



Promoting Excellence In Ultrasound

Policies and Statements

D11

Guidelines for the Performance of First Trimester Ultrasound

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INTRODUCTION AND EQUIPMENT

Studies should be performed using an abdominal and/or vaginal approach. A high frequency transducer should be used and the equipment should be operated with the lowest ultrasonic exposure settings capable of providing the necessary diagnostic information. A vaginal transducer should always be available and a transvaginal scan should be offered to the patient when it is anticipated that this would result in a more diagnostic study. The patient may choose to accept or refuse this offer and undue persuasion is inappropriate.

Reference should be made to the Guidelines for the Performance of a Gynaecological Scan regarding the facilities and preparation for such an examination.

ASUM policy on disinfection of vaginal transducers should be followed.

HISTORY

Estimate gestation based on last menstrual period or time of conception. Document symptoms and, if possible, the result and date of any pregnancy test - Human Chorionic Gonadotrophin (HCG).

GESTATION SAC

The gestation sac should usually be visible from four and one half (4.5) to five (5) weeks using high frequency transvaginal ultrasound.

When a gestation sac like structure is seen but no live fetus demonstrated, it is important to attempt to ensure that it is not a 'pseudo gestational sac'. Look for the echogenic trophoblast rim and the yolk sac, and ensure that the fluid in the gestation sac is echo free.

If a gestation sac is not visible in the uterus of a patient believed to be pregnant, the adnexa should be carefully examined looking for evidence suggesting the presence of an ectopic pregnancy - most ectopics can be suspected with high frequency transvaginal ultrasound.

In a patient with a positive pregnant test but either -

- no gestational sac is seen within the uterus or elsewhere in the pelvis
- an apparent sac is seen but no fetal structures (including yolk sac) or heart movements are visible

consider the following -

- pregnancy not as advanced as thought (eg. Delayed ovulation and conception in that cycle)
- ectopic pregnancy
- failed pregnancy including complete miscarriage.

Interpretation of the scan may be more accurate if the result of the quantitative HCG levels is known.

There is more than one accepted laboratory standard for reporting HCG levels. The units for the local service should be taken into account when correlating sac development and HCG level. In general when the level is > 2,000 IU/l a gestation sac should be seen in the uterus on transvaginal scanning. If no sac is visible an ectopic must be considered.

If the level is < 1,000 IU/l then further follow up by serial HCG is appropriate and/or a repeat scan if the diagnosis is uncertain.

GESTATIONAL AGE

This is most accurately assessed in the first trimester. The earlier the crown rump length (CRL) is measured, the more accurate is the assessment of gestational age. The CRL can be measured from six weeks gestation. The composite CRL chart in the ASUM Policies and Statements folder is recommended. From eleven weeks multiparameter assessment can be used. Biparietal diameter (BPD) is the most often used second measurement.

FETAL HEART MOVEMENTS

With a high resolution vaginal transducer, fetal heart movements are often visible from five (5) to six (6) weeks (i.e. CRL = 2mm), but may not be seen until CRL = 3-4mm (see paragraph on pregnancy failure).

FETAL NUMBER

The diagnosis of a multiple pregnancy requires the visualisation of multiple sacs prior to six (6) weeks and subsequently visualization of multiple embryos.

The first trimester is the optimum time to determine chorionicity of the fetuses. The chorionicity of the fetuses should be stated in the report. The presence of separate sacs and the thickness of the intervening membrane and the shape of its junction with the placenta should be assessed. Be aware that early in the first trimester an intervening amnion may not be visible in diamniotic, monochorionic twins. Later in the first trimester the number of placentas can be evaluated.

PREGNANCY FAILURE

An experienced operator using high quality transvaginal equipment may diagnose pregnancy failure under either or both of the following circumstances:

1. When no live fetus is visible in a gestation sac and the mean sac diameter (MSD) cut off >25mm.
2. When there is a visible fetus with a CRL cut off >7mm but no fetal heart movements can be demonstrated. The area of the fetal heart should be observed for a prolonged period of at least thirty (30) seconds to ensure that there is no cardiac activity.

In situations where pregnancy failure is suspected by an operator who either does not have extensive experience in making the diagnosis or does not have access to high quality equipment or if there is any doubt about the viability of the fetus, a second opinion or a review scan in one week should be

recommended in the report.¹

FETAL STRUCTURE

The following list of gestational ages at which various fetal structures may be visualised is not intended to provide a complete list of what should be examined. However, using high resolution equipment (often only with a vaginal transducer) the following structures can commonly be seen:

9 weeks	Head, trunk and limbs
10 weeks	Some ossification of long bones, jaw and skull
11 weeks	Stomach, spine, ossified cranium, four chamber heart
12 weeks	Mid gut herniation no longer present, kidneys, bladder.

NUCHAL TRANSLUCENCY

The nuchal translucency measurement is a test to assess the risk of chromosomal abnormality, in particular of trisomy 21. The measurement may also be abnormal in other fetal anomalies (e.g. some congenital heart disease). It has been estimated that first trimester screening by a combination of sonography and maternal serum testing of PAPP-A and free β hCG can potentially identify 94% of trisomy 21 fetuses with a false positive rate of 5%.²

This study should be performed by adequately trained staff according to strict protocol. The outcomes of the test should be audited regularly. The recommendations of the Fetal Medicine Foundation/Royal Australian and New Zealand College of Obstetricians and Gynaecologists should be noted.

It may be performed between the gestational ages of eleven (11) weeks and thirteen (13) weeks plus six (6) days (CRL 45-84mm). A measurement greater than 2.5-3 mm is usually considered to be abnormal but must be correlated with gestational age. Reference values have been provided by Nicolaidis.³

The nuchal translucency measurement may be performed at the request of the referring Medical Practitioner. Due consideration should be given as to how and who is going to counsel the patient prior to the performance of a nuchal translucency scan.

Each practice should develop a written protocol on the procedure to be followed when the measurement is abnormal. This protocol should include guidelines for the immediate care of the patient and how the referring doctor will be informed. Usually the referring doctor should be notified so that appropriate counseling may be given and the patient can be referred to a specialised unit where formal risk assessment and counseling process can be undertaken.

Method of measurement:

1. The nuchal translucency should be measured on a sagittal midline scan through the fetus.
2. The fetus should be in neutral position and occupy at least 75% of the image.
3. The amnion should be seen separate to the fetal skin line.
4. Calipers should be positioned to measure the maximum diameter of the fluid at the back of the neck.

OVARIES, UTERUS AND ADNEXA

Each ovary should be examined. The corpus luteum can vary greatly in appearance during the first (and early second) trimesters of pregnancy. Sonographic appearances include a solid, rounded target like lesion or a predominately cystic structure. Peripheral vascularity is usually detectable.

The size of a corpus luteum is also variable, commonly measuring up to 3cm.

Larger or unusual masses should be assessed as in the non-pregnant woman.

The uterus should be examined for evidence of fibroids or uterine developmental defects. The uterine position should also be noted (anteverted, axial, retroverted).

The adnexa should be examined for coexistent ectopics and free fluid.

REFERENCES

1. Hatley, Case and Campbell. Establishing the death of an embryo by ultrasound. *Ultrasound Obstet. Gynecol.* 5 (1995) 353-357
2. Nicolaides KH. *Am. J. Obstet. Gynecol.* (2004) 191:45-47
3. From Nicolaides group: Snijders et al. Assessment of risk of Trisomy 21 by maternal age and fetal nuchal-translucency thickness.