Fetal Growth Restriction

Purpose: To provide guidelines for screening and management of fetal growth restriction (FGR) complicating pregnancy.

1. Definitions

- Fetal growth restriction: Estimated fetal weight (EFW) less than 10th percentile for gestational age or abdominal circumference less than 10th percentile for gestational age.

- Suspected fetal growth restriction: EFW > 10th percentile and/or the AC <10th percentile.

- Severe fetal growth restriction: EFW less than the 3rd percentile with or without abnormal Doppler.

It is important to differentiate 2 different entities: fetal growth restriction and small for gestational age.

- Fetal growth restriction is because of a pathologic process, has not attained its biologically determined growth potential.

- Suspected fetal growth restriction of a fetus in utero is an estimated fetal weight that measures < 10th percentile or AC measures <10% on ultrasound. This diagnosis does not necessarily imply pathologic growth abnormalities and may simply describe a fetus at the lower end of the normal range.

Fetal weight determination in fetuses between the 10th and 90th percentiles by ultrasound biometry alone has at least a 10% error rate across gestation but is effective equally when measuring with abdominal circumference alone or in combination with head size (biparietal diameter or head circumference) and/or femur length to establish an estimated fetal weight.

The estimate may deviate from birth weight by up to 20% in 95% of the cases, and for the remaining 5% of cases, the deviation is even greater than 20%.

2. Etiology:

Table 1. Etiology of FGR

Maternal factors	Fetal factors	Placental factors
Demographics:	**Genetic:**	**Placenta:**
Extreme of maternal age	Trisomy 21, 18, 13	Placental abruption
Race	Turners syndrome	Placenta accreta
Low pre-pregnancy weight	Deletion of chromosomes 4,	Placental infarction
Poor maternal weight gain	5	Circumvallate placenta

Corewell Health Maternal Fetal Medicine has developed these guidelines as a reference tool to assist referring physicians. Obstetric medical needs are complex and these guidelines may not apply in every case. Treating clinicians should exercise their own professional medical judgment with regard to the appropriate treatment and management of their patients. Treating clinicians are solely responsible for confirming the accuracy, timelines, completeness, appropriateness and helpfulness of this material in making all medical, diagnostic, or prescription decisions.

Obstetrical: Short inter-pregnancy interval Prior history of SGA **Behavioral/environmental:** Smoking Alcohol Drug use High altitude **Systemic disease:** Hypertension Pregestational diabetes Renal Disease Anemia Pulmonary disease Congenital heart disease Autoimmune disease Antiphospholipid syndrome GI disease Malnutrition Transplant recipient (renal) **Others:** Artificial reproductive technology Uterine factors Medications Angiotensin gene mutation	Genetic syndromes Congenital malformations: Congenital heart disease Abdominal wall defect Anencephaly **Infection:** TORCH Malaria Chlamydia, Mycoplasma, Listeria, TB **Others:** Multiple pregnancy	Confined placental mosaicism Placental hemangioma Placental chorangioma Fetal villous obliteration **Umbilical cord:** Velamentous cord insertion Single umbilical artery

3. Workup:
   - Confirm dating
   - Detailed medical history: to evaluate for any disease or risk factor associated with FGR (refer to Table above). This includes recent infections, smoking and drug history.
   - Targeted anatomy survey by trained MFM to evaluate: biometry, measure cerebellum, humerus length, detailed anatomy, amniotic fluid volume, placenta, umbilical cord insertion, umbilical artery Doppler analysis (consider Doppler of other vessels if indicated).
   - Fetal echocardiogram if suboptimal visualization of the heart on targeted US.
   - Amniocentesis should be offered to obtain Karyotype (consider Microarray depending on the case) and to obtain polymerase chain reaction (PCR) for cytomegalovirus (CMV), toxoplasmosis, specifically if no other causes are identifiable.
   - Placental biopsy (late chorionic villous sampling) considered in cases suspicious of placental mosaicism.
   - Infectious work up: include serology (IgG and IgM) of CMV, toxoplasmosis and PCR on Amniotic fluid as described above. Confirm Rubella immunity.
   - NO need for thrombophilia work up (there is insufficient evidence to recommend it).
   - Antiphospholipid antibodies: anticardiolipin IgG and IgM, lupus anticoagulant and anti-β2 glycoprotein.
   - **Maternal work up for preeclampsia.**

