

UT Southwestern Department of Radiology

Ultrasound – OB First Trimester Evaluation

PURPOSE:

To evaluate the uterus (myometrium and endometrium), adnexa (ovaries and fallopian tubes), cul-de-sac, and early pregnancy.

SCOPE:

Applies to all ultrasound pelvis studies performed in:

- UT Southwestern University Hospitals and Clinics, Imaging Services (UTSW)

INDICATIONS:

- Confirm presence of an intrauterine pregnancy (IUP), single versus multiple gestation, confirm cardiac activity, and estimate gestational age
- Signs or symptoms (pain, bleeding, etc) referred to the pelvis
- Evaluate for suspected ectopic pregnancy
- Evaluate for suspected gestational trophoblastic disease
- Evaluate for uterine or adnexal masses
- Assess for early fetal anomalies

CONTRAINDICATIONS:

- No absolute contraindications
- **Transvaginal approach should not be performed on a patient who has refused the exam.**
- **A chaperone is required for male sonographers. Chaperone's name should be documented in tech notes.**

EQUIPMENT:

Curvilinear transducer with a frequency of 2-9 MHz or greater that allows for appropriate penetration and resolution depending on patient's body habitus for transabdominal approach.

Endovaginal transducer with a frequency of 5 MHz or greater for transvaginal approach. Probe cover.

PATIENT PREPARATION:

- Review any prior imaging, making note of abnormalities requiring further evaluation.
- For transabdominal approach, bladder should be distended with urine
- For transvaginal approach:
 - Obtain verbal consent from patient*
 - Obtain chaperone (requirement for all male sonographers)
 - The bladder should be empty
- PREGNANCY STATUS:
 - Positive urine pregnancy test (UPT) should be documented in EPIC (positive home UPT does NOT count).
 - A negative UPT must be within 24 hours. If previous UPT is negative, then another UPT after 24 hours (especially in the setting of very early pregnancy) is appropriate.
 - If UPT is negative or bHCG is 0.0, then use protocol "US Transabdominal & Transvaginal."
 - If previous documented pregnancy (positive UPT and/or sonogram) and the current exam falls within the EDC (estimated date of confinement), then no repeat UPT is necessary. The prior sonogram can be from Radiology, MFM, or outside institution.

- For any clinical scenarios the sonographer is unsure about, please consult the radiologist.

EXAMINATION:

GENERAL GUIDELINES:

- ***Minors who are confirmed to be pregnant are medically emancipated for her health and the health of the baby. Parental consent is not required.**
- A complete examination includes evaluation of the entire uterus (myometrium and endometrium), adnexa (ovaries and fallopian tubes), cul-de-sac, and structures associated with early pregnancy.
- If patient is being evaluated for pain and transabdominal evaluation does not identify all of the following: both ovaries (with vascularity), IUP, and cardiac motion, a transvaginal scan must be performed.

EXAM INITIATION:

- Introduce yourself to the patient
- Verify patient identity using patient name and DOB
- Explain test
- **Obtain patient history including symptoms and last menstrual period (LMP).** Enter and store data page.
 - For women of child-bearing potential presenting to the Emergency Department, record urine pregnancy test (UPT) or bHCG results if no previous pregnancy has been documented.
 - If the current exam falls within the EDC, then no repeat UPT is necessary.
- Place patient in supine and/or lithotomy position.
- For transvaginal exam, apply endovaginal probe cover.

