

FOLLOW UP OBSTETRICAL ULTRASOUND PROTOCOL

BILLING CODE: UOBF

- ** Requisitions should be read carefully to ensure the proper exam is performed.**
- ** See separate protocols for OB Basic and Detailed Anatomy, OB Follow Up exams and specialty OB exams.**
- ** See specialized protocol for TTTS (Twin to Twin Transfusion Syndrome) and TAPS (Twin Anemia Polycythemia Sequence) for all mono-di and mono-mono pregnancies.**
- ** See minimum additional images for FL or HL measuring $\leq 2\%$. If indicated, a referral will be made to MFM for further evaluation and full skeletal dysplasia survey.**
- **Microcephaly protocol should be performed when the HC is $\leq 2\%$ using the Chervenak FA, Jeanty P, Cantraine F, et al. table.**
- **If anatomy was cleared before 17 weeks 0 days, all anatomy images need to be repeated. If it was cleared on or after 17 weeks 0 days, it does not need to be repeated.**
- ** If it has been greater than 3 weeks since last biometry was done, new biometry will be obtained unless it clearly states not to.**
- **If a patient has not been seen within our system and is referred to us for a limited exam or follow up growth, the provider must indicate where the anatomy study was completed and be clear that we do not need to repeat it. If the anatomy study was not completed, we cannot do partial anatomy surveys and must repeat a basic or detailed anatomy assessment.**

DATING: Refer to dates used on previous ultrasounds or Working EDD listed in EPIC.

IMAGES TO OBTAIN

UTERUS: *if indicated*

- Follow up fibroids if previously seen.
- New or incidental findings should also be imaged.

ADNEXA AND OVARIES: *if indicated*

- Follow up cysts or masses if previously seen.
- New or incidental findings should also be imaged.

CERVIX:

TRANSABDOMINAL IMAGING

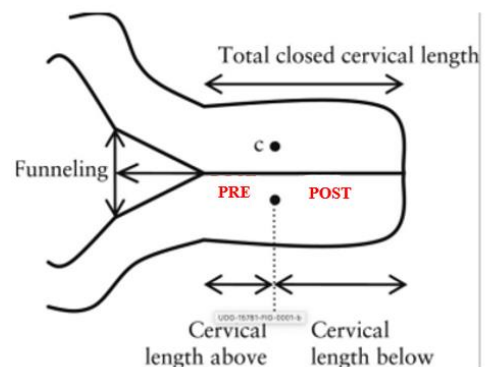
- To be measured transabdominally on all pregnancies less than 24 weeks GA. Normal cervical length is greater than 3.0 cm before 24 weeks.
- Color image of the LUS to assess for vasa previa.
- If you suspect vessels are present, or are unable to see the cervix without fetal parts obscuring the area, a transvaginal imaging study should be performed.

TRANSVAGINAL IMAGING

STERILE OR BACTERIOSTATIC GEL PACKS AND SINGLE USE COVERS TO BE USED FOR ALL TRANSVAGINAL IMAGING.

*****Verbal consent to be obtained from the patient for transvaginal imaging. Documentation of consent to be included in report. If a male sonographer is doing the scan, there will need to be a female chaperone present for the transvaginal or translabial portion of the exam.**

- If the cervix appears shortened or funneled before 24 weeks, or if a cervical length is specifically the requested, a transvaginal ultrasound should be performed, and the following should be documented: *A translabial study can be done in place of transvaginal imaging in cases of PPROM, bulging membranes or patient request/refusal of TV.*
 - Total cervical length
 - Closed length of cervix
 - Open length of funneling if present. Greater than 50% open length of cervix is associated with higher risk of preterm delivery.
 - Assess whether the cervix is dynamic by observing for changes for at least 2 minutes. Images should be taken at the beginning and end of this period to document the time spent. If the cervix is dynamic, report the shortest closed cervical length.
 - Color image of the LUS to assess for vasa previa.
 - Sample any vessels seen within 2cm of the cervical os with spectral Doppler to see if they are arterial or venous. If it is an arterial vessel, be sure to also include heart rate measurements to differentiate the fetal blood vessels from maternal vessels by comparing their respective heart rates.
- Transvaginal ultrasound is not needed to evaluate the cervix after 24 weeks. If you find a short or dilated cervix transabdominally during an ultrasound exam, contact the referring provider and inform them of the findings. If the referring provider cannot be contacted, call triage nurse or L&D.
- For cerclage evaluation: Take 2D images, as well as cine sweeps, of the cervix showing suture in transverse and sagittal. Measure the total cervical length AND closed cervical length from stitch to external os. Do not apply fundal pressure or Valsalva with patients that have a cerclage.



