

OB 2nd & 3rd Trimester Follow-up & Limited Protocols

Reviewed By: Dan Van Roekel, MD Spencer Lake, MD

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Contact: (866) 761-4200, Option 1

NOTE: All elements of this protocol should be acquired for all follow-up & limited orders and indications, unless otherwise directly guided by a radiologist.

- BPP orders should be treated as all other follow-up & limited indications and require all elements below.

General:

Cardiac activity: M-mode tracing for all; CINE of HR at discretion of technologist (unless BPP, then required)

→ Note any abnormal heart rate or rhythm

→ If HR <120, > 160: At least 2 M-mode images to confirm persistence

→ On worksheet, document both HR measures and average

Presentation:

→ For multiple gestations, document chorionicity and amnionity

Fluid:

-At < 24 weeks: qualitative (normal, high, low)

-ADD semi-quantitative when:

(1) Subjectively abnormal

-If oligohydramnios, include measurement of deepest pocket

(2) AFI specifically requested

(3) Known chromosomal or anatomic abnormality, especially, abdominal wall defect, kidney, bladder, stomach/intestines/esophagus, spinal cord or intracranial

-At $\geq$ 24 weeks: semi-quantitative on all

DETAILS on semi-quantitative:

-Singleton: Measure amniotic fluid index (AFI = the sum of the deepest vertical pockets measured in each of the 4 quadrants) as well as the deepest vertical pocket (DVP) and report both. For AFI and DVP measurements, each pocket of amniotic fluid must be at least 1 cm in width. The largest of the four quadrant measurements for AFI should be used as the DVP. If during the course of the exam a DVP is found that is greater than the largest of the four initial AFI measurements, then the AFI should be remeasured. Thus, the DVP will always be the greatest of the 4 AFI measurements.

-Multiples: Deepest vertical pocket (DVP) for each

Contact the radiologist for NEW oligohydramnios, defined as:

-Single deepest vertical pocket $\leq$ 2cm (singleton + multiples)

OR

-AFI $\leq$ 5 cm (singleton)

Placenta: location, appearance, relationship to internal os (still images acceptable unless r/o abruption, abdominal trauma, abnormality detected, or other at tech discretion)

→Origin of cord *shown in 2 planes*, required on all follow-up studies.

→Images should be in **greyscale and color**

- Add CINE if abnormality detected (unless only eccentric origin)
- Document cord origin for all cases as one of the following:
 - Normal = central
 - Abnormal/other:
 - Eccentric (but $>$ 2 cm from the edge)
 - Marginal ($\leq$ 2 cm from the edge)
 - Velamentous
 - Other (with description)

→ ***It is critical to document to presence or absence of previa on all OB US***

- Show at least 1 still image of most inferiorly extending part of the placenta, with label; include the internal os (if possible, depending on placental position)
- Add *CINE* if abnormal

→ Add TV and color and pulsed Doppler if accreta is suspected, at 32-week follow up of low-lying placenta or placenta previa (even if resolved), or while evaluating vasa previa.

- *Suspected vasa previa must have spectral Doppler to document fetal arterial waveform*

→ Accepted verbiage:

- Low-lying: 0-2 cm from internal os (note that “marginal” no longer used)
- Previa: covering internal os (does not matter how much)

-Add **CINE** through placenta in 2 planes IF:

- Indication is “rule out abruption” or “abdominal trauma”
- Abnormality is detected
- Technologist discretion

Umbilical cord: document number of vessels on all; placental origin on all; fetal insertion is optional on follow-up studies

→ 2 umbilical arteries around bladder is required for all cases, **shown with color**

- Cross-sectional view of cord optional
- Placental origin is required on all follow-up examination (see above).
- Fetal insertion is optional unless reason for follow-up, previously abnormal, not previously documented and/or umbilical artery Doppler is being performed

→ **When to do umbilical artery Doppler:**

1. Requested
2. IUGR (sonographic estimated fetal weight < 10%) or worrisome change in weight in fetus at > = 24 weeks

3. New oligohydramnios
4. Optional: Cord abnormality – discuss with radiologist prior to performing

See end of document for S/D Ratio Reference Ranges

→ What to provide: **6 total** spectral tracings = **3 of each umbilical artery**

- Each umbilical artery should be sampled at **the fetal insertion, the mid-cord, and the placental origin (when possible)**
- Additional tracings can be acquired as necessary
- Range of S/D ratios for each site (*not average*)
- Comment on absent or reversed diastolic flow

→ Always mark these exams STAT, even if normal, and call the radiologist

Cervix: document length if possible

- Provide image with and without color
- If appears shortened (specifically, 16-28 weeks: <30 mm) or abnormal on routine TA: Empty bladder and do TV (see end of document for best technique)
 - If TV contraindicated or declined: translabial/transperineal imaging (with empty bladder) should be performed for accurate length
 - If concerning findings at 28-32 weeks, discuss with radiologist regarding need for TV

****If ordered to assess for cervical length or pre-term labor: TV (with empty bladder) regardless of transabdominal length unless otherwise specified****

EFW/Dating (fetal measurements required only if requested in order): after 14 weeks 0 days, perform biometry = measure HC, BPD, AC, FL

→ This should be an average of 2 to 3 measures for each

NOTE #1: Acquire a *different* image of the fetal part for the 2nd/3rd measurement (unfreeze and re-acquire). **AVOID re-measuring on the same image.**

NOTE #2: OK for 1st set of BPD and HC (different parameters) to be on the same image. However, 2nd/3rd set of BPD and HC measurements need to be on a *newly* acquired 2nd/3rd image.

→ If there is a >10 day discrepancy between HC and BPD, measure occipital-frontal distance (OFD)

--> This will allow the *radiologist* to calculate "corrected BPD"

[For your information: Corrected BPD = square root of (BPD x OFD / 1.265)]

NOTE for late dating (i.e., end of 1st trimester or early 2nd trimester)

- 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 (as per 1st Trimester OB US protocol)

-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

→ 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

Limited Fetal Anatomy (for all indications, including orders for BPP):

- Document heart, stomach, renal region & bladder (*including* color to show 2 umbilical arteries)
- Document any requested specific anatomy

-For studies ordered to follow up a previously seen anatomic abnormality:

→ Document the findings (or resolution of them) with both still and cine images.

→ If the technologist is unsure if more images are needed, they can check the images with the radiologist prior to letting the patient go.

Biophysical Profile (BPP), if requested:

- Each section is scored 0 or 2 for a total of 8 points possible
- If BPP is less than 8 out of 8, radiologist should be notified
- Always mark these exams STAT, even if normal
- Entire "limited/follow-up" protocol (above) should be performed when BPP is ordered, unless otherwise directly advised by radiologist

COMPONENTS, to get points:

- Fetal breathing: At least 1 episode continuing for ≥ 30 seconds within the 30-minute BPP
- Fetal movement: At least 3 discrete body or limb movements
- Fetal tone: At least 1 or more episodes of active extensions and return to flexion
- Amniotic fluid volume: At least one 2 x 2 cm pocket of fluid

Provide at least 3 CINE for all BPP examinations:

1. Cardiac motion (in addition to M-mode tracing)
2. Breathing
3. Movement and Tone

More CINE images can be provided at the discretion of the technologist.

Maternal anatomy

- Evaluate uterus and adnexa/ovaries
- Do not need to include kidneys unless there is specific indication in order

Best technique for measuring cervical length

- If request is for cervical length in addition to anatomy, use TV technique unless otherwise specified by ordering clinician (or discussed with radiologist).
- If cervical length is abnormal on transabdominal exam, add TV to evaluate. Discuss with radiologist if unsure.

For most accuracy:

1. Empty maternal bladder

- Full/partially full bladder = falsely elongates cervix

2. Zoom-in: cervix should take up 75% of image

- Entire canal should be seen on 1 image

3. Be careful with transducer pressure: anterior thickness of cervix should be same as posterior thickness

- Anterior echogenicity should be same as posterior echogenicity
- Too much pressure = falsely elongates cervix

4. Ensure measurement is from internal os (not membrane) to external os (not vaginal wall)

- Take 3 measurements

5. When curved: do NOT trace, use 2 (or more) LINEAR measurements

- Report shortest measurement with best technique

6. If shortened and patient is in triage/L & D, assess for funneling: apply gentle fundal pressure for 15 seconds and observe for funneling. This should not be done for routine outpatients.

7. Always provide an image with color to document presence/absence of overlying umbilical vessels

UMBILICAL ARTERY DOPPLER – S/D RATIO TABLE

- Normal is < 95%-tile
- These values correspond to mid-cord measurements

Gestation (wk)	Percentile								
	2.5th	5th	10th	25th	50th	75th	90th	95th	97.5th
19	2.73	2.93	3.19	3.67	4.28	5.00	5.75	6.26	6.73
20	2.63	2.83	3.07	3.53	4.11	4.80	5.51	5.99	6.43
21	2.51	2.70	2.93	3.36	3.91	4.55	5.22	5.67	6.09
22	2.43	2.60	2.83	3.24	3.77	4.38	5.03	5.45	5.85
23	2.34	2.51	2.72	3.11	3.62	4.21	4.82	5.22	5.61
24	2.25	2.41	2.62	2.99	3.48	4.04	4.63	5.02	5.38
25	2.17	2.33	2.52	2.88	3.35	3.89	4.45	4.83	5.18
26	2.09	2.24	2.43	2.78	3.23	3.75	4.30	4.66	5.00
27	2.02	2.17	2.35	2.69	3.12	3.63	4.15	4.50	4.83
28	1.95	2.09	2.27	2.60	3.02	3.51	4.02	4.36	4.67
29	1.89	2.03	2.20	2.52	2.92	3.40	3.89	4.22	4.53
30	1.83	1.96	2.13	2.44	2.83	3.30	3.78	4.10	4.40
31	1.77	1.90	2.06	2.36	2.75	3.20	3.67	3.98	4.27
32	1.71	1.84	2.00	2.29	2.67	3.11	3.57	3.87	4.16
33	1.66	1.79	1.94	2.23	2.60	3.03	3.48	3.77	4.06
34	1.61	1.73	1.88	2.16	2.53	2.95	3.39	3.68	3.96
35	1.57	1.68	1.83	2.11	2.46	2.87	3.30	3.59	3.86
36	1.52	1.64	1.78	2.05	2.40	2.80	3.23	3.51	3.78
37	1.48	1.59	1.73	2.00	2.34	2.74	3.15	3.43	3.69
38	1.44	1.55	1.69	1.95	2.28	2.67	3.08	3.36	3.62
39	1.40	1.51	1.64	1.90	2.23	2.61	3.02	3.29	3.54
40	1.36	1.47	1.60	1.85	2.18	2.56	2.96	3.22	3.48
41	1.33	1.43	1.56	1.81	2.13	2.50	2.90	3.16	3.41

From Acharya G, Wilgaard T, Bernstein GKR, et al: Reference ranges for serial measurements of umbilical artery Doppler indices in the second half of pregnancy. Am J Obstet Gynecol 192:937, 2005