Obstetrical Ultrasound

Procedure and Protocol

I. **Gestational Age Determination:** Gestational age is determined by the patient's lst menstral period (LMP) vs. the first ultrasound exam that identifies a fetus. The sonographically derived estimated date of delivery (EDD) is used for the pregnancy if it differs from that calculated using the last menstrual period (LMP) by more than seven days in the first trimester (less than 12 weeks 0 days based on LMP) and by more than 10 days (less than 20 weeks 0 days based on LMP) to 14 days (less than 27 weeks 0 days based on LMP) in the second trimester.

Therefore, at our institution(s), it is imperative that a clinically established EDD incorporating the 1st ultrasound is obtained from the attending physician before beginning an exam **if prior** ultrasound imaging **has been** performed for that pregnancy. All subsequent exams should be careful to utilize the same EDD.

i. Multiple Gestational Age Determination(Sonographic): The sonographically derived estimated date of delivery (EDD) for multiple gestations is determined by using the crown rump length (CRL) from the largest fetus for that pregnancy. Therefore, at our institution(s), if **no prior** ultrasound imaging has been done on the current pregnancy, we use the larger fetus to date the pregnancy on the initial ultrasound exam.

II. **Physician Orders:** You must only perform the exam that is ordered by the physician, unless indicated differently within this protocol under the specific exam. The order must clearly indicate either Obstetrical (note: TA approach only), Obstetrical transvaginal, or Obstetrical with transvaginal. If you are unable to complete the exam ordered (i.e. pregnancy is further along than indicated, body habitus, etc), a new order must be obtained from the ordering physician **prior** to performing the additional study.

III. **0 to <12 weeks**

a. **Image Descriptors:**

i. Uterus and Adnexa: Longitudinal and transverse images should be obtained assessing contour, shape and position of the uterus. Both adnexa should be assessed for masses, free fluid and structural abnormalities. Complete evaluation of ovaries should be documented in both long and transverse scan planes (at least 3 grayscale images each plane), pulsed Doppler flow obtained, and measured, if seen.

ii. Gestational Sac: If present, the gestational sac should be imaged and assessed for abnormalities. If a normal, live fetus is not identified, the sac should be measured in 3 planes to compute a mean sac diameter. If a fetal pole is present, gestational sac measurements should not be factored into the

EDD. **NOTE: Gestational sac size gives an estimation of gestational age, but does not establish an EDD.

iii. Yolk Sac: Assess the yolk sac for size, shape and echogenicity. Presence of a yolk sac confirms intrauterine gestation. Measured from inner-to-inner margin. Should not be calcified, misshapen, or ≥ 6mm in diameter.

iv. Placenta: Longitudinal and transverse images to assess echogenicity, contour and left and right as well as the cranial and caudal borders. The caudal tip should be assessed for its proximity to the internal cervical os.

v. Crown Rump Length: The fetus should be measured from outer margin crown (cephalic pole) to rump (preferably in extended position) three times, with the average of the three establishing an EDD.

vi. Heart Rate: Fetal heart rate should be assessed using M mode. If no fetal heart rate is noted in a fetus greater than 5 weeks 6 days, power Doppler should be placed over the fetus and a cine loop clip should be taken to confirm fetal demise and the Radiologist should be consulted before the patient leaves.

vii. Nuchal Translucency: If the nuchal area appears prominent, this should be measured and addressed with the Radiologist before the patient leaves.

viii. Amniotic Fluid: The amniotic fluid should be assessed subjectively. Whereas fine, homogeneous internal echoes can be seen within the chorionic cavity, the amniotic cavity is echo-free. Diameter of amniotic cavity typically 10 mm at 7 weeks and 50 mm at 12 weeks, with a linear growth pattern.

ix. Fetal Number: If multiple gestations, document number of embryos, gestational sacs, and placentas if possible. If multiple fetuses show a discordant CRL of 3 mm or more, the rate of embryonic loss under 9 weeks is approximately 50%. **Note: Multiple gestations should only be reported if multiple embryos are documented.