PLACENTA:

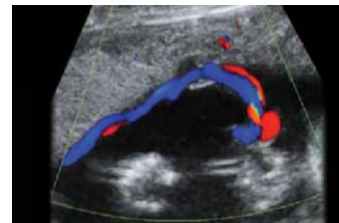
- Document location of placenta in sagittal and transverse.
- Show thickness and echotexture.
- If venous lakes are present, include a color image and a 2D cine clip showing the slow flow movement within.
- Assess for a bi-lobed placenta or succenturiate lobe. If present, document location of connecting vascular supply to the primary placental lobe.
- Assess relationship of placental edge to the internal cervical os to rule out placenta previa.
- Measure the distance from the inferior most portion of the placental tissue if it appears to be low lying. Also include a measurement from the edge of the placental sinus if one is present. A placenta should be described as low lying if it is less than 2 cm from the cervical os, or less than 1.1 cm from the placental sinus.
- Cine clip of any abnormality.
- If accreta is suspected, see additional images needed in separate PAS protocol.



Measurement from a placental sinus to internal os.

PLACENTAL CORD ORIGIN *if previously marginal or velamentous:*

- Document the placental cord origin in transverse and sagittal planes using color Doppler and show the vessels of the cord separating into the placenta. To rule out a velamentous cord origin, the cord should be shown clearly coming out from the placenta, not just coursing along the surface.
- Measure the distance from the cord origin to the edge of the placenta if it appears near the edge. A marginal cord origin is defined as less than 2 cm from placental edge.



FETAL POSITION:

- Document fetal position

FETAL HEART RATE:

- Measure fetal heart rate with M-Mode. Normal range is 110 – 170 bpm. If the fetal heart rate is above or below, refer to Urgent OB Contact List to contact charge nurse or L&D. If being scanned at an outpatient clinic, contact the referring provider or on call the OB staff for further instructions.

AMNIOTIC FLUID VOLUME:

- 20-24 weeks: AFI evaluation should be done using MVP. If abnormal, obtain a four quadrant AFI.
- After 24 weeks, or if appears abnormal before 24 weeks: Evaluation should be done using a four quadrant AFI
- For multiple gestations (twins, triplets, etc): Always measure the MVP unless Mono/mono gestation, then use four quadrant measurements.
- Fluid pockets measured should be greater than 1cm in width.

AMNIOTIC FLUID VOLUME continued:

AFI LEVELS (FOUR QUADRANTS)

<5cm	Oligohydramnios
5-8 cm	Borderline Low
8-20cm	Normal
20-24cm	Borderline High
>24cm	Polyhydramnios

SINGLE MVP AMNIOTIC FLUID LEVELS

<2cm	Oligohydramnios
2-8cm	Normal
>8cm	Polyhydramnios

BIOMETRY every 3 weeks unless stated otherwise:

Measure each of the following at 2-3 times:

BPD –measured on an axial plane that traverses the thalami and CSP

HC – include in image with BPD. If $\leq 2\%$, Microcephaly protocol should be performed

AC - Transverse image through the upper abdomen at the level of the fetal stomach, umbilical vein and portal sinus.

Femur - See additional image requirements at end of protocol if HL or FL measure $\leq 2\%$

HEAD:

- Lateral ventricles with measurements (normal < 10mm).

HEART:

- 4 chamber view
- Lt ventricular outflow tract, 5 chamber view showing the relationship of the aorta to the ventricular septum.
- Right ventricular outflow tract, showing branching of the PA.

