICE guidelines NG126 April 2019 (updated Nov 2021).

When carrying out a transvaginal ultrasound scan in early pregnancy, look for these signs indicating there is a tubal ectopic pregnancy:

- an adnexal mass, moving separate to the ovary, comprising a gestational sac containing a yolk sac
  or
- an adnexal mass, moving separately to the ovary comprising a gestational sac and fetal pole (with or without fetal heartbeat).

When carrying out a transvaginal ultrasound scan in early pregnancy, look for these signs indicating a possible ectopic pregnancy:

- an adnexal mass, moving separately to the ovary, with an empty gestational sac (sometimes described as a 'tubal ring' or 'bagel sign')
  or
- a complex, inhomogeneous adnexal mass, moving separate to the ovary.

If these features are present, take into account other intrauterine and adnexal features on the scan, the woman's clinical presentation and serum hCG levels before making a diagnosis.

When carrying out a transvaginal ultrasound scan in early pregnancy, look for these signs indicating a high probability of a tubal ectopic pregnancy:

- an empty uterus
  or
- a collection of fluid within the uterine cavity (sometimes described as a pseudo-sac).

If these features are present, take into account other intrauterine and adnexal features on the scan, the woman's clinical presentation and serum hCG levels before making a diagnosis. When carrying out a transabdominal or transvaginal ultrasound scan in early pregnancy, look for a moderate to large amount of free fluid in the peritoneal cavity or Pouch of Douglas, which might represent haemoperitoneum. If this is present, take into account other intrauterine and adnexal features on the scan, the woman's clinical presentation and hCG levels before making a diagnosis.

When carrying out a transabdominal or transvaginal ultrasound scan during early pregnancy, scan the uterus and adnexae to see if there is a heterotopic pregnancy. All ultrasound scans should be performed or directly supervised and reviewed by appropriately qualified healthcare professionals with training in, and experience of, diagnosing ectopic pregnancies.

Where an ectopic mass is identified the entire mass should be measured not only the gestation sac within the mass where one is present. It is the size of the whole mass which is used to assess suitability for different management options and one cannot use the MSD to date an ectopic pregnancy – the size of the sac is not relevant.

Where mixed echoes are identified in the cavity it must always be remembered that these may represent blood, clot and decidua and the possibility of ectopic must be excluded either by serial hCG or good evidence of passing POC or previous US showing IUP. The only measurement of these mixed echoes required is the AP diameter (measured perpendicularly to the endometrial cavity) and management of AP <20mm is likely to be conservative. Management will depend on duration and heaviness of bleeding.

If no previous US the following report wording is suggested: “Mixed echoes seen in cavity measuring ….mm in AP diameter. This is a PUL and serial hCG measurements are recommended.”

Please do not refer to a cystic area at the fundus as a gestation sac unless you can see a yolk sac. There have been cases where an ectopic pregnancy has been missed because of describing it as a gestation sac.
Please use the term PUL Pregnancy of Unknown Location.

Ectopic mass - Please report the size of the whole mass and not just fluid area within and state the maximum diameter of the 3 dimensions. The treatment options will depend on the maximal size of the mass. The patient can have methotrexate if the mass measures up to 35mm in any one diameter.

5. Education and Training

None

6. Monitoring Compliance

None

7. Supporting References

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10. Imaging Referral – Gynaecology UHL Imaging Guideline C57/2015

11. Ultrasound Probes - Decontamination UHL Policy B33/2016

12. Ovarian or Adnexal Mass UHL Gynaecology Guideline C53/2015

13. Menopause UHL Gynaecology Guideline C28/2019

8. Key Words

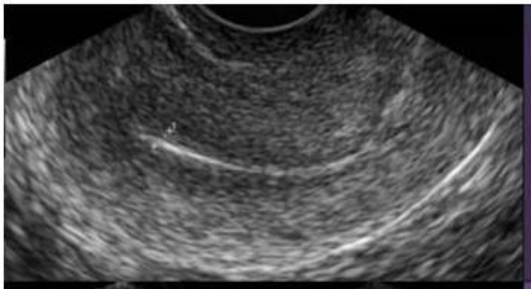
Radiographer transvaginal (TV) and/or transabdominal (TA)