x. Mean sac diameter (MSD in mm) minus crown rump length (in mm) with value greater than 5mm is normal. When value less than 5mm, termed “first trimester oligohydramnios”.

xi. Bradycardia. If FHR <90 bpm at 5-7 weeks, if <120 bpm from 7 weeks.

b. **Required images (measurements):**

i. Long ML Cervix
ii. Long ML Cervix w/ channel length measurement
iii. Long ML Cervix with color
iv. Long ML Uterus-lower uterine segment
v. Long ML Uterus-fundal border
vi. Long Left Uterus
vii. Long Right Uterus
viii. Trans Vaginal canal

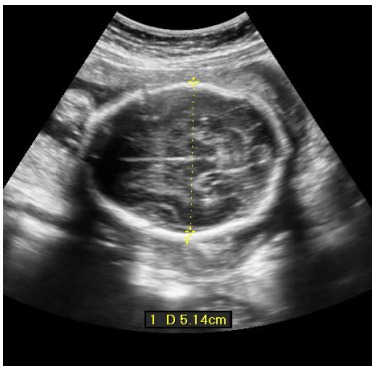
ix. Trans Cervix
x. Trans LUS
xi. Trans Body
xii. Trans Fundus
xiii. Long Left Adnexa (with and without color)
xiv. Trans Left Adnexa (with and without color)
xv. Long LT Ovary
xvi. Long LT Ovary Lateral
xvii. Long LT Ovary Mid (Length & AP)
xviii. Long LT Ovary Medial
xix. Long LT Ovary (color)
xx. Trans LT Ovary
xxi. Trans LT Ovary Superior
xxii. Trans LT Ovary Mid (width)
xxiii. Trans LT Ovary Inferior
xxiv. Trans LT Ovary (color)
xxv. Long Right Adnexa (with and without color)
xxvi. Trans Right Adnexa (with and without color)
xxvii. Long RT Ovary
xxviii. Long RT Ovary Lateral
xxix. Long RT Ovary Mid (Length & AP)
xxx. Long RT Ovary Medial
xxxi. Long RT Ovary (color)
xxxii. Trans RT Ovary
xxxiii. Trans RT Ovary Superior
xxxiv. Trans RT Ovary Mid (width)
xxxv. Trans RT Ovary Inferior
xxxvi. Trans RT Ovary (color)
xxxvii. Long Gestational Sac **(Long & AP**-if no embryo present)
xxxviii. Trans Gestational Sac **(Width**-if no embryo present)
xxxix. Yolk Sac
xl. Yolk Sac w/ one distance measurement (inner to inner)
xli. Embryo/fetus with and without CRL x 3 **(length)**
xlii. M-Mode **(heart rate)**
xliii. Long Placenta-caudal border **(tip to os)**
xliv. Long Placenta-caudal tip w/ length measurement from tip to internal os
xlv. Long Placenta-cranial border
xlvi. Trans Placenta-right (sup, mid, inf)
xlvii. Trans Placenta-left (sup, mid, inf)

IV. **14-18 Weeks**

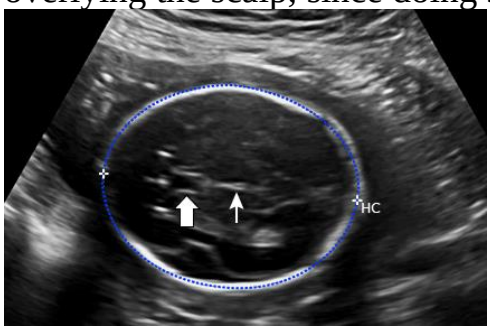
a. Image Descriptors:

i. Uterus and Adnexa: Longitudinal and transverse images should be obtained assessing contour, shape and position of the uterus. Both adnexa should be assessed for masses, free fluid and structural abnormalities. Ovaries should be documented, pulsed Doppler flow obtained, and measured, if seen.
ii. Placenta: Longitudinal and transverse images to assess echogenicity, contour and left and right as well as the cranial and caudal borders. The caudal tip should be assessed for its proximity to the internal cervical os.
iii. Fetal Biometry: Two (2) measurements should be made for each of the following:

