SASUOG

South African Society for Ultrasound in Obstetrics and Gynaecology

# BEST PRACTICE GUIDELINE – DIAGNOSIS AND MANAGEMENT OF FETAL GROWTH RESTRICTION (FGR)

## Definitions

### Small for Gestational Age:

Abdominal circumference (AC) or estimated fetal weight (EFW) below the 10$^{th}$ percentile for the appropriate reference range with normal Dopplers. No increased mortality.

### Fetal or intrauterine growth restriction (FGR/IUGR):

**FGR is possible at any growth percentile when there are abnormal Dopplers, or with an EFW or AC less than the 3rd centile even with normal Dopplers.**

## Causes of SGA (small-for-gestational age):

- Placental insufficiency (i.e., not just small BUT growth restricted – FGR – earlier delivery may be of benefit):
    - Maternal medical conditions:
        - Pre-existing diabetes mellitus
        - Renal disease
        - Autoimmune disease
        - Cyanotic cardiac lesion
        - Preeclampsia
    - Placental disorders
    - Substance use and abuse
    - Multiple gestation
- Cord abnormalities
- No placental insufficiency (early delivery usually not of benefit):
    - Teratogen exposure
    - Congenital infection
    - Genetic disorders
    - Structural abnormalities

- Constitutionally small fetus (i.e., normal SGA but NOT FGR– early delivery is not of benefit)

## Screening for and diagnosis of suboptimal fetal growth

- History:
  - Identify women with risk factors for developing FGR associated with preeclampsia and consider aspirin and calcium if indicated
- SF measurement at each visit:
  - Plot SF measurement on the antenatal graph and assess trend. If low slope, below P10 (if previously P50) or stationary: perform ultrasound assessment
- Ultrasound assessment:
  - Verify gestational age based on all available information
  - Measure the BPD, HC, AC, FL and deepest vertical pool (DVP)
  - Calculate EFW (Hadlock formula 1985)
  - Use recommended reference ranges for interpretation (Chitty for biometry, INTERGROWTH 21$^{st}$ (make sure to use the reference range based on EFW calculated with the Hadlock formula), NIHCD Grantz 2018 or WHO Kiserud 2017 for biometry and EFW). Consider customising for age, parity, height, weight ± race with online calculator (GROW), esp. if maternal phenotype very different from average.
  - Rule out structural anomalies, genetic/infective markers
  - Doppler studies:
    - Umbilical artery (UA free loop) RI or PI (Drukker 2020, INTERBIO-21$^{st}$)
    - Uterine artery (UtA) PI (Gomez)
    - Middle cerebral artery (MCA) PI in the third trimester (FMF Ciobanu 2019)
    - CPR (cerebroplacental ratio MCA/UA PI) in the third trimester (FMF Ciobanu 2019)
    - Ductus venosus (DV) PIV (Hecher 1997, Parra-Cordero 2007 or Gurses 2021).
  - Diagnose early FGR if < 32 weeks AND:
    - AC or EFW < P3
    - AEDF
    - AC or EFW P3-10 WITH UmbA or UtA RI or PI > P95
  - Diagnose late FGR if > 32 weeks AND:
    - AC or EFW < P3
    - AEDF
    - AC or EFW P3-10 WITH UmbA RI or PI > P95 or CPR < P5 or EFW crossing > 50 centiles

## Manage according to GA and Dopplers

### *Follow up for "normal" SGA at a viable gestation and weight (according to local criteria)*

- Advise on smoking, drinking, harmful exposures etc.
- Rule out preeclampsia regularly - Repeat BP, urine.
- Repeat UmbA Doppler 