STOMACH: Transverse view

BLADDER: Transverse view

KIDNEYS:

- Sagittal kidneys with measurements, labeled Right and Left
- Transverse picture of kidneys at the level of renal pelvis.
- Measure any pelviectasis if present in a transverse view (APRPD anterior-posterior renal pelvic diameter) and follow the UTD Classification System.

Normal: 16-27weeks 6 days APRPD <4mm

≥ 28 weeks APRPD <7mm

A1: 16-27weeks APRDP 4 to <7mm with central calyceal dilation

≥ 28 weeks APRDP 7 to <10mm central calyceal dilation

A2-3: 16-27 weeks APRDP ≥ 7 mm

≥ 28 weeks APRPD ≥ 10 mm

Exceptions:

- Peripheral calyceal dilation without meeting criteria is upgraded to A2-3
- Abnormal echogenic renal parenchyma is upgraded to A2-3
- Ureter dilation without meeting criteria is upgraded to A2-3

INCLUDED ANY ANATOMY THAT HAS NOT BEEN CLEARED ON ANATOMIC SURVEY.

****If abnormalities are seen, include additional 2D images, cine sweeps, 3D imaging and color doppler images as needed.***

***IMAGES THAT DO NOT NEED TO BE DOCUMENTED ON FOLLOW UP EXAMS IF PREVIOUSLY CLEARED:**

- Extremities
- Spine
- Orbits, profile, nose & lips,
- Cord insertion/Cord origin/3VC
- Diaphragm
- Posterior fossa, cerebellum, CSP, choroid plexus
- Situs

ADDITIONAL IMAGES TO BE OBTAINED AS NEEDED

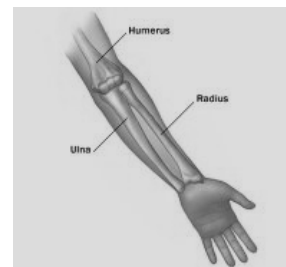
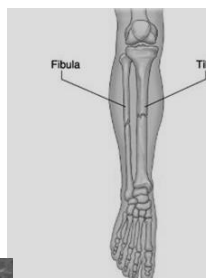
LONG BONES (FL or HL) MEASURING $\leq 2\%$

DETAILED ANATOMY IMAGE REQUIREMENTS IF ONLY A BASIC WAS ORDERD

MEASURE BILATERAL LONG BONES–

Note whether long bones and skull show proper mineralization, curvatures, or fractures:

- Femur
- Tibia
- Fibula
- Humerus
- Radius
- Ulna



CHEST CIRCUMFERENCE

SAGITTAL AND CORONAL VIEWS OF CHEST
showing chest size in relation to abdomen.



Bell shaped chest

If indicated, a referral will be made to MFM for further evaluation and full skeletal dysplasia survey.

HC MEASURING $\leq 2\%$ - See Microcephaly protocol for additional info

1. **SKULL**-Assess size, shape, sutures, and mineralization
2. **ORBITAL DISTANCE**
 - a. Inner to inner
 - b. Outer to outer
3. **CEREBELLUM**-Measured in transverse
4. **PROFILE** – Is forehead sloping or with normal contour
5. **LATERAL VENTRICLES**: (Normal is < 10 mm)
6. **CINE SWEEP** sweeping superior to inferior through the entire head showing structures of the brain.

ADDITIONAL IMAGES TO BE OBTAINED AS NEEDED cont..

MULTIPLE GESTATIONS – TWINS, TRIPLETS ETC

SEE SPECIALIZED PROTOCOL FOR **TTTS AND TAPS FOR ALL MONOCHORIONIC PREGNANCIES**

DETAILED ANATOMY IMAGE REQUIREMENTS SHOULD BE DONE FOR ALL MULTIPLE GESTATIONS. IN ADDITION TO THE FOLLOWING:

UTERUS: Sagittal and transverse **cine sweeps** to show orientation of fetuses.

POSITION: Document each fetus' position within in the uterus as well as presentation

- On each uterus image, label the location of fetuses with A, B etc.
- Include description of fetus location in "Presentation" section of Viewpoint report.

MEMBRANE / CHRONICITY AND AMNIONICITY ASSESSMENT:

- Document the free-floating membrane between each fetus and ensure membrane is not adhered to fetus.
- Demonstrate membrane completely separating each fetus
- Document the thickness of membrane.
- Look for twin peak sign (diamniotic) or T-sign (monoamniotic)

PLACENTA:

- Document both placentas and determine if there are separate or shared placentas present. Show twin peak sign between placentas if visualized.
- Describe the location of each placenta

AMNIOTIC FLUID:

- Measure the deepest pocket (MVP) for each. In mono/mono pregnancies use 4 quadrants for AFI assessment.

UMBILICAL ARTERY DOPPLER: Perform UA Doppler as requested, or if either of the following is determined- AC or EFW is <10% . For multiple, regardless of chorionicity, UA Doppler should be taken for BOTH twins if one is FGR.

TECHNIQUE:

- 3 spectral Doppler samples of the umbilical artery are taken at the middle section of the umbilical cord.
- The sample with the highest S/D ratio is documented in the OB report.
- Avoid being close to the fetus or placental cord insertions.
- For multiples, if necessary, the cord can be traced from fetal cord insertion to ensure the proper fetal cord is documented in cases where it is challenging to determine which cord corresponds to a certain fetus. In this case, it should be clearly stated on the report that the Doppler was obtain at the fetal end to accurately compare to prior and future measurements.
- If a dramatic difference is seen in S/D ratios between exams, BOTH umbilical arteries should be sampled and compared. There are cases where one artery has normal flow, and the other is abnormal. Describe this in the report if this is the case.

INTERPRETATION:

- An umbilical artery S/D ratio of > 95th percentile is considered abnormal.
- If absent end diastolic flow (or reversed diastolic flow) is seen, this needs to be reported urgently via a phone call to the clinical team before the patient leaves. The patient may be admitted.
- If absent or end diastolic flow is present additional imaging of ductus venosus is indicated.
- Absent or reversed diastolic flow does not mean that the S/D = 1. For these cases, only include the peak systolic velocity and report these as "Absent diastolic flow," or "Reversed diastolic flow."

MIDDLE CEREBRAL ARTERY DOPPLER:

TECHNIQUE:

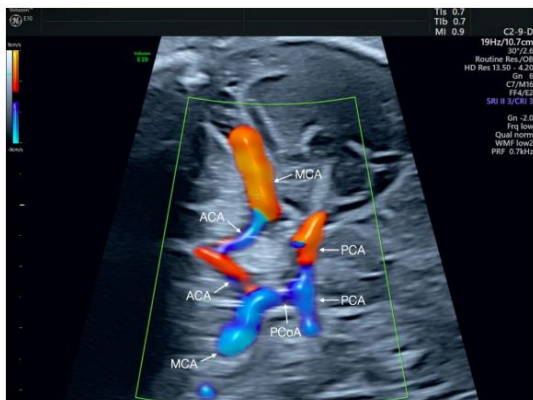
- An axial image of the head should be taken at the level of biparietal diameter.
- The image of the head should fill > 75% of the screen
- Color flow mapping using the smallest possible color box should be used to identify the Circle of Willis and proximal MCA.
- The pulse wave Doppler sample gate should be set at a width of 2 mm and placed on the proximal 1/3 of the MCA, preferably just distal to its origin from the internal carotid artery.
- The high-pass filter should be set between 50-60 Hz with sweep speed to capture 4-8 cardiac cycles. Fetus should be at rest, without breathing.
- The angle of insonation should be kept as close as possible to 0 degrees.
- Angle correction should be less than 30 degrees when used only when a zero degree angle has been attempted and can not be obtained.
- Pressure by the transabdominal probe should be avoided.
- Only use the anterior most MCA, the posterior MCA should never be used.
- At least 3 valid measurements should be taken.
- Do not use auto trace for the MCA velocities. Only manually measure the PSV. This is also the only value that should be reported.
- Report the highest velocity from the 3 measurements

INTERPRETATION:

- Increased peak systolic velocity in the MCA can be suggestive of developing fetal anemia TAPS.
- The risk of anemia is highest in fetuses with a pre-transfusion peak systolic velocity of 1.5 times the median or higher.