1. Biparietal Diameter (BPD): performed from the axial image that includes the cavum septum pellucidum and thalami; measured from leading edge to leading edge of the largest transverse diameter of the cranium. Position the abdominal transducer perpendicular to the fetal parietal bone and calvarium appear smooth and symmetrical in the plane of section.



2. Head Circumference (HC): performed from the same image as the BPD or image similar to BPD with additional visualization of cavum septum pellucidum; measured around the outer calvarium. The standard view should not include the cerebellum or the cerebral ventricles. Important to avoid measuring the outer margin of the skin overlying the scalp, since doing so will falsely increase the HC.



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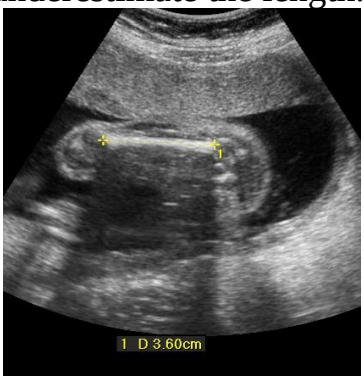
3. Abdomen Circumference (AC): performed at true transverse view of the fetal stomach and hepatic portion of the umbilical vein; measured

around outer skin margin. Measured at the level of the largest diameter of the fetal liver, denoted by the point of union of the right and left portal veins, which has a "hockey stick" shape, and confirmed by visualizing the umbilical segment of the left portal vein in its shortest length. Fetal stomach is typically visualized. Position the transducer perpendicularly to the fetal abdominal wall and visualize the symmetrical appearance of the lower ribs. The kidneys should not be seen in the AC image or the plane is too caudal.

4. Femur Length (FL): measure entire ossified length of the femoral diaphysis. Transducer should be aligned along the long axis of the femoral bone visualizing either the femoral head or the greater trochanter at the proximal end of the femur and the femoral condyle at the distal end. The calipers should be placed at the junction of bone and cartilage to measure only ossified bone; should not contain the femoral head. Including non-ossified portions of the femur and not visualizing the full femur (femoral head/greater trochanter to femoral condyle) are the major sources of error in gestational age assessment by FL. Avoid measuring the femur length in oblique, as this may underestimate the length.



5. Humerus Length (HL): measure the entire length of the humeral diaphysis

iv. Anatomy: Evaluation of fetus should include documentation of any gross abnormality. Nuchal fold thickness should be documented and reported. Full fetal surveys are performed after a gestational age of 18 weeks 0 days.

v. Heart Rate: Fetal heart rate should be assessed using M mode. If no fetal heart rate is noted in a fetus greater than 5 weeks 6 days on M mode, power doppler should be placed over the fetus should be documented AND gray scale cine clip obtained to confirm fetal demise and the Radiologist should be consulted before the patient leaves.
vi. Fetal Number: If multiple gestations, document number of embryos, gestational sacs, and placentas if possible.
vii. Amniotic Fluid: The amniotic fluid should be assessed subjectively.