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

Contact and review details			
Guideline Lead (Name and Title) Y Griffin – Consultant Radiologist UHL Lead Sonographer			**Executive Lead** Chief Medical Officer
Original authors: Y Griffin & T Lardner			
Details of Changes made during review:			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
March 2022	**3**	Y Griffin – Consultant Radiologist O Barney – Consultant Hilary Brooke-Clarke Clinical Lead Sonographer	**Uterus** Added reference to the possibility of the uterus changing position **Endometrium** AVB Pathway replaced by Suspected Endometrial Pathology pathway (SEP) Post-menopausal endometrium measurements amended from 4mm in max AP diameter to 7mm in maximum AP diameter with a mean ET for a postmenopausal uterus of 3mm. Actions added in findings of ET >4mm, symptomatic, ET>7mm or >2mm fluid or polyp/vascularity/cystic space **Endometrial hyperplasia** Definition expanded **HRT** Persistent unscheduled bleeding on HRT >6months should be referred on SEP pathway **Tamoxifen** Added screening the endometrium in asymptomatic women on Tamoxifen not required **Ring Pessary** Transperineal or transrectal USS offered as alternative to transabdominal or transvaginal USS. **Post-partum** In cases post TOP/miscarriage & +PT>3/52 Ref to GAU to exclude RPOC, Molar & AVM **Intrauterine device** Malpositioned need ref to GP/Gynae **Endometrioma** Added postmenopausal cysts to the less typical features list **Early pregnancy** In cases of mixed ECHOS in cavity & no previous USS – report as PUL and recommend serial hCG

Appendix A: Normal endometrial appearance images

Appendix A - normal endometrial appearances in premenopausal women.

	Early proliferative phase endometrium	•Thin •Linear •Echogenic
	Late proliferative phase endometrium	•Thick •Trilaminar appearance: 1. Central thin, echogenic line 2. Darker echolucent rim in the middle 3. Surrounding echogenic basilar layer
	Secretory phase endometrium	•Thick •Hyperechoic •Homogeneous

Appendix B: assessment of premenopausal adnexal masses in gynaecology

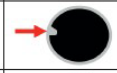
Assessment of Premenopausal Adnexal Masses in Gynaecology	
IOTA Group Simple Rules	
M rules	**B rules**
Irregular solid tumour	Unilocular
Ascites	Solid components <7mm
≥ 4 papillary projections	Acoustic shadowing
Irregular multilocular tumour > 100mm	Smooth multilocular tumour <100mm
Strong blood flow	No blood flow

Please report these findings as described

TA and TV scan to be performed if ovaries are NOT seen or pathology seen TA

For reporting information	
Only B features seen	Low risk for malignancy - gynae referral only if clinically indicated
No B or M features	Inconclusive on ultrasound - refer MRI and tumour markers
B and M features seen	Inconclusive on ultrasound - refer MRI and tumour markers
Only M features seen	High risk for malignancy - urgent gynae referral using 2ww ovarian pathway

Features for predicting a malignant tumor (M-features)	
Irregular solid tumor	
Presence of ascites	
≥ 4 papillary structures	
Irregular multilocular solid tumor with largest diameter ≥ 100 mm	
Very strong blood flow (color score 4)	

Features for predicting a benign tumor (B-features)	
Unilocular	
Presence of solid components where the largest solid component has a diameter < 7mm	
Presence of acoustic shadows	
Smooth multilocular tumor with largest diameter < 100 mm	
No blood flow (color score 1)	

Appendix C: management of adnexal cysts seen on US in postmenopausal women.