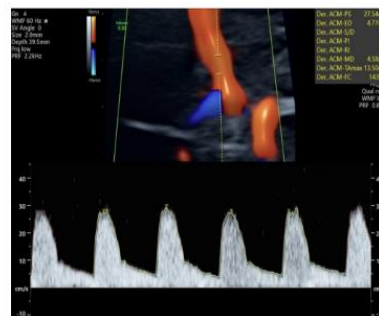
Doppler assessment of the fetal cerebral circulation



Identification of the vessels forming the circle of Willis. MCA, middle cerebral artery; PCA, posterior cerebral artery; ACA, anterior cerebral artery; PCoA, posterior communicating artery



Doppler assessment of the fetal cerebral circulation



Correct pulsed-Doppler interrogation of the MCA. The image is optimized, as the MCA occupies more than 50% of the screen, 4 similar waveforms are obtained and analyzed, the high-pass filter is set in 60 Hz (*), and the Doppler sample volume is applied to the center of the vessel with a width of 2 mm.

FETAL HYDROPS ASSESSMENT: (Defined by two of the following)

- Ascites
- Integumentary edema
- Pericardial effusion
- Pleural effusion
- Placentomegaly

SEE SPECIALIZED PROTOCOLS FOR:

- Multiple Gestation Complications – TTTS/TAPS
- Placenta Accreta Assessment
- Chest Anomalies:
 - Congenital Diaphragmatic Hernia (CDH)
 - CPAM (Congenital Pulmonary Airway Malformation)
 - Pulmonary Sequestration
- Gastroschisis/Omphalocele Anomalies
- Skeletal Dysplasia
- Fetal Arrhythmia

OB FOLLOW UP IMAGE LIST

IMAGE	MODE
GENERAL	
Presentation	2D
FHR	M-mode
AFI (MVP for 20-24wks, 4 quad >24wks)	2D+
Cervix <24wks	2D+
LUS with color	Color
Placenta Sag - <i>recheck if low lying or previa</i>	2D
Placenta Trans	2D
<i>Plac Edge/CVX -recheck if low lying or previa</i>	2D+
<i>Eval any fibroids or ovarian cysts seen on prior</i>	2D+
HEAD	
BPD/HC x 3	2D+
Lateral Ventricle w/ measurement	2D+
HEART if able	
4CH	2D
LVOT	2D
RVOT	2D
ABDOMEN	
AC x3	2D+ x3
Stomach	2D
Kidneys Trans	2D
Rt Kidney Sag w/ measurement	2D+
Lt Kidney Sag w/ measurement	2D+
Bladder	2D
EXTREMITIES	
FL x3	2D+
ADDITIONAL IMAGES IF NEEDED	
<i>UMBILICAL ARTERY IF EFW OR AC <10%</i>	<i>Spectral</i>
<i>ALL LONG BONES IF FL <2%</i>	
<i>SKELETAL DYSPLASIA PROTOCOL IF FL <1%</i>	
<i>REPEAT ANY PREVIOUSLY SEEN ABNORMALITY</i>	
<i>IF NEW FINDING SEEN, ADD DETAILED ANATOMY VIEWS IF NOT DONE PREVIOUSLY</i>	
<i>Falx</i> <i>Vermis</i> <i>Nasal Bone w/ measurement</i> <i>Maxilla /Mandible</i> <i>Lungs</i> <i>Ductal Arch</i> <i>Aortic Arch</i> <i>IVC/SVC</i>	