TECHNICAL CONSIDERATIONS:

- Always review any prior imaging, making note of abnormalities requiring further evaluation.
- Transabdominal approach used to evaluate structures that may not be completely evaluated transvaginally. Examples: Fundal fibroids; high-riding ovaries; large adnexal masses.
- Endovaginal transducer may be introduced by the patient, sonographer, or physician.
- Uterine length is measured on the long axis image from fundus to cervix (external os). In a flexed uterus, segmental measurements may be needed. AP dimension or depth of the uterus is measured on the same long axis view perpendicular to the length from anterior to posterior wall. Maximum width is measured on the transverse view.
- Evaluate myometrium and cervix for contour change, echogenicity, masses, and cysts
- Measure the largest fibroid(s) and any fibroids that contact the endometrium
- Endometrial thickness is measured on the midline longitudinal image including anterior and posterior basal endometrium and excluding adjacent hypoechoic myometrium and endometrial fluid
- Evaluate the endometrium for uniformity, focal abnormality, fluid/masses in the endometrial cavity, and presence/location of IUD
- Measure the ovaries in 3 dimensions on views obtained in 2 orthogonal planes. Ovaries may not be identifiable. Survey the adnexal region, cul-de-sac, and around the uterine fundus.

- Survey the adnexal region for masses and dilated tubular structures. Normal fallopian tubes are not commonly identified.
- If the ovaries are not visualized, include image labeled “Adnexa” including the ipsilateral iliac vessels
- Evaluate cul-de-sac for presence of free fluid or mass. Differentiate mass from bowel loops.
- Focal abnormalities should be documented with size measurements in 3 dimensions, color Doppler, and its relationship to adjacent structures
- 3D acquisitions must be acquired for all patients with an IUD with coronal reformatted images submitted to PACS.
- Addition of reconstructed coronal view of the uterus from 3D acquisition may also be useful for evaluation of congenital uterine anomalies.
- Note and report any tenderness during the exam
- Evaluate for gestational sac in the uterus and adnexa. Document location and associated structures including yolk sac, amnion, and embryo. In the absence of a definite yolk sac or embryo, intrauterine fluid collection could represent a pseudogestational sac associated with ectopic pregnancy.
- Evaluate for multiple gestations documenting location and number of gestational sacs as well as number of yolk sacs
- If no fetal pole is seen, then measure the gestational sac in 3 dimensions for estimation of gestational age by mean sac diameter (MSD).
- Measure crown-rump length (CRL) of embryo as most accurate determination of gestational age. Obtain the average of three measurements. Use magnification view of the gestational sac occupying the majority of the image.
 - At 14 weeks, 0 days, BPD, HC, AC, and FL (instead of CRL) should be used for dating.
- **If the mean sac diameter (MSD) measurement is taken and a fetal pole is subsequently found, the technologist *must* delete the gestational sac measurements from the calc package. This helps to ensure the most accurate fetal measurements by *only* including the CRL, when a fetal pole is seen.**
- **Document fetal heart motion with cine clip and M-mode only.** Measure fetal heart rate (FHR) by M-mode tracing.
- In general, **Spectral, Color and Power Doppler should NOT be used to evaluate the embryo due to theoretical thermal damage and cavitation.** Cine clips and M-mode should be sufficient for documenting cardiac motion, which is generally detected when $CRL \geq 5$ mm.
- **If no cardiac motion is detected transvaginally by these techniques when $CRL \geq 10$ mm, only then may you try color or power Doppler. Do NOT use Doppler on the embryo when $CRL < 10$, even if cardiac motion absent.** A short-term follow-up will be offered instead.
- Evaluate early fetal anatomy appropriate for first trimester.
- Evaluate for subchorionic bleed and open/closed cervix (especially in setting of pain/bleeding).
- If no definite intrauterine pregnancy is seen, thorough evaluation for ectopic pregnancy is required. Classically demonstrated by adnexal mass (thick tubal ring with “ring of fire” on color Doppler) +/- yolk sac, +/- embryo, +/- FHR. If adnexal mass demonstrates pulsatile flow, measure and compare rate (presumed FHR) to maternal heart rate sampled at external iliac artery. Be aware of heterotopic pregnancies and ectopic pregnancies other than tubal ectopics.

DOCUMENTATION:

OB First Trimester Evaluation can be completed with a transabdominal exam alone if an intrauterine pregnancy with cardiac motion can be confirmed. Both ovaries must be identified and documented (including color Doppler flow and spectral waveforms) if the indication for the examination is pain. Supplement inadequate transabdominal imaging with transvaginal images as below. Contact Radiologist/Resident for any questions regarding adequacy of transabdominal-only exam.

- Transabdominal +/- transvaginal approach:
 - Uterus and Cervix
 - Longitudinal images:
 - Cervix and cul-de-sac
 - Right of midline, midline, and left of midline
 - Midline with length and AP measurement
 - Midline with endometrial thickness measurement if no IUP visualized (annotate LMP if not stored on data page)
 - Transverse images:
 - Cervix and cul-de-sac
 - Lower uterine segment
 - Mid body with transverse measurement
 - Fundus
 - Cine sweep, transverse (superior to inferior) and longitudinal through uterus
 - Ovaries, Right and Left
 - Longitudinal and transverse images through each ovary
 - or “adnexa” if ovary is not visualized
 - Include and image the ipsilateral iliac vessels
 - Representative image without and with measurements in 3 orthogonal planes if ovary is well visualized
 - Doppler
 - Representative color Doppler images
 - **Arterial and venous spectral Doppler waveforms if indication is pain, or suspicion for torsion**
 - Cine sweep, transverse (superior to inferior) and longitudinal (medial to lateral) of each ovary
 - Gestational sac
 - Representative images including amnion and yolk sac if seen
 - Transverse, Long, and AP measurement for MSD (if no embryo seen)
 - **If embryo seen, do not include MSD measurement in calc package for EGA**
 - Embryo with CRL* measurement, if present
 - Obtain three measurements to ensure accuracy
 - *Only for fetus < 14 weeks 0 days. If age > 13 weeks 6 days, obtain BPD, HC, AC, and FL for dating.
 - Confirm cardiac activity
 - Document cardiac motion with stationary cine loop
 - Measurement of FHR with M-mode

- In general, **Spectral, Color and Power Doppler should NOT be used. If no cardiac motion is detected transvaginally when CRL \geq 10 mm, only then may you try color or power Doppler.**
 - Size and extent of any peri-gestational, subchorionic collection.
- Cul-de-sac
 - If not included above.
- Data page(s)

PROCESSING:

- Review examination data. Ensure accurate calculation of EGA (based on CRL only, if fetal pole present; otherwise MSD).
- Export all images to PACS. Include OB report page.
- Document relevant history (including bHCG level, if applicable) and any study limitations
- UTSW: Confirm data in Imorgon

REFERENCES:

ACR-ACOG-AIUM-SMFM-SRU Practice Guideline (Revised 2018)

REVISION HISTORY:

SUBMITTED BY:	David T. Fetzer, MD	Title	Medical Director
APPROVED BY:	David T. Fetzer, MD	Title	Medical Director
APPROVAL DATE:	11-09-2015		
REVIEW DATE(S):	10-30-2018		Theresa Huang, MD
REVISION DATE(S):	01-24-2016	Brief Summary	Added need to obtain UPT or bHCG prior to exam
REVISION DATE(S):	06-06-2016	Brief Summary	Clarified use of Doppler (Color, Spectral) on the embryo
	06-19-2017	Brief Summary	Clarified use of CRL to determine EGA, only use MSD if fetal pole not present.
	11-19-2017	Brief Summary	Clarified use of color and power Doppler, cutoff for FHT by CRL for fetal demise
	02-13-2019		Clarified when and when to use CRL as opposed to BPD/HC/AC/FL for dating
	5-4-2019		Updated details regarding when, when not to obtain UPT/bHCG
	03-24-2021		Updated verbiage regarding no MSD measurement in calc package when CRL measurement is taken.
	6-9-2021		Clarified requirements for TV based on quality of TA images
	09-27-2023		Ovarian Doppler waveforms only for indications of pain or suspicion for torsion