b. **Required images (measurements):**
i. Long ML Cervix **(cervical length)**
ii. Long ML Cervix with color
iii. Long ML Uterus-lower uterine segment
iv. Long ML Uterus-fundal border
v. Long Left Uterus
vi. Long Right Uterus
vii. Trans Vaginal canal
viii. Trans Cervix
ix. Trans LUS
x. Trans Body
xi. Trans Fundus
xii. Long Left Adnexa **(Length & AP ovary)**
xiii. Trans Left Adnexa **(Width ovary)**
xiv. Long Right Adnexa **(Length & AP ovary)**
xv. Trans Right Adnexa **(Width ovary)**
xvi. Long Placenta-caudal border **(tip to os)**
xvii. Long Placenta-cranial border
xviii. Trans Placenta-right
xix. Trans Placenta-left
xx. (2) BPD **(Diameter of head)**
xxi. (2) Head Circumference **(Area of head)**
xxii. (2) Abdominal Circumference **(Area of Abdomen)**
xxiii. (2) Femur Length **(Femoral Diaphysis length)**
xxiv. (2) Humeral Length **(Humeral Diaphysis length)**
xxv. M-Mode **(heart rate)**

V. **18-26 Weeks**
a. **Imaging Descriptors:**
i. Cervix: Longitudinal images should be obtained. Measure the length of the cervix. If not adequately visualized transabdominally, then translabial and/or transvaginal sonography must be obtained to assess the cervix. Assess for funneling, closed. Assess for presenting cord.

ii. Uterus and Adnexa: Longitudinal and transverse images should be obtained assessing contour, shape and position of the uterus. Both adnexa should be assessed for masses, free fluid and structural abnormalities. Ovaries should be documented, pulsed Doppler flow obtained, and measured, if seen.

iii. Placenta: Longitudinal and transverse images to assess echogenicity, contour and left and right as well as the cranial and caudal borders. The caudal tip should be assessed for its proximity to the internal cervical os. Placenta tip should be greater than 3 cm from the internal cervical os. Ensure myometrial rim of 3mm or more under the placenta (otherwise suspect placenta percreta/accreta).

iv. Fetal Biometry: Two (2) measurements should be made for each of the following:
    1. Biparietal Diameter (BPD): performed from the axial image that includes the cavum septum pellucidum and thalami; measured from leading edge to leading edge.
    2. Head Circumference(HC): performed from the same image as the BPD; measured around the outer calvarium
    3. Abdomen Circumference (AC): performed at true transverse view of the fetal stomach and hepatic portion of the umbilical vein; measured around outer skin margin
    4. Femur Length (FL): measure entire length of the femoral diaphysis
    5. Humerus Length (HL): measure the entire length of the humeral diaphysis

v. Anatomy:
    1. Long axis views of the cervical, thoracic, lumbar and lumbosacral spine, all demonstrating skeletal anatomy as well as intact posterior skin surface
    2. Transverse views of the cervical, thoracic, lumbar and lumbosacral spine, all demonstrating skeletal anatomy as well as intact posterior skin surface
    3. Axial view of choroid plexus within the cerebral lateral ventricles.
        a. **If a choroid plexus cyst(s) is noted, you must obtain an image of the fetal hand in an open position
    4. Axial view of the cerebral lateral ventricles with transverse diameter measurement at the ventricular atrium (in the posterior margin), normal less than 10mm in diameter.
    5. Axial view that includes the cavum septum pellucidum and thalami and the midline falx;
    6. Axial view of the posterior fossa to include the cerebellum (with measurement), cisterna magna (with measurement, normal less than 10mm), and nuchal fold (with measurement from the outer occipital bone to the outer skin edge)

7. Long axis view of the midline facial profile, with the nasal bone present (the fetal face should occupy 75% of the image, and the mandible and maxilla should be demonstrated)
8. Coronal view of orbits
9. Coronal view of nose and lips with appropriate zoom to assess for cleft lip. Axial view to document the echogenic intact alveolar ridge (anterior palatine arch) with overlying intact upper lip, if possible.
10. Axial view of four chamber heart, demonstrating intact septi, proper size (1/3 of chest), and position (40 degree angle from midline)
11. Left ventricular outflow tract, demonstrating the left ventricle giving rise to the aorta
12. Right ventricular outflow tract, demonstrating the right ventricle giving rise to the pulmonary arteries and the aorta in cross-section
13. Aortic and ductal arches, if possible
14. Coronal chest and abdomen view to demonstrate situs (stomach and heart) and left and right hemidiaphragms
15. Fluid filled stomach
16. Left/Right Kidneys; AP renal pelvis measurements when indicated. Can use color Doppler to confirm renal arteries and aid in identification of the kidneys in a large patient.
17. Umbilical cord insertion site
18. Fluid filled bladder
19. Three-vessel umbilical cord with arteries demonstrated on the same half of umbilical vein
20. Coronal chest image demonstrating both hemidiaphragms (the heart and stomach should be shown on the same side)
21. Dual image demonstrating the stomach in one image and the heart in the other, both present on the left (both images should be labeled left/right)
22. Image each to include all 12 long bones
    a. Confirm presence and symmetric size/length of the 3 bones of the bilateral arms and legs.
23. Documentation of 2 hands and 2feet with evaluation of the digits when possible.
    a. Foot should normally be perpendicular to the tibia and fibula. If the tibia/fibula and foot are identified in the same plane suspect talipes.
    b. Fist is often clenched, although ideally watch the hand open/close and check for 5 fingers/knuckles on each side.
24. Cine clip in axial plane using sweep technique with appropriate zoom (must be able to visualize vertebral column and four chamber heart) documenting stomach, four chamber heart, 5 chamber view, main

pulmonary artery (or 3 vessel view), and the tracheal view. http://www.fetal.com/FetalEcho/04%20Standard.html

vi. Chromosomal Markers:
    1. Assess fetal heart for any evidence of an intracardiac echogenic focus that is similar in echogenicity to the nearby bony structures
    2. Assess fetal kidneys for any evidence of renal pyelectasis of 4 mm AP or greater
    3. Assess fetal bowel for echogenicity similar to the nearby bony structures
    4. Assess nuchal fold thickness for any measurement of 5 mm or greater (when BPD <=50mm)
    5. Assess for fetal structural abnormality
    6. Assess for short femur/ humerus

vii. Heart Rate: Fetal heart rate should be assessed using M mode.

viii. Fetal Number: If multiple gestations, document number of embryos, gestational sacs, and placentas if possible. All anatomy should be assessed and labeled "Twin A," "Twin B," etc.

ix. Amniotic Fluid: The amniotic fluid should be assessed subjectively during the exam. The largest fluid pocket should be measured in the AP dimension.

b. **Required images (measurements):**

i. Long ML Cervix **(cervical length)**
ii. Long ML Cervix with color
iii. Long ML Uterus-lower uterine segment
iv. Long ML Uterus-fundal border
v. Long Left Uterus
vi. Long Right Uterus
vii. Trans Vaginal canal
viii. Trans Cervix
ix. Trans LUS
x. Trans Body
xi. Trans Fundus
xii. Long Left Adnexa **(Length & AP ovary)**
xiii. Trans Left Adnexa **(Width ovary)**
xiv. Long Right Adnexa **(Length & AP ovary)**
xv. Trans Right Adnexa **(Width ovary)**
xvi. Long Placenta-caudal border **(tip to os)**
xvii. Long Placenta-cranial border
xviii. Trans Placenta-right
xix. Trans Placenta-left
xx. (2) BPD **(Diameter of head)**
xxi. (2) Head Circumference **(Area of head)**

xxii. (2) Abdominal Circumference **(Area of Abdomen)**
xxiii. (2) Femur Length **(Femoral Diaphysis length)**
xxiv. (2) Humeral Length **(Humeral Diaphysis length)**
xxv. Fetal Stomach
xxvi. Fetal Kidneys
xxvii. Abdominal Cord Insertion
xxviii. Fetal Bladder
xxix. Gender (if disclosed)**
xxx. 3 Vessel Cord
xxxi. 4 Chamber Heart
xxxii. Right Ventricular Outflow Tract
xxxiii. Left Ventricular Outflow Tract
xxxiv. M-Mode **(heart rate)**
xxxv. Diaphragm
xxxvi. Situs
xxxvii. Right Upper Extremity
xxxviii. Left Upper Extremity
xxxix. Right Lower Extremity
xl. Left Lower Extremity
xli. Long C-Spine
xlii. Long T-Spine
xliii. Long L-Spine
xliv. Long S-Spine
xlv. Trans C-Spine
xlvi. Trans T-Spine
xlvii. Trans L-Spine
xlviii. Trans S-Spine
xlix. Choroid Plexus
l. Lateral Ventricle **(Post Vent Diameter)**
li. Cavum Septum Pellucidum/Midline Falx
lii. Cerebellum (Diameter)
liii. Cisterna magna (Diameter)
liv. Nuchal fold **(Fold thickness)**
lv. Orbits
lvi. Nose/Lips
lvii. Fluid (AP Diameter)
lviii. Long Presenting Part
lix. Cine clip in axial plane from stomach to main pulmonary artery (3 vessel view)

** These structures are the only structures that do not require a patient call back. If any other listed anatomy is not clearly demonstrated, the patient should be given an additional

appointment time to attempt completion of the fetal survey. If the exam is not completed on the callback attempt due to fetal position, another callback should be attempted. If the exam is incomplete due to late gestation or maternal body habitus, the exam should be reported by the radiologist as limited by such.

VI. **27 Weeks to Term**

a. Imaging Descriptors:

i. Cervix: Longitudinal images should be obtained. Measure the length of the cervix. If not adequately visualized transabdominally, then translabial and/or transvaginal sonography must be obtained to assess the cervix. Assess for funneling, closed. Assess for presenting cord.

ii. Uterus and Adnexa: Longitudinal and transverse images should be obtained assessing contour, shape and position of the uterus. Both adnexa should be assessed for masses, free fluid and structural abnormalities. Ovaries should be documented, pulsed Doppler flow obtained, and measured, if seen.

iii. Placenta: Longitudinal and transverse images to assess echogenicity, contour and left and right as well as the cranial and caudal borders. The caudal tip should be assessed for its proximity to the internal cervical os.

iv. Fetal Biometry: Two (2) measurements should be made for each of the following:

1. Biparietal Diameter (BPD): performed from the axial image that includes the cavum septum pellucidum and thalami; measured from leading edge to leading edge.
2. Head Circumference(HC): performed from the same image as the BPD; measured around the outer calvarium
3. Abdomen Circumference (AC): performed at true transverse view of the fetal stomach and hepatic portion of the umbilical vein; measured around outer skin margin
4. Femur Length (FL): measure entire length of the femoral diaphysis
5. Humerus Length (HL): measure the entire length of the humeral diaphysis

v. Anatomy: **(only done if no fetal survey has been performed)**

1. Axial view of the cerebral lateral ventricles with transverse diameter measurement at the ventricular atrium (in the posterior margin)
2. Axial view of the posterior fossa to include the cerebellum (with measurement), cisterna magna (with measurement), and nuchal fold (with measurement from the outer occipital bone to the outer skin edge)
3. Axial view of four chamber heart, demonstrating intact septi, proper size(1/3 of chest), and position (40 degree angle from midline)
4. Coronal chest and abdomen view to demonstrate situs (stomach and heart) and left and right hemidiaphragms

5. Fluid filled stomach
6. Lt/Rt Kidneys; AP renal pelvis measurements when indicated
7. Umbilical cord insertion site
8. Fluid filled bladder
9. 3 vessel umbilical cord with arteries demonstrated on the same half of umbilical vein
10. Evaluation of fetus should include documentation of any gross abnormality.

vi. Heart Rate: Fetal heart rate should be assessed using M mode.

vii. Fetal Number: If multiple gestations, document number of embryos, gestational sacs, and placentas if possible. All anatomy should be assessed and labeled "Twin A," "Twin B," etc.

