

Fetal Growth Restriction

I. Definition

For the purpose of this protocol, the following definitions have been adopted by the University of Cincinnati for management of patients with fetal growth restriction.

1. **Fetal Growth Restriction (FGR)** is defined as estimated fetal weight (EFW) <10th percentile OR abdominal circumference <10th percentile irrespective of EFW, in accordance with the 2020 SMFM Consult Series recommendations.¹
2. **Severe FGR** is defined as EFW <3rd percentile.

II. Screening

Screening for FGR can be accomplished with maternal symphysis-fundal height measurement (low risk patient) or sonographic measurements (high risk patient).

III. Evaluation

The evaluation of ultrasound diagnosed FGR includes:

- Complete history and physical exam to elicit risk factors associated with impaired fetal growth
- Detailed anatomic survey to rule out congenital anomalies
- For severe FGR, EFW <3rd, recommend maternal-fetal medicine consultation
- Offer genetic testing with microarray if clinically indicated (polyhydramnios, early onset FGR <32 weeks, or fetal anomaly)
- If amniocentesis is performed, order CMV PCR
- Maternal antiphospholipid syndrome testing with lupus anticoagulant, anticardiolipin antibody and B2 glycoprotein if delivery <34 weeks gestation
- Maternal preeclampsia work-up if clinically indicated

IV. Fetal Surveillance

Management of the fetus with FGR includes the following:

- Initial assessment of umbilical artery Doppler. Perform BPP if at a clinically viable gestational age.
- Due to differences of growth curves, all referrals for the indication of ultrasound diagnosed FGR should have umbilical artery Doppler velocimetry performed regardless of EFW/AC percentile demonstrated on our evaluation.
- Serial fetal growth assessment every 3-4 weeks
 - o 2-week interval growth assessment will be reserved for severe growth restriction (EFW <3rd percentile or FGR with abnormal Doppler studies)
- Fetal surveillance (with fetal viability): Twice weekly testing with alternating NST/BPP (refer to ANFS protocol)
 - o Non-stress test (NST) once per week
 - o Biophysical profile (BPP) (at least once per week)
- Umbilical artery Doppler velocimetry
 - o Obtained at time of diagnosis of fetal growth restriction and at least weekly for fetuses in ANFS or with abnormal Doppler studies and viable gestational age
 - o If normal Doppler at initial assessment, repeat Doppler in 1-2 weeks
 - o If in ANFS, plan weekly Doppler studies
 - o Considered abnormal if pulsatility index (PI) is > 95th percentile for gestational age, absent end diastolic flow (AEDF), or reversed end diastolic flow (REDF)
 - o If elevated PI, repeat Doppler studies at least weekly

- If AEDF or REDF, Doppler studies minimum of 2-3 times per week
- Ductus venosus (DV)
 - Not performed on a routine basis in the evaluation of FGR, but will be used for significant umbilical artery Doppler abnormalities such as AEDF or REDF
 - Considered non-reassuring if absent or reversed A wave
- Middle cerebral artery (MCA)
 - Performed if the umbilical artery Doppler has elevated pulsatility index (not indicated for AEDF or REDF)
 - For the purposes of FGR assessment, the MCA Doppler PI is used in the calculation of the cerebroplacental Ratio (CPR)
 - CPR = {MCA pulsatility index/UA pulsatility index} and is considered abnormal if < 1.08
 - An abnormal cerebroplacental Ratio (CPR) is associated poor fetal growth, decreased latency, worse neonatal outcome, elevated risks for preeclampsia.
 - The MCA PSV (for MoM calculation) is not indicated for assessment of the fetus with FGR unless the patient also has risk factor for alloimmunization.
 - To minimize the frequency of MCA Doppler assessment, we will limit its use to ultrasound occasions when fetal growth assessment is being performed.

VII. Management (see flow diagram)

- Initial management includes ANFS and Doppler velocimetry studies as above.
- Review with patient daily kick counting.
- All testing reassuring - initiate outpatient antenatal testing regimen.
 - Umbilical artery PI >95th percentile - initiate outpatient antenatal testing regimen
 - Ultrasound for fetal growth assessment every 2 weeks while Doppler studies remain abnormal.
 - AEDF or REDF
 - Consider hospitalization and administration of glucocorticoids if indicated. Fetal monitoring as recommended by MFM. If undelivered, repeat Doppler evaluation within 24 hours after admission.

