# FETAL ULTRASOUND COMPLETE
# 2nd OR 3rd TRIMESTER

## Patient Prep (recommended):

Patients are recommended to drink 32 ounces of water 2 hours prior to exam time. The water should be finished 1 hour prior to exam time. The patient should have a full bladder for exam.

## Survey:

Perform a real-time survey of the fetus that is 14 weeks or greater.

1. Evaluate maternal uterus, ovaries and adnexa.
2. Evaluate cervical length.
3. Evaluate the fetus for position, anatomical survey, fetal biometry and fetal age.
4. Evaluate fetal cardiac activity and heart rate.
5. Evaluate placenta for grade, echogenicity, attachment to uterine wall, location and relationship to internal cervical os.
6. Evaluate amniotic fluid level.

Use Doppler or color flow to distinguish vessels and on any abnormalities.

* Multiple pregnancies require that a survey is performed for placental number, gestational sac number, fetal size comparison, presence or absence of an interposed membrane, compare amniotic volume, umbilical cords and fetal genitalia (when visualized). Each fetus will have the required documentation and measurements provided.

## Image Documentation:

Each image must be labeled with the patient's full name, medical record number, accession number, initials of the imaging technologist, organ/area identification and scanning plane.

If an image of a structure is not well seen, take an image of the structure and annotate the purpose of the image (i.e. right ovary not well seen).

For dating purposes:
If an EDD (Estimated Date of Delivery) has been determined from a prior ultrasound this is to be used for dating. If the patient has not had a prior ultrasound but the LMP (Last Menstrual Period) is known for sure use this date. If the EDD and LMP are not available, dating will be based on the measurements from this ultrasound.

All follow up ultrasounds will use the established EDD from the first ultrasound for dating. This will show growth of fetus between ultrasounds.

NOTE:
After obtaining the required images of the uterus, ovaries, cervix and adnexa the patient can void for comfort if there is adequate amniotic fluid for good visualization of the fetal structures. If the patient gets lightheaded, allow them to lie on their side or sit up.

General Procedure description:

## UTERUS

1. Representative images of the uterus in the longitudinal axis demonstrating midline (inferior, mid, fundal), right of midline and left of midline.
2. Representative images of the uterus in the transverse plane demonstration inferior, mid and fundal.
3. Any abnormality of uterus documented in longitudinal and transverse axis with measurements. A color flow image of abnormality if appropriate.

## CERVIX

1. Longitudinal and transverse images of the cervix.
2. Longitudinal axis image of the cervix with measurement.
3. Longitudinal axis image of the relationship of the cervix and placenta edge.
4. If the placenta is low lying measure the edge of the placenta to the cervical os.
5. If the cervix appearance elongated due to an extremely full bladder reevaluate the cervix at the end of the exam after the patient has voided.
6. If an endovaginal exam needs to be performed there must be an order for it. If a verbal order is given before the written order is obtained document the name of the person that provided the verbal order. If an endovaginal probe cannot be utilized the transperineal approach may be beneficial.

## OVARIES:

1. Two longitudinal axis images of each ovary. Measurements of the length and depth are to be documented.
2. Two transverse axis images of each ovary. Measurement of the width to be documented.
3. A volume measurement of each ovary documented.
4. Color flow image of each ovary documented.
5. Doppler waveforms of each ovary should be recorded to document relevant venous and arterial blood supply if requested or necessary of an ovarian mass.
6. If an ovary cannot be located, take an image in the area of the ovary and annotate the purpose of the image (i.e. ovary not seen).
7. Document any cysts, follicles or solid masses in the ovaries. Take longitudinal and transverse measurements as necessary. Document color flow and Doppler waveforms as needed. * See Below

## ADNEXA:

1. One longitudinal axis image of each adnexa to be documented.
2. One transverse image of each adnexa to be documented.
3. Any abnormalities in the adnexa documented.

## PLACENTA

1. Longitudinal axis images of the placenta to include both edges and mid region.
2. Evaluate the cord insertion into the placenta.
3. Evaluate the placenta grade, echogenicity, attachment to uterine wall, location and relationship to internal cervical os.
4. Transverse axis images of the placenta.

## AMNIOTIC FLUID INDEX (AFI)

1. When the fetus is at 18 weeks gestation provide an AFI.
2. In the longitudinal axis measure the amniotic fluid in all four quadrants of the uterus with the anterior-posterior (AP) approach. There should not be any fetal body parts or umbilical cord in these measurements. These measurements will be added together to calculate the AFI.
3. When the fetus is at 14 weeks gestation, in the longitudinal axis measure the Maximum Vertical Pocket of amniotic fluid. This may be one of the measurements from the four quadrant measurements. This measurement will be used to diagnose the range that the amniotic fluid level falls in.
4. The normal range for the Maximum Vertical Pocket is 20mm – 80mm. Below 20mm would be Oligohydramnios and above 80mm would be Polyhydramnios.
5. Provide the information on the worksheet from the charts provided based on fetal age.

## UMBILICAL CORD

1. Image the umbilical cord in the transaxial view to visualize that there is a 3 vessel cord (2 arteries and 1 vein).
2. If a 3 vessel cord cannot be identified. Provide a transverse image of the umbilical arteries adjacent to the bladder if possible.
3. Image insertion of umbilical cord into fetus abdomen with and without color flow.
4. Image insertion of umbilical cord into placenta with and without color flow.

## UMBILICAL CORD DOPPLER

1. Perform when requested from ordering physician.
2. When obtaining umbilical cord Doppler images obtain two velocity measurement in loop free area of the umbilical cord. These should be obtained at the straightest segments away from both the fetus and placenta insertion sites. If no straight segments areas can be found, use a segment closer to the fetus instead of the placenta. No angle correct should be utilized. Need resistive Index (RI) and S/D ratio (systolic velocity/diastolic velocity).

## FETAL SURVEY

### Head

1. In transverse axis evaluate and image the lateral cerebral ventricles, cisterna magna, midline falx, cerebellum and choroid plexus.
2. In transverse axis at the widest position of the skull evaluate and image the thalamus and cavum septum pellucidum.
3. Evaluate the shape of the skull.

### Face

1. Evaluate and image upper lip.
2. Evaluate and image nose/nostrils.
3. Evaluate and image palate.

**Spine**

1. In longitudinal and transverse axis evaluate and image the spine at each level cervical, thoracic, lumbar and sacral spine.
2. Make sure the skin line is noted on all longitudinal images.
3. NOTE: Careful evaluation of the complete spine, especially lumbar is essential. Spina Bifida commonly affects the lumbar-sacral region.

**Heart/Cardiac Activity**

1. Evaluate and image in the transverse axis for a four-chamber heart. Label image right or left side so situs can be determined.
2. Evaluate and image left and right ventricular outflow tracts.
3. Evaluate and image heart rate and rhythm utilizing M Mode. Record this tracing and calculate the heart rate. Note any Brady, tachycardia or erratic heart beats.
4. Cine loop (clip store) needs to be utilized to confirm or exclude cardiac activity.
5. Doppler or color flow should only be utilized on a fetal heart when an abnormality is suspected or to confirm no cardiac activity.

**Stomach**

1. Evaluate and image in the transverse axis. Seen on the left side of the fetal abdomen as an oval fluid filled structure.
2. Evaluate the liver, junction of the umbilical vein and portal sinus.

**Anterior Abdominal Wall**

1. Evaluate and image the fetal umbilical insertion site and anterior abdominal wall.

**Kidneys**

1. Evaluate and image the kidneys in the longitudinal and transverse axis.
2. If dilation of the renal pelvis is visualized, provide a measurement of the renal pelvis in the transverse image.
3. If abnormal dilation of the collection system, document fetal gender, if possible.

**Urinary Bladder**

1. Evaluate and image the bladder in the transverse axis.
2. Document any dilatation of the distal ureters.

**Extremities**

1. Evaluate and image both upper and lower extremities.

**Gender**

1. When requested by ordering physician, medically indicated and with multiple gestations document the gender on the image when seen. When providing images to the patient do not document the gender on the image if you are not absolutely positive what the gender is.

## FETAL MEASURMENTS

## At least two measurements need to be provided.

**Biparietal Diameter (BPD)**

1. This measurement is to be obtained in a transaxial plane at the widest portion of the head. This image needs to have the Thalamus and Cavum Septum Pellucidum at midline.
2. This measurement is obtained at the outer to inner margins (leading edge to leading edge) of

the parietal bones.
3. If the fetal head is dolichocephalic or brachycephalic a corrected BPD may be needed. To do this measure the fronto-occipital diameter and obtain a cephalic index (a ratio of BPD to fronto-occipital diameter).

**Occipitofrontal Diameter (OFD)**

1. This measurement is to be obtained in a transaxial plane at the widest portion of the head. This image needs to have the Thalamus and Cavum Septum Pellucidum at midline.
2. This measurement is obtained at midline of the skull from outer to outer edge.

**Head Circumference (HC)**

1. This measurement is to be obtained in a transaxial plane at the widest portion of the head. This image needs to have the Thalamus and Cavum Septum Pellucidum at midline.
2. This circumference measurement is obtained at the outer perimeter of the calvarium.

**Cisterna Magna (CM)/Cerebellum**

1. This measurement is to be obtained in a transaxial plane with posterior fossa, cisterna magna and cerebellum in the same image.
2. The cisterna magna measurement is obtained at midline. The cisterna magna is measured from inner edge of calvarium and outer edge of cerebellum.
3. The cerebellum measurement is obtained at the widest area of cerebellum. The cerebellum is measured from outer edge to outer edge.

**Ventricular Atrium (Lateral Ventricle)**

1. This measurement is to be obtained in a trasventricular plane just superior to the transthalmic images.
2. The ventricle measurement is obtained at the level of the glomus of the choroid plexus.
3. The ventricle measurement is obtained from the inner margin of the medial wall to the inner margin of the lateral wall.

**Abdominal Circumference (AC)**

1. This measurement is to be obtained in a true transverse plane with the liver, stomach and the junction of the umbilical vein and portal sinus.
2. This abdominal circumference measurement is obtained at the outer aspect of the soft tissue.

**Femur Length (FL)**

1. Evaluate and image the longitudinal axis of the femur demonstrating the ossified ends of the diaphysis.
2. Measure the femur from end to end. Make sure that this measurement is taken with the femur oriented horizontally.

**Humerus Length (HUM)**

1. Evaluate and image the longitudinal axis of the humerus demonstrating the ossified ends of the diaphysis.
2. Measure the humerus from end to end. Make sure that this measurement is taken with the humerus oriented horizontally.

Make sure all measurements are placed in the calculation package. If the patient has a prior exam and the information is available place in the calculation package to produce growth curves. Provide images of the calculation package.

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