Corewell Health Maternal Fetal Medicine has developed these guidelines as a reference tool to assist referring physicians. Obstetric medical needs are complex and these guidelines may not apply in every case. Treating clinicians should exercise their own professional medical judgment with regard to the appropriate treatment and management of their patients. Treating clinicians are solely responsible for confirming the accuracy, timelines, completeness, appropriateness and helpfulness of this material in making all medical, diagnostic, or prescription decisions.

4. Management:

Table 2. Surveillance

FGR **EFW <10%tile**	**Suspected FGR** **EFW >10%tile** **AC <10%tile**	**Borderline FGR** **EFW >10%ile** **AC <10%tile**	**Normal Growth** **EFW > 10%ile** **AC > 10%tile**
Fetal growth q 2 weeks NST 2 x weekly AFI/Doppler weekly/ BPP	Fetal growth q 2 weeks NST 2 x weekly AFI/Doppler weekly/ BPP	Fetal growth q 3 weeks, BPP	No further testing or Fetal growth q 4 weeks (depending on risk factors)

5. Umbilical artery Doppler interpretation & management: (obtain minimum 3 waveforms/measurements)
   UA Doppler evaluation should be performed in any fetus with an EFW <10th percentile or EFW>10th percentile but AC less than the 10th percentile.
   a. Elevated SD ratio (S/D ratio >95th percentile):
      i. Weekly AFI/UA Doppler
      ii. Consider twice a week NST if > 28 weeks or when patient is willing to intervene.
   b. Absent end diastolic flow (AEDF) and intermittent absent end diastolic flow:
      i. Administer steroids for fetal lung maturity
      ii. Admit to hospital for continuous monitoring in the first 24 hrs
      iii. AFI/UA Doppler twice or three times a week
      iv. Continue daily testing if persistent AEDF
      v. Manage inpatient or outpatient depending on etiology and gestational age.
   c. Reverse end diastolic flow (REDF):
      i. Administer steroids for fetal lung maturity
      ii. Admit to hospital for continuous monitoring
      iii. Daily AFI/Doppler
      iv. Deliver for non-reassuring fetal status or 24 hours after steroids

6. Timing of delivery
   a. Constitutionally small: Deliver at 39 weeks
   b. EFW > 10th percentile, AC < 10th percentile with normal Doppler and AFI: Deliver at 39 weeks
   c. EFW < 10th percentile with normal Doppler: Deliver at 38 weeks
   d. FGR with increased SD ratio (>95th percentile), normal AFI, reactive NST: Deliver at 37 weeks.
   e. FGR with AEDF or oligohydramnios: Deliver at 34 weeks or for non-reassuring testing.

Corewell Health Maternal Fetal Medicine has developed these guidelines as a reference tool to assist referring physicians. Obstetric medical needs are complex and these guidelines may not apply in every case. Treating clinicians should exercise their own professional medical judgment with regard to the appropriate treatment and management of their patients. Treating clinicians are solely responsible for confirming the accuracy, timelines, completeness, appropriateness and helpfulness of this material in making all medical, diagnostic, or prescription decisions.

f. FGR with REDF: Deliver 24 hours after steroids with reassuring fetal testing or immediately for non-reassuring fetal testing.
g. Also consider delivery for poor or no interval growth.

Corewell Health Maternal Fetal Medicine has developed these guidelines as a reference tool to assist referring physicians. Obstetric medical needs are complex and these guidelines may not apply in every case. Treating clinicians should exercise their own professional medical judgment with regard to the appropriate treatment and management of their patients. Treating clinicians are solely responsible for confirming the accuracy, timelines, completeness, appropriateness and helpfulness of this material in making all medical, diagnostic, or prescription decisions.