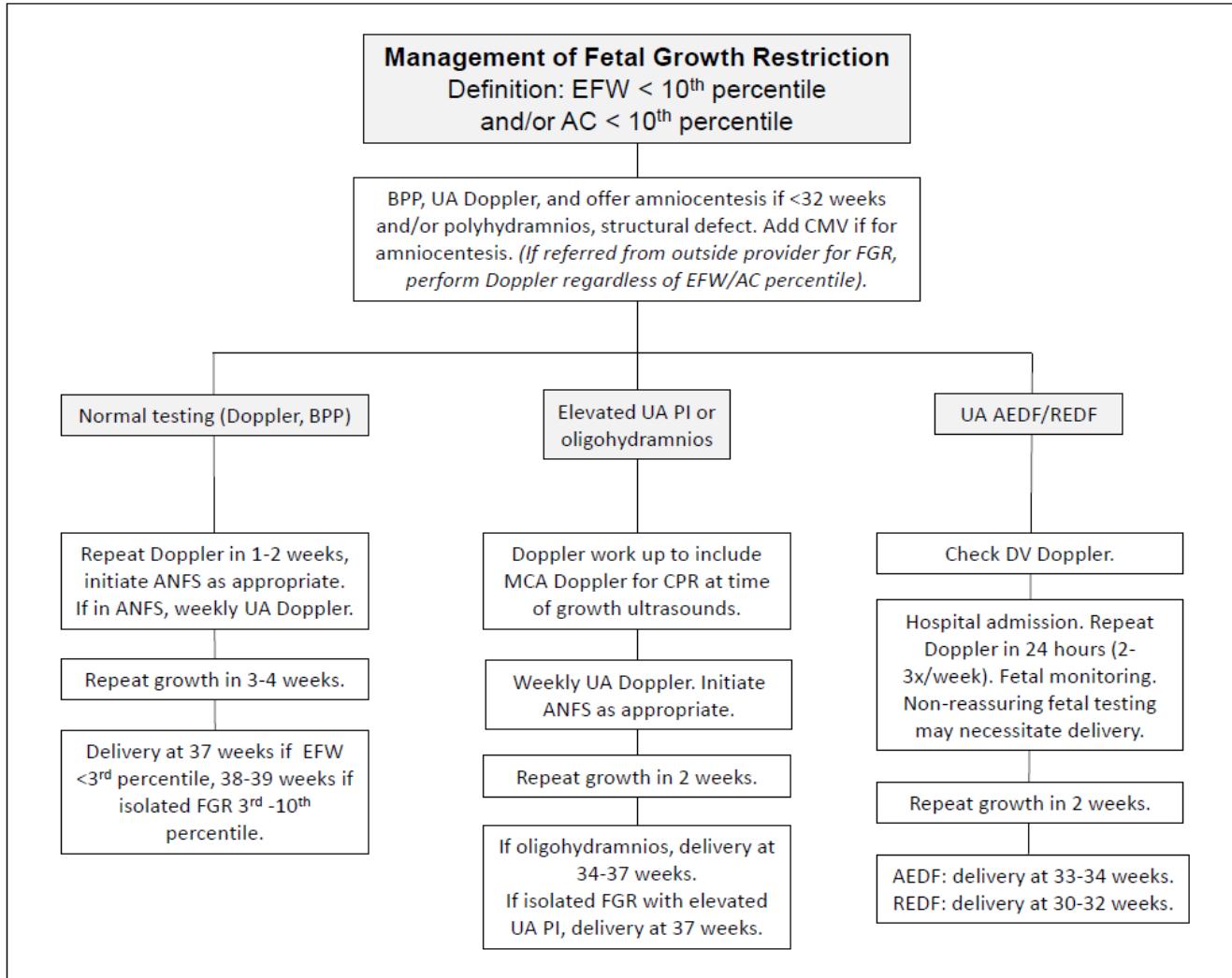
VIII. Delivery

Preterm delivery may be indicated in pregnancies complicated by FGR. Pregnancies delivered prior to 37 weeks may be candidates for betamethasone for fetal lung maturity. Pregnancies delivered prior to 32 weeks may be candidates for magnesium for neuroprotection.

*Not all possible scenarios of pregnancy complicated by fetal growth restriction are represented in this clinical guideline, and thus individualized screening and management approaches may be indicated.

Recommended delivery GA	Condition
38 0/7 to 39 0/7 weeks	Uncomplicated, isolated fetal growth restriction with EFW 3 rd to <10 th percentile with normal umbilical artery Doppler
37 0/7 to 37 6/7 weeks	Severe FGR (EFW <3 rd percentile) with normal Doppler; FGR (<10 th percentile EFW or AC) with abnormal umbilical artery Doppler PI >95 th percentile
34 0/7 to 37 0/7 weeks	FGR with oligohydramnios OR abnormal Doppler OR

	maternal co-morbidity such as preeclampsia, hypertension, diabetes, lupus, etc.
33 0/7 to 34 6/7 weeks	Persistent AEDF
30 0/7 to 32 6/7 weeks	Persistent REDF



References:

1. Society for Maternal-Fetal Medicine Publications Committee, Am J Obstet Gynecol. 2020 May. Diagnosis and Management of Fetal Growth Restriction.
2. Warshak CR, Masters H, Regan J, DeFranco E. Doppler for growth restriction: the association between the cerebroplacental ratio and a reduced interval to delivery. J Perinatol. 2015 May;35(5):332-7
3. ACOG practice bulletin no. 204: fetal growth restriction. Obstet Gynecol. 2019 February;133(2):97-102
4. Society for Maternal-Fetal Medicine Publications Committee, Berkley E, Chauhan SP, Abuhamad A. Doppler assessment of the fetus with intrauterine growth restriction. Am J Obstet Gynecol. 2012 Apr;206(4):300-8.
5. Copel JA, Bahtiyar MO. Obstet Gynecol. A practical approach to fetal growth restriction. 2014 May;123(5):1057-69
6. Nassr AA, Abdelmagied AM, Shazly SA. Fetal cerebro-placental ratio and adverse perinatal outcome: systematic review and meta-analysis of the association and diagnostic performance. J Perinat Med. 2016 Mar;44(2):249-56.