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
  - 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)
  - Non-stress test (NST) once per week
  - Biophysical profile (BPP) (at least once per week)
- Umbilical artery Doppler velocimetry
  - 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
  - If normal Doppler at initial assessment, repeat Doppler in 1-2 weeks
  - If in ANFS, plan weekly Doppler studies
  - Considered abnormal if pulsatility index (PI) is > 95th percentile for gestational age, absent end diastolic flow (AEDF), or reversed end diastolic flow (REDF)
  - 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)
  o 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
  o Considered non-reassuring if absent or reversed A wave
- Middle cerebral artery (MCA)
  o Performed if the umbilical artery Doppler has elevated pulsatility index (not indicated for AEDF or REDF)
  o 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.

<table>
<thead>
<tr>
<th>Recommended delivery GA</th>
<th>Condition</th>
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<tbody>
<tr>
<td>38 0/7 to 39 0/7 weeks</td>
<td>Uncomplicated, isolated fetal growth restriction with EFW 3rd to &lt;10th percentile with normal umbilical artery Doppler</td>
</tr>
<tr>
<td>37 0/7 to 37 6/7 weeks</td>
<td>Severe FGR (EFW &lt;3rd percentile) with normal Doppler; FGR (&lt;10th percentile EFW or AC) with abnormal umbilical artery Doppler PI &gt;95th percentile</td>
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<tr>
<td>34 0/7 to 37 0/7 weeks</td>
<td>FGR with oligohydramnios OR abnormal Doppler OR</td>
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maternal co-morbidity such as preeclampsia, hypertension, diabetes, lupus, etc.

<table>
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<tr>
<th>Week Range</th>
<th>Description</th>
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<tbody>
<tr>
<td>33 0/7 to 34 6/7 weeks</td>
<td>Persistent AEDF</td>
</tr>
<tr>
<td>30 0/7 to 32 6/7 weeks</td>
<td>Persistent REDF</td>
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</table>

**Management of Fetal Growth Restriction**

**Definition:** EFW < 10\(^{th}\) percentile and/or AC < 10\(^{th}\) percentile

- **BPP, UA Doppler, and offer amniocentesis if <32 weeks and/or polyhydramnios, structural defect. Add CMV if for amniocentesis. (If referred from outside provider for FGR, perform Doppler regardless of EFW/AC percentile).**

**Normal testing (Doppler, BPP):**
- Repeat Doppler in 1-2 weeks, initiate ANFS as appropriate. If in ANFS, weekly UA Doppler.
- Repeat growth in 3-4 weeks.
- Delivery at 37 weeks if EFW <3\(^{rd}\) percentile, 38-39 weeks if isolated FGR 3\(^{rd}\) - 10\(^{th}\) percentile.

**Elevated UA PI or oligohydramnios:**
- Doppler work up to include MCA Doppler for CPR at time of growth ultrasounds.
- Weekly UA Doppler. Initiate ANFS as appropriate.
- Repeat growth in 2 weeks.
- If oligohydramnios, delivery at 34-37 weeks.
- If isolated FGR with elevated UA PI, delivery at 37 weeks.

**UA AEDF/REDF:**
- Check DV Doppler.
- Hospital admission. Repeat Doppler in 24 hours (2-3x/week). Fetal monitoring. Non-reassuring fetal testing may necessitate delivery.
- Repeat growth in 2 weeks.
- AEDF: delivery at 33-34 weeks.
- REDF: delivery at 30-32 weeks.
References: