

Policies, Standards, and Guidelines

Guidelines for the Performance of First Trimester Ultrasound G02

Adopted by Council December 2017

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G02 Guidelines for the Performance of First Trimester Ultrasound

Purpose

The purpose of the Guidelines for the Performance of First Trimester Ultrasound is to guide practitioners to provide accurate information on gestational age, viability and fetal development which will guide antenatal care. In the presence of twins and higher order multiple pregnancies it is also intended to assess chorionicity and amnionicity which have implications for continuing care.

Scope/Applicability

This guideline is applicable to all ultrasound practitioners.

This guideline supersedes **ASUM D11 Guidelines for the Performance of First Trimester Ultrasound**:

Adopted by Council: May 1995,

Revised: October 1999, October 2002, July 2005, August 2012, August 2014, May 2015.

Guideline 1 – Pre-Performance of Ultrasound

Requirement

Studies should be performed using an abdominal and/or vaginal approach.

A vaginal transducer should always be available. 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.

Reference should be made to either or both ASUM Statement on Abdominal Scanning and ASUM Statement on the Performance of a Gynaecological Scan regarding the facilities and preparation for such an examination.

Procedure #1 - 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).

Procedure #2

If performing transvaginal scan, local recommendations/policy on the consent process of the transvaginal scan should be adhered to.

Note (for Australian practitioners):

In WA, transvaginal scan is an invasive imaging procedure which requires written consent.

For Australian practitioners who have to comply with DIAS, please note DIAS Standard 2.2, *Consumer Consent and Information Standard*.

Guideline 2 – Equipment

Requirement

A high frequency transducer should be used. The equipment should be operated with the lowest ultrasonic exposure settings capable of providing the necessary diagnostic information.

Procedure #1

If performing a transvaginal approach, ASUM policy on disinfection of vaginal transducers should be followed: see ASUM G04 Guidelines for Reprocessing Ultrasound Transducers.

Guideline 3 – The Examination

Procedure #1 - Gestational Sac

The gestational sac should usually be visible from four (4) weeks and three (3) days after the last menstrual period, (assuming the dates are correct, and the woman has a regular menstrual cycle), using high frequency transvaginal ultrasound (TVS).

One should make a clear distinction between a true gestational sac and intra-cavity fluid. A true gestational sac is eccentrically placed within the endometrial cavity and surrounded by an “echogenic ring” on TVS. Intra-cavitary fluid, previously called a 'pseudo gestational sac', is in the midline of the endometrial cavity, displacing the anterior and posterior surfaces of the endometrial cavity.

If a gestational sac is not visible in the uterus of a woman believed to be pregnant, the adnexal regions should be carefully examined looking for evidence suggesting the presence of an ectopic pregnancy. Most ectopic pregnancies can be visualised with high frequency TVS assuming the practitioner is experienced.

The clinical scenario in which there is a positive pregnant test and in which there are no signs of intra- or extra-uterine pregnancy and where there are no obvious retained products of conception on TVS, is defined as a pregnancy of unknown location (PUL). Under these circumstances there are three possibilities:

1. intra-uterine pregnancy;
2. ectopic pregnancy; or
3. failed PUL.

When interpreting the scan result of a woman with a PUL, there is no evidence to suggest that a single level of quantitative serum human chorionic gonadotrophin (hCG) is helpful. Rather it is the change in hCG over time which is of value. Therefore, serial estimations are recommended.

Atypical location of the gestational sac within the endometrial cavity should be noted and reported. This is particularly important for low positioned gestational sac, adjacent to or bulging into a Caesarean section scar.

Procedure #2 - Fetal Number

The diagnosis of a multiple pregnancy requires the visualisation of multiple sacs prior to six (6) weeks and subsequent visualisation 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 monochorionic diamniotic twins. A transvaginal ultrasound scan should be offered to help determine amnionicity when monoamnionicity is suspected on a trans-abdominal scan. Later in the first trimester the number of placentas can be evaluated.

Procedure #3 - Fetal Heart Movements

With a high resolution vaginal transducer, fetal heart movements are often visible from five to six (5-6) weeks (i.e. CRL = 2 mm), but may not be seen until CRL = 6-7 mm (see Procedure #5 - Pregnancy Failure).

Procedure #4 - Gestational Age

This is most accurately assessed by measurement of the CRL in the first trimester.

Before an embryo is visible, the Mean Sac Diameter (MSD) can support gestational age by LMP but it should not be used as the sole determinant of due date.

Once an embryo is visible, the Crown Rump Length (CRL) can be used to calculate the due date and the MSD should not be included in this calculation. After eleven (11) weeks, multiparametric assessment can be used with biparietal diameter (BPD) being the most often used second measurement.

The EDD by LMP (adjusted for cycle length) should be used unless:

1. The LMP is unknown;
2. The GA by CRL is <10 weeks and differs from GA by LMP by more than five (5) days; or
3. The GA by CRL (+/- BPD) is ten to fourteen (10-14) weeks and differs from GA by LMP by more than seven (7) days.

EDD by assisted reproduction dates (e.g. IVF) should only be adjusted with extreme caution.

In the presence of twins, the CRL for the larger twin is used in assessing the EDC.

For measurement criteria for a CRL, see RANZCOG-FMF Protocols.

Procedure #5 - Pregnancy Failure

At initial or follow up scan, an experienced practitioner using high quality transvaginal equipment may diagnose pregnancy failure under either of the following circumstances:

1. when the mean sac diameter (MSD) is ≥ 25 mm with no visible fetal pole; or
2. when there is a visible fetal pole with CRL ≥ 7 mm 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.

If no live embryo is demonstrated but the above criteria are not met, then the following criteria can be used to diagnose pregnancy failure by follow up imaging:

1. if the initial scan showed a fetal pole <7 mm with no fetal heart beat and a repeat scan in seven (7) or more days also shows no cardiac activity;

2. if the initial scan showed a MSD ≥ 12 mm with no embryo and a repeat scan in seven (7) or more days does not show an embryo with cardiac activity; or
3. if the initial scan showed a MSD < 12 mm with no embryo and a repeat scan in fourteen (14) or more days shows no visible cardiac activity and the MSD has not doubled.

If there is any doubt as to the diagnosis of a miscarriage, a further scan should be offered (see Priesler et al).

In situations where pregnancy failure is suspected by a practitioner 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 (1) week should be recommended in the report (see Hately et al).

Procedure #6 - 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, 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, hands and feet
12 weeks	kidneys, bladder
13 weeks	Mid gut herniation resolution

Procedure #7 - 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 (eg some congenital heart disease). It has been estimated that first trimester screening by a combination of sonography and material serum testing of PAPP-A and free β hCG can potentially identify 94% of trisomy 21 fetuses with a false positive rate of 5% (see Nicolaides).

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 (see RANZCOG-FMF Protocols).

The nuchal translucency should be measured in accordance with the Fetal Medicine Foundation guidelines (see RANZCOG-FMF Protocols).

It may be performed between the gestational ages of eleven (11) weeks and thirteen (13) weeks plus six (6) days (CRL 45-84 mm). A nuchal translucency measurement of greater than 3-3.5 mm is usually considered to be abnormal but must be correlated with gestational age. Reference values have been provided by Fetal Medicine Foundation First Trimester Screening Group (see Snijders et al).

The nuchal translucency measurement may be performed at the request of the referring **health 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 **health practitioner** will be informed. Usually the referring **health practitioner** should be notified so that appropriate counselling may be given. The patient can be referred to a specialised unit where formal risk assessment and counselling process can be undertaken.

Procedure #8 – Uterus, Ovaries 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 3 cm.

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

The uterus should be examined for evidence of a fibroids or uterine developmental defects. The uterine position should also be noted (anteverted, axial, retroverted). The cervical length may be assessed in certain high-risk women although at this early gestation, it may not be predictive of outcome. In addition, the uterine landmarks are difficult to delineate at an early gestation which reduces the accuracy. It is recommended that the cervical length measurement is deferred until at least 14 weeks gestation where possible.

The adnexa should be examined for coexistent ectopic pregnancy and free fluid.

Guideline 4 – Reports

Requirement 1

As a minimum, the following details should be included in the report:

1. The clinical gestational age based on LMP or IVF procedure.
2. Embryonic or fetal size and number with corresponding gestational age.
3. Presence of fetal heart motion.
4. In the presence of twins or higher order multiples, an assessment of chorionicity and amnionity.

Definitions

The following definitions are relevant to this guideline.

Term	Definition
BPD	biparietal diameter
CRL	crown rump length
DIAS	Diagnostic Imaging Accreditation Scheme
EDC	estimated date of confinement
EDD	estimated date of delivery

GA	gestational age
hCG	human chorionic gonadotrophin
IVF	in-vitro fertilisation
LMP	last menstrual period
MSD	mean sac diameter
PUL	pregnancy of unknown location

Related/Supporting documents

The following documents are required to give effect to this guideline:

1. ASUM STD01 Statement on Normal Ultrasonic Fetal Measurements.
2. ASUM G05 Guidelines for Abdominal Scanning.
3. ASUM G06 Statement on the Performance of a Gynaecological Scan.
4. ASUM G04 Guidelines for Reprocessing Ultrasound Transducers.

Supporting information/References

The following documents inform this guideline:

1. ASUM Policy on Diagnostic Ultrasound Services.
2. ASUM Safety Statement on Continuous Wave Doppler Fetal Monitoring.
3. ASUM G02 Guidelines for the Performance of Second (Mid) Trimester Ultrasound.
4. ASUM G07 Guidelines for the Performance of Third Trimester Ultrasound.
5. Hately W, Case J, Campbell S. Establishing the death of an embryo by ultrasound. *Ultrasound Obstet. Gynecol.* 1995;5:353-357.
6. Nicolaides KH. Nuchal translucency and other first-trimester sonographic markers of chromosomal abnormalities *Am. J. Obstet. Gynecol.* 2004;191:45-67.
7. Snijders RJM, Noble P, Sebire N, Souka A, Prof Nicolaides KH for the Fetal Medicine Foundation First Trimester Screening Group. UK multicentre project on assessment of risk of trisomy 21 by maternal age and fetal nuchal-translucency thickness at 10–14 weeks of gestation *The Lancet* 1998;352:343-346.
8. Priesler J, Kopeika J, Ismail L, Vathanan V, Farren J, Abdallah Y et al. Defining safe criteria to diagnose miscarriage: prospective observational multicentre study *BMJ* 2015;351:h4579.
9. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG), the Fetal Medicine Foundation (FMF). *Protocols for Measuring the Nuchal Translucency* <https://www.nuchaltrans.edu.au/Documents/Protocols-for-measuring-the-NT>

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Review

This guideline will be reviewed and evaluated as required to ensure relevance and currency.

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1.0	Dec 2017	Present	Original version	ASUM Website

The review table indicates previous versions of the guideline and any significant changes.

Approval

This guideline has been approved and issued by the ASUM Council.

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