TRA MEDICAL IMAGING
253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

OB First Trimester Ultrasound Protocol

Reviewed By: Spencer Lake, MD
Last Reviewed: November 2020

Contact: (866) 761-4200, Option 1

Special Note: 1st Trimester OB US in the ED & B-hCG orders

Please attempt to confirm positive beta-hCG (at least urine) before doing a 1st trimester US. When a 1st trimester US order is received from the ED, ensure a beta-hCG has been ordered. If there is time pressure from the ED/schedule to complete the examination prior to a positive result, it can be done with a pending beta-hCG

CINE **clips should be labeled:**

-MIDLINE structures: “right to left” when longitudinal and “superior to inferior” or “fundus to cervix” when transverse
-RIGHT/LEFT structures: “lateral to medial” when longitudinal and “superior to inferior” when transverse
each should be 1 sweep, NOT back and forth

Some terms used:

MSD = mean sac diameter
FP = fetal pole
CRL = crown-rump length
FHR = fetal heart rate
IUP = gestational sac + yolk sac (+/- embryo)

IMPORTANT NOTE regarding 1st trimester US: ***AVOID*** *Doppler (color, spectral, power) when possible*

→ WHY limitations on Doppler in the 1st trimester?

-There is a potential risk of harm to a developing embryo from the increased heat associated with Doppler ultrasound (especially spectral and power)

→ WHEN to use Doppler *(this is detailed further below), very brief summary:*

TRA MEDICAL IMAGING
253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

REQUIRED:

OVARIES/ADNEXA:

➔ ED patient, all: color; spectral only certain indication/appearance (i.e., torsion)
➔ Outpatient rule out torsion: color + spectral (document both venous and arterial flow)

➔ Abnormal ovaries/adnexa - any adnexal mass or ovarian mass *not clearly* corpus luteum: color; spectral only for certain indication/appearance

ENDOMETRIUM:

➔ ONLY if abnormal endometrial findings **without** IUP or potential for IUP (i.e., gestational trophoblastic disease, retained products of conception): color; if present, add spectral

OPTIONAL:
➔ Suspected fetal demise (no HR) + CRL > = 7mm

TECHNIQUE: TA & TV vs. TA or TV only

ED patient: TA + TV for all* unless contraindicated or patient declines
→ *Note: proceeding to transvaginal imaging will be necessary in the majority of cases for optimal visualization and accurate measurements. If the sonographer believes that the transabdominal images are optimal and that transvaginal imaging is not needed, clearance must be given by the radiologist prior to release of the patient.

OUTPATIENT based on CRL dating:
1. **CRL < = 8.6 weeks**: TA+ TV* *or* TV only (if so ordered)
→ *Note: proceeding to transvaginal imaging will be necessary in the majority of cases for optimal visualization and accurate measurements. If the sonographer believes that the transabdominal images are optimal and that transvaginal imaging is not needed, clearance must be given by the radiologist prior to release of the patient.

2. **CRL 9 – 11 weeks**: Start with TA
→ *Add* TV:
    1. If there is a >= 5 day discrepancy between LMP and CRL
    2. If patient or physician is uncertain of LMP

TA only will be OK if good views *and* < 5 day discrepancy between LMP and CRL

3. **CRL = > 11.1 weeks**: TA only OK if good views and measurements adequate, even if >= 5 day discrepancy between LMP and CRL or unknown LMP
→ Can add TV if this would improve accuracy (technologist discretion)

TRA MEDICAL IMAGING
253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

IUP or POSSIBLE IUP: GENERAL

Endometrial Contents: Gestational sac, yolk sac, fetal pole

Summary of *CINE*s through uterus REQUIRED on all 1st trimester examination, *further detailed below:*

(1) Overview of gestational sac/uterus: Single sweep (longitudinal or transverse) through uterus (best TA or TV) to demonstrate gestational sac morphology and position

(2) Fetal Cardiac activity: short clip demonstrating presence of cardiac motion

GESTATIONAL SAC

-Presence, location, appearance and number of gestational sac(s)

-If there are multiple gestations, document amnionicity and chorionicity

-Sac to be measured (MSD) when:

(1) No FP or FP uncertain

(2) CRL < 12 weeks

NOTE: At 11.1 to 12 weeks, MSD can be omitted *if it is difficult to obtain*

-Document and measure subchorionic hemorrhage(s), if present;

→ Comment on location in relation to gestational sac

→ Comment if bleed encompasses < or >= 50% of gestational sac

-Comment on location of developing placenta, if it is seen (should be seen by 10 weeks)

-May say “too early to visualize” if it is not well seen (depending on gestational age)

TRA MEDICAL IMAGING

253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

YOLK SAC

-Document and measure yolk sac

-Report if no yolk sac is seen, if yolk sac is enlarged, or if yolk sac is misshapen or otherwise abnormal

FETAL POLE

-Document and measure embryo/fetus

BRIEF SUMMARY:

- LMP/dates <= 13w6d → CRL
  - If CRL >=84mm → add biometry (and provide separate AUA)

- LMP/dates >=14w0d → biometry
  - If Biometry <=13w6d → add CRL (and provide separate AUA)

FURTHER DETAILS:

-At LMP/provided dating <= 13 weeks 6 days: measure CRL

→ Embryo should be magnified and in neutral position

-Use **average of 3** discrete measures if all adequate, otherwise choose best

→Provide AUA based on CRL

BUT IF CRL >= 84 mm, **ADD** biometry (BPD + HC + AC + FL)

→Biometry: at least 2 measurements of each

-Use average if all adequate, otherwise choose best

TRA MEDICAL IMAGING
253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

→ Provide 2 *separate* AUA: *Do NOT average CRL and Biometry*

(1) AUA for CRL

(2) AUA for Biometry

-At LMP/provided dating >= 14 weeks 0 days = 2nd trimester US: do biometry as per 2nd/3rd trimester US protocol

→Biometry: at least 2 measurements of each

-Use average if all adequate, otherwise choose best

→Provide AUA based on biometry

BUT IF Biometry <= 13 weeks 6 days, **ADD** CRL

→ Provide 2 *separate* AUA: *Do NOT average CRL and Biometry*

(1) AUA for CRL

(2) AUA for Biometry

-Cardiac activity, both M-mode and *CINE* for all:

(1) M-mode image(s): at least 1

→If fetal HR <120, >160 bpm, provide at least 2 M-mode tracings to confirm persistence

→ On worksheet, document both HR measures and average

(2) *CINE* video clip of beating heart/flutter

-Anatomy*, if visible*: Document bladder, stomach, extremities

-CRL >= 11 weeks: Add magnified midline true sagittal image of the fetus in neutral position

DOPPLER on the endometrium (color, spectral, power): most examinations should NOT have Doppler on the endometrium (or its contents), *more specifically*:

→ NO DOPPLER for definite IUP or potential for IUP, including the following:

-No sac and *otherwise normal* endometrium

TRA MEDICAL IMAGING
253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

-Possible gestational sac (empty or otherwise)

-Well-formed gestational sac (empty or otherwise)

SPECIAL NOTES:

(1) REQUIRED USE OF DOPPLER

→ Retained products of conception, gestational trophoblastic disease, and other endometrial mass/abnormality **without definite IUP or potential for IUP (as above) – TV imaging:**

-*CINE* greyscale longitudinal and transverse, even if no abnormality identified at time of examination

-Assess for color if endometrium is abnormal

→If color present:

(1) Add spectral

(2) *CINE* color (best plane)

(2) OPTIONAL USE OF DOPPLER

→ CRL **> = 7mm** + NO heartbeat: *per technologist discretion* to better demonstrate lack of blood flow (i.e., demise)

NOTE: if CRL < 7 mm + no FHR, ***do NOT use*** *Doppler*

Comments about early pregnancy dating and data to provide:

1. **No FP or FP uncertain**: MSD measured and associated date documented
   ***Estimated* US gestational age based on MSD – this is just an estimate, CRL will be used for dating when embryo visible

2. + FP & LMP/dates <= 13w6d → CRL
   - If CRL >=84mm → add biometry (and provide separate AUA)
   - Provide MSD & associated dates if CRL <12w, but MSD not used for dating

3. + FP & LMP/dates >=14w0d → biometry
   - If Biometry <=13w6d → add CRL (and provide separate AUA)

TRA MEDICAL IMAGING
253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

Additional Notes:

-Use “provided dates” or “LMP” or “clinical dates” when possible for expected dating

-Technologists should NOT re-date pregnancy based on other ultrasound(s) unless this dating is being used clinically

-See end of document for ACOG recommendations on pregnancy re-dating based on US – i.e., when OB would use US dates to *formally* re-date the pregnancy

Maternal Structures:

Do not need to include kidneys unless there is specific indication in order

Uterus (other than gestational sac, yolk sac, fetal pole):

Measurement of size:

-If there is a gestational sac + yolk sac + fetal pole, uterine dimensions and volume do not need to be performed/recorded.

--> All must be present (if not, please measure, as below)

--> Checkbox on worksheet: "appropriate gravid enlargement" (if this is accurate)

-If 1 or multiple of above are *not* present (i.e., gestational sac + yolk sac without fetal pole; sac-like structure; questionable fetal pole; empty endometrium, etc.), uterine dimensions and volume should be performed and recorded.

--> When measuring:

→ Length in sagittal from fundus to lower uterine segment (include cervix)

→ AP in same sagittal view as length (perpendicular to length)

→ Width in transverse view

→ Provide volume measurement (mL)

→ *NOTE, if there is nothing in the endometrium, measure endometrial thickness*

Documentation of general appearance:

253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

-Standard sagittal & transverse views

-Document fibroids; measure largest fibroid and any that may be affecting the gestational sac/endometrial canal

-Do not use Doppler (color, spectral, power) on fibroids

Ovaries and Adnexa:

SUMMARY of when to *CINE*:

→ REQUIRED:

(1) No IUP and + b-HCG (i.e., possible ectopic): *CINE* both adnexa even if no obvious mass is identified, as below

-This includes empty "gestational sac-like structure"

(2) Ovarian/adnexal mass: ectopic or otherwise*, detailed below*

→ NOT required: IUP + *normal* ovaries/adnexa (including typical corpus luteum)

-No need to *CINE* ovaries with typical corpus luteum cyst

General

-Document and measure each ovary, document corpus luteum (if visible)

-Complete documentation of the ovaries requires several still images through each ovary in two planes per ACR requirements, even if normal in appearance

→ Obtain 3 images in longitudinal plane (lat→med or med→lat) and 3 images in transverse plane (sup→inf or inf→sup)

-Document adnexal regions (even if ovaries are both seen, need at least STILL images of both adnexa)

-If there is no IUP and + b-HCG, *CINE* both adnexal regions (even if no obvious mass is seen)

-This includes empty gestational sac-like structure

-Document any other ovarian or adnexal mass/cyst

253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

-If mass is identified: provide *CINE* in multiple planes

-If the mass is near or not definitively separate from the ovary:

→*CINE* to show mass moving separately from ovary, HOW to:

→TV: use probe to separate ovary from mass; if this is not helpful, use non-scanning hand to push on the abdomen to attempt to separate the ovary from the mass

Comment:

-If mass + ovary move together, it may be ovarian - likely corpus luteum

-If mass and ovary move separately, it is unlikely ovarian - concerning for ectopic

DOPPLER on ovaries/adnexa in pregnancy:

ED patients, all indications:

-Ovaries and adnexa: color *only* for all patients

-Add spectral to document waveforms ONLY if:

1. Indication is “rule out torsion”
2. Appearance is worrisome for torsion

Outpatient:

-Normal ovaries and adnexa: no Doppler of any kind

-Abnormal ovaries/adnexa or lesion that is not clearly the corpus luteum: color *only*

-Add spectral to document waveforms ONLY if:

1. Indication is “rule out torsion”
2. Appearance is worrisome for torsion

Cul-de-Sac:

-Evaluate for fluid; if present, document amount and if simple or complex

TRA
MEDICAL IMAGING

253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

-ED patient or outpatient for “rule out ectopic” and no IUP: evaluate for fluid in Morrison’s pouch (even if no pelvic fluid)

-ED patient or outpatient with > = moderate pelvic free fluid and no IUP: evaluate for fluid in Morrison’s pouch

When to notify the radiologist before letting patient go (ED, inpatient or outpatient):

(1) Suspected demise

(2) Evidence of ectopic: either adnexal mass OR complex free fluid

(3) Any other required items on the “Sonographer to Radiologist Communication of Ultrasound Findings” document.

TRA
MEDICAL IMAGING

253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

Table 1. Guidelines for Redating Based on Ultrasonography

Gestational Age Range*	Method of Measurement	Discrepancy Between Ultrasound Dating and LMP Dating That Supports Redating
≤ 13 6/7 wk	CRL	
• ≤ 8 6/7 wk		More than 5 d
• 9 0/7 wk to 13 6/7 wk		More than 7 d
14 0/7 wk to 15 6/7 wk	BPD, HC, AC, FL	More than 7 d
16 0/7 wk to 21 6/7 wk	BPD, HC, AC, FL	More than 10 d
22 0/7 wk to 27 6/7 wk	BPD, HC, AC, FL	More than 14 d
†28 0/7 wk and beyond	BPD, HC, AC, FL	More than 21 d

Abbreviations: AC, abdominal circumference; BPD, biparietal diameter; CRL, crown–rump length; FL, femur length; HC, head circumference; LMP, last menstrual period.

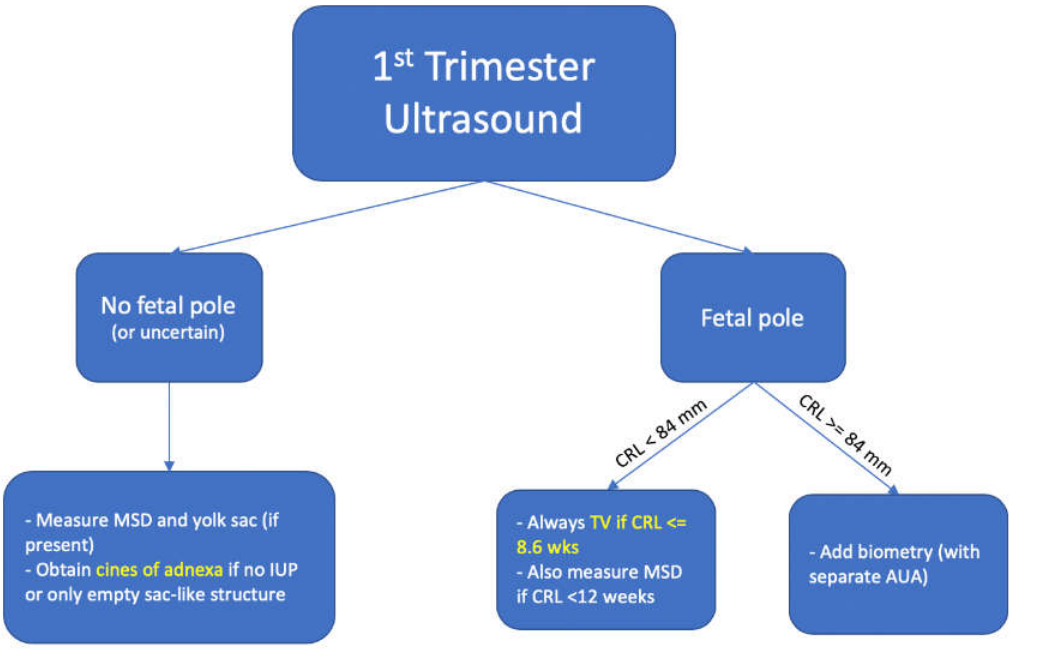
*Based on LMP

†Because of the risk of redating a small fetus that may be growth restricted, management decisions based on third-trimester ultrasonography alone are especially problematic and need to be guided by careful consideration of the entire clinical picture and close surveillance.

TRA MEDICAL IMAGING

253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

First Trimester Ultrasound Flow Chart



Required of all studies:
- Cine sweep through the uterus
- Cine and M-mode of fetal cardiac activity (if fetal pole present)
- Measurement of subchorionic hemorrhage (if present)

Notes on Doppler:
- Endometrial cavity: Doppler should NOT be used if there is an IUP or potential for an IUP (including an empty cavity), except optionally if there is a FP with CRL >= 7 mm without cardiac motion (diagnostic of fetal demise)
- Ovaries/adnexa: Doppler should be used on the adnexa in all ED patients, in outpatient rule out torsion cases (with spectral), or if there is an ovarian/adnexal mass