viii. Amniotic Fluid: The amniotic fluid should be assessed subjectively during the exam. The largest fluid pocket should be measured in the AP dimension. A four-quadrant Amniotic Fluid Index (AFI) should be assessed, with the transducer held in a vertical position at all times.

ix. S/D Ratio: Color and pulsed wave doppler assessment should be performed on the umbilical artery and a Systolic/Diastolic Ratio should be reported.

b. **Required images- 27 weeks to term (measurements):**

i. Long ML Cervix **(cervical length)**
ii. Long ML Cervix with color
iii. Long ML Uterus-lower uterine segment
iv. Long ML Uterus-fundal border
v. Long Left Uterus
vi. Long Right Uterus
vii. Trans Cervix
viii. Trans Body
ix. Trans Fundus
x. Long Left Adnexa **(Length & AP ovary)**
xi. Trans Left Adnexa **(Width ovary)**
xii. Long Right Adnexa **(Length & AP ovary)**
xiii. Trans Right Adnexa **(Width ovary)**
xiv. Long Placenta-caudal border **(tip to os)**
xv. Long Placenta-cranial border
xvi. Trans Placenta-right
xvii. Trans Placenta-left
xviii. (2) BPD **(Diameter of head)**
xix. (2) Head Circumference **(Area of head)**
xx. (2) Abdominal Circumference **(Area of Abdomen)**
xxi. (2) Femur Length **(Femoral Diaphysis length)**
xxii. (2) Humeral Length **(Humeral Diaphysis length)**

xxiii. Fetal Stomach
xxiv. Fetal Kidneys
xxv. Fetal Bladder
xxvi. Gender (if disclosed)
xxvii. M-Mode **(heart rate)**
xxviii. Fluid **(AP Diameter)**
xxix. Fluid **(AFI)**
xxx. Long Presenting Part

c. **Required images- 27 weeks to term survey (measurements):**
   i. 3 Vessel Cord
   ii. 4 Chamber Heart
   iii. Choroid Plexus
   iv. Lateral Ventricle **(Post Vent Diameter)**
   v. Cerebellum **(Diameter)**
   vi. Cisterna magna **(Diameter)**
   vii. Nuchal fold **(Fold thickness)**
   viii. Abdominal Cord Insertion

VII. **Biophysical Profile**

a. Observation Time/Overall Score Assignment:
   i. The fetus is observed for a period of 30 minutes, or until all sonographic variables are identified. Initial image (such as longitudinal midline pelvis for fetus presentation) at initiation of exam to document start time should be obtained. ***If BPP score of 6/8 or less, an additional image (such as of an amniotic fluid pocket) should be obtained to document at least 30 minute duration of exam.
   ii. Variables are assigned a score of "2" if present during the exam, or a score of "0" if not observed.
   iii. A score of 8/8 is assigned if all variables are normal and present within 30 minutes, a BPP score of 6 or less is considered an abnormal score, upon which the Radiologist should be consulted, and the ordering physician should be notified immediately.
   iv. Cine clip acquisition
      1. If BPP score of 8/8, maximum of 4 cine clips saved to PACS including at least one sagittal respiratory motion cine demonstrating downward movement of the hemidiaphragm and inward movement of the rib cage.
      2. If BPP score of 6/8 or less, must document at least one sagittal cine clip demonstrating presence or absence of respiratory motion and preferably an additional coronal cine clip for respiratory motion.

Additional clips should be stored to document presence or absence of fetal posture/tone and fetal movement.

b. Sonographic Variable Technique:
   i. Fetal Breathing Movements (respiration):
      1. Normal(2): at least one episode of > 30 seconds of FBM in 30 minutes or less;
      2. Abnormal (0): Absent or no episode of >30 seconds of FBM in 30 minutes.
   ii. Fetal Posture and Tone:
      1. Normal (2): 1 episode of active extension with return to flexion of fetal limbs or trunk; opening and closing of hand is considered a normal tone;
      2. Abnormal (0): Slow extension with return to partial flexion, movement of a limb in full extension, or absent fetal movement.
   iii. Fetal Movement:
      1. Normal (2): 3 discrete body/limb movements in 30 minutes or less (episodes of active continued movement are considered a single movement);
      2. Abnormal (0): Less than 3 episodes of body/limb movements in full 30-minute time span.
   iv. Amniotic Fluid Index:
      1. Normal (2): 1 pocket of fluid measuring 2 cm or greater in the vertical axis (Note: amniotic fluid index (AFI) should be reported as well along with any oligohydramnios or polyhydramnios, however the AP pocket is the qualitative factor for the exam);
      2. Abnormal (0): Either no fluid pockets, or largest fluid pocket is less than 2 cm in vertical height.
   v. S/D Ratio: Color and pulsed wave doppler assessment should be performed on the umbilical artery and a Systolic/Diastolic Ratio should be reported. S/D ratio greater than 2.6 in the setting of a BPP score of 6/8 or less is considered significant, although non-specific if BPP score of 8/8.

c. **Required images (measurements):**

****Note:** A majority of this exam is observation. A minimum of one cine clip required to document fetal breathing movement in sagittal plane with proper magnification for a normal BPP score of 8/8 examination. Any abnormalities should be documented with cine loop clip with specific documentation of all the aspects that are present/absent (fetal tone, fetal gross body movement, and fetal respiration).

1. Long ML Uterus (presentation)
2. S/D Ratio **(Ratio)**
3. Cine clip of fetal tone movement (2)

4. Cine clip of fetal gross body movement (2)
5. Cine clip of fetal respiration
6. RUQ **(AP diameter)**
7. RLQ **(AP diameter)**
8. LLQ **(AP diameter)**
9. LUQ **(AP diameter)**
10. M-Mode **(heart rate)**

VIII. **Limited Obstetric ultrasound**

The only appropriate use of the Limited OB worksheet (which assesses only the placenta previa/abruption, the cervix, fetal heart rate) is when a limited OB ultrasound is requested **AND** the patient has had a prior ultrasound performed for this pregnancy. A limited OB ultrasound is performed when the clinician has specified only a limited exam indication, such as to evaluate cervical length, evaluate for placental abruption, evaluate for placenta previa, etc.

a. Imaging Descriptors:
   i. Cervix: Longitudinal images should be obtained. Measure the length of the cervix. If not adequately visualized transabdominally, then translabial and/or transvaginal sonography must be obtained to assess the cervix. Assess for funneling, closed. Assess for presenting cord.
   ii. Placenta: Longitudinal and transverse images to assess echogenicity, contour and left and right as well as the cranial and caudal borders. The caudal tip should be assessed for its proximity to the internal cervical os. Assess for placental abruption, placenta previa
   iii. Heart Rate: Fetal heart rate should be assessed using M mode.
   iv. Fetal Number: If multiple gestations, document number of embryos, gestational sacs, and placentas if possible. Fetal position, heart rate should be assessed and labeled "Twin A," "Twin B," etc.
   v. Amniotic Fluid: The amniotic fluid should be assessed subjectively during the exam. The largest fluid pocket should be measured in the AP dimension. A four-quadrant Amniotic Fluid Index (AFI) should be assessed, with the transducer held in a vertical position at all times.
   vi. Fetus position: Assess the presenting part of the fetus (i.e., cephalic, transverse breech, footling breech).

b. **Required images- Limited obstetric ultrasound (measurements):**
   i. Long ML Cervix **(cervical length)**
   ii. Long ML Cervix with color
   iii. Long Placenta-caudal border **(tip to os)**
   iv. Long Placenta-cranial border
   v. Trans Placenta-right
   vi. Trans Placenta-left

vii. M-Mode **(heart rate)**
viii. Fluid **(AP Diameter)**
ix. Fluid **(AFI)**
x. Long Presenting Part