

Fetal Growth Restriction

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

1. Definitions:

- FGR: fetus with an estimated fetal weight (EFW) less than 10th percentile for gestational age **and/or** AC < 3rd percentile.
- Small AC FGR: fetus with an EFW > 10th percentile and AC between the 3rd and 10th percentile.

It is important to differentiate 2 different entities: Fetal growth restriction (FGR) and small for gestational age (SGA). FGR is due to a pathologic process. The fetus has not attained its biologically determined growth potential *in-utero* by ultrasound evaluation. SGA describes a newborn whose *birthweight* is less than the 10th percentile for gestational age. It is a postnatal diagnosis.

Hadlock formula was found to be more accurate in the overall estimation of fetal weight and it is the recommended population-based reference to determine fetal weight percentiles.

2. Classification:

- Early onset FGR: diagnosed before 32 weeks (30%). It is more severe and follows an established pattern of Doppler deterioration. It is highly associated with hypertensive disorders and placental insufficiency.
- Late onset FGR: diagnosed at or after 32 weeks (70%). It is often milder in presentation.

Differentiation between asymmetric and symmetric using HC/AC has not been found to be an independent predictor of adverse pregnancy outcomes.



SHMG 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 regarding 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.

3. Etiology:

Table 1. Etiology of FGR

Maternal factors	Fetal factors	Placental factors
<p>Demographics:</p> <ul style="list-style-type: none"> Extremes of maternal age Race Low pre-pregnancy weight Poor maternal weight gain <p>Obstetrical:</p> <ul style="list-style-type: none"> Short inter-pregnancy interval Prior history of SGA <p>Behavioral/environmental:</p> <ul style="list-style-type: none"> Smoking Alcohol or Drug use High altitude <p>Systemic disease:</p> <ul style="list-style-type: none"> Hypertension Pregestational diabetes Renal Disease Anemia Pulmonary disease Congenital heart disease Autoimmune disease Antiphospholipid syndrome GI disease Malnutrition Transplant recipient (renal) <p>Others:</p> <ul style="list-style-type: none"> Artificial reproductive technology Uterine factors Medications Angiotensin gene mutation 	<p>Genetic:</p> <ul style="list-style-type: none"> Trisomy 21, 18, 13 Turner syndrome Deletion of chromosomes 4, 5 Genetic syndromes Congenital malformations: Congenital heart disease Abdominal wall defect Anencephaly <p>Infection:</p> <ul style="list-style-type: none"> TORCH Malaria Chlamydia, Mycoplasma, Listeria, TB <p>Others:</p> <ul style="list-style-type: none"> Multiple pregnancy 	<p>Placenta:</p> <ul style="list-style-type: none"> Placental abruption Placental infarction Circumvallate placenta Confined placental mosaicism Placental hemangioma Placental chorioangioma Fetal villous obliteration <p>Umbilical cord:</p> <ul style="list-style-type: none"> Velamentous cord insertion Single umbilical artery



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4. Workup:

- Confirm pregnancy dating (recommend as early in pregnancy as possible for all pregnancies)
- Detailed medical history: to evaluate for any disease or risk factor associated with FGR (refer to Table 1 above).
- Targeted anatomy survey (CPT code 76811) by Maternal Fetal Medicine.
- Fetal echocardiogram if suboptimal visualization of the heart on targeted US.
- Offer diagnostic testing including chromosomal microarray analysis (CMA) when FGR and a fetal malformation, polyhydramnios or both are present. Offer CMA for unexplained isolated FGR if diagnosed < 32 weeks.
- Polymerase chain reaction (PCR) for CMV in patients with unexplained FGR who elect amniocentesis.
- Recommend against serology for toxoplasmosis, CMV, rubella or herpes in the absence of other risk factors.
- **Maternal work up for preeclampsia: baseline CBC, CMP and protein: creatinine ratio.**
- Recommend serial Umbilical Artery Doppler assessment to evaluate for deterioration.

5. Management:

Table 2. Surveillance

FGR: EFW <10th and/or AC < 3rd regardless of EFW	Small AC FGR: EFW >10th with AC 3-10th
Fetal growth q 2 weeks UA Doppler weekly BPP with NST weekly (after viability)	Fetal growth q 2 weeks UA Doppler q 2 weeks BPP with NST (after viability)



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6. Umbilical artery Doppler interpretation & management: (obtain minimum 3 waveforms/measurements and use the best one) UA Doppler evaluation should be performed in any fetus with an EFW <10th percentile or AC less than the 10th percentile.

Elevated SD ratio, PI or RI >95 th percentile	Absent end diastolic flow (AEDF) and intermittent AEDF	Reverse end diastolic flow (REDF)
<ul style="list-style-type: none"> • Weekly AFI/UA Doppler • BPP with NST weekly (23-32 weeks) and twice weekly NST starting at 32 weeks 	<ul style="list-style-type: none"> • Admit to hospital for monitoring, consult MFM • Administer steroids for fetal lung maturity • AFI/UA Doppler two or three times per week • Twice daily NST • Manage inpatient 	<ul style="list-style-type: none"> • Admit to hospital for monitoring, consult MFM • Recommend continuous monitoring, if testing is reassuring consider twice daily NST • Administer steroids for fetal lung maturity • AFI/UA Doppler daily or every other day • Manage inpatient • Deliver for non-reassuring fetal status or 24 hours after completion of steroid course depending on gestational age

7. Timing of delivery

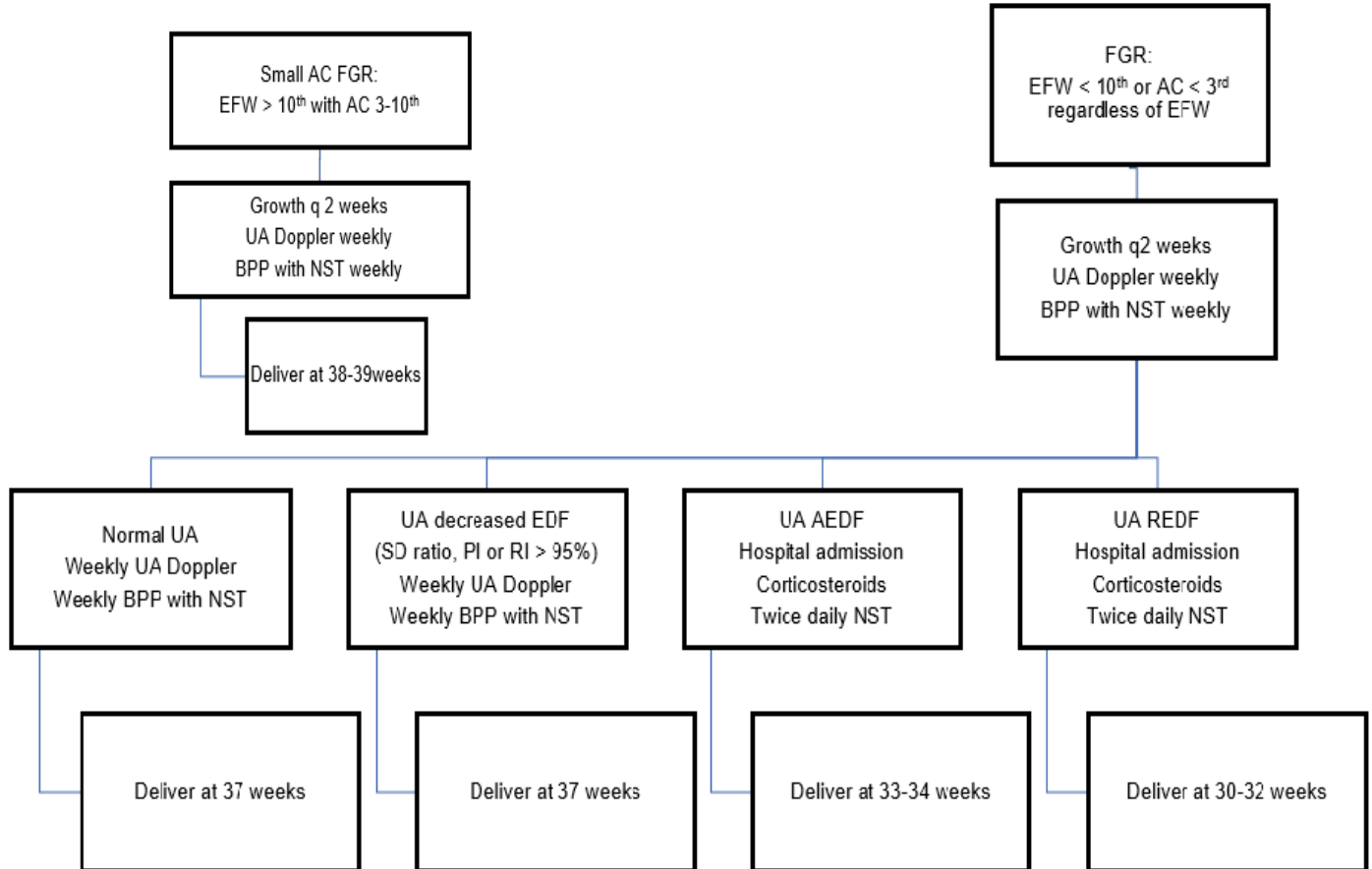
- Small AC FGR: EFW > 10th with AC 3-10% with normal AFI/UA Doppler (SD ratio, PI or RI < 95th percentile): Deliver at 38-39 weeks
- FGR: EFW < 10th and/or AC < 3rd with normal AFI and normal or increased UA Doppler (SD ratio, PI or RI < or > 95th percentile): Deliver 37 weeks.
- FGR with AEDF or oligohydramnios: Deliver at 33 to 34 weeks or for non-reassuring testing.
- FGR with REDF: Deliver 24 hours after completion of steroid course with reassuring fetal testing or immediately for non-reassuring fetal testing. Deliver at 30-32 weeks.
- Consider delivery for no interval growth of the fetus.
- Pregnancies with **FGR complicated by A/REDV, cesarean delivery** should be considered based on the entire clinical scenario.
- Recommend antenatal corticosteroids if delivery is anticipated before 33 6/7 weeks of gestation or for pregnancies between 34 0/7 and 36 6/7 weeks of gestation in women without contraindications who are at risk of preterm delivery within 7 days and who have not received a prior course of antenatal corticosteroids.
- Magnesium sulfate for fetal and neonatal neuroprotection for women with pregnancies that are less than 32 weeks of gestation in whom delivery is likely.



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Maternal Fetal Medicine

Proposed algorithm for management of FGR:



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