OB FOLLOW UP PROTOCOL HISTORY

	Date	Changes made	By whom
Updated			Becky Marion
Updated	5/1/2022	-Format Change -Added UA, MCA, Percrreta sections	Renee Betit Fitzgerald
Approved	5/5/2022		Manjiri Dighe
		Added to Doppler section – -Do both twins if either is ordered -Ok to follow cord from abdomen to ensure correct fetus in multiples -Sample both arteries if big discrepancy between exams	
Change	9/29/2022	UA Dopplers for Di-Di Twins only to be done on FGR twin. Mono-di/Mono-Mono will remain both twins	Manjiri Dighe and Edith Cheng
Added	10/25/2022	Placenta Accreta Protocol Checklist 1-10	Renee Betit Fitz
Added	10/25/2023	Agreed on AFI level chart	Manjiri Dighe Edith Cheng Renee B Fitz
Changed	5/5/2023	Cerclage image was incorrect. Pre and Post labels revised. Removed Placenta Accreta section – see specialized protocol	OB Protocol meeting 4/27/23 Dighe, Cheng, Ma, Hitti, Shaun, Renee, Dalene
Added	5/5/2023	Intro statements for TTTS protocol and skeletal dysplasia protocols	
Added	5/23/2023	If anatomy was cleared on or after 17 weeks 0 days, it does not need to be repeated.	Manjiri Dighe
Added	4/16/2024	Image lists	Renee Betit Fitzgerald
Change	7/25/2024	Added 1.1cm for cut off of low lying from placental sinus Di-Di Twins: UA Doppler should be obtained for BOTH twins when one is FGR Workflow change: Due to time restraints, patients will be referred to MFM for full skeletal dysplasia survey and workup if short long bones are incidentally seen on routine imaging. Minimum images to still obtain are: Bilateral long bones, chest circumference, sagittal image of chest. Detailed anatomy views if a basic was ordered	Combined Protocol Meeting MFM/RAD Attendees: M. Dighe, E. Cheng, J. Hitti, M. Richley, S Bornemeier, B. Marion, R. Betit Fitzgerald
Added	10/15/2024	If the cervix is contracted on transvaginal imaging, wait at least 2 minutes for the contraction to pass. Document an image at the beginning of scanning and after 2 minutes to verify this was done.	Renee Betit Fitzgerald
Added	1/23/2025	Added AFI MVP for 20-24wks, do 4 quad if abnormal.	Combined Protocol Meeting: 1/23/25 E Cheng, M Dighe, K Ma, M Richley, S Swati, C Cheng, S Bornemeier, B Marion, R Betit Fitzgerald, P Thompson
Added	2/12/2025	Added: CERVIX	Manjiri Dighe Renee Betit Fitzgerald

		<ul style="list-style-type: none"> - A translabial study can be done in place of transvaginal imaging in cases of PPRM, bulging membranes or patient request/refusal of TV. -Assess whether the cervix is dynamic by observing for changes for at least 2 minutes. -Color image of the LUS to assess for vasa previa. -Sample any vessels seen within 2cm of the cervical os with spectral Doppler to see if they are arterial or venous. If it is an arterial vessel, be sure to also include a HR measurement to differentiate the fetal blood vessels from maternal vessels by comparing their respective heart rates. <p>PLACENTA</p> <ul style="list-style-type: none"> -If venous lakes are present, include a color image and a 2D cine clip showing the slow flow movement within. -Assess for a bi-lobed placenta or succenturiate lobe. If present, document location of connecting vascular supply to the primary placental lobe. -Document the placental cord origin in transverse and sagittal planes using color Doppler and show the vessels of the cord separating into the placenta. To rule out a velamentous cord origin, the cord should be shown clearly coming out from the placenta, not just coursing along the surface. 	
Added	4/30/2025	<p>MCA Statement updated:</p> <ul style="list-style-type: none"> -30 degree angle correction is ok -Only use manual measurement of PSV of MCA <p>If HC measuring $\leq 2\%$, see additional image requirements and Microcephaly Protocol</p>	<p>Protocol meeting attendees 4/24/25</p> <p>E Cheng, A Hollard, M Dighe, K Ma, S Swati, S Bornemeier, B Marion, R Betit Fitzgerald, D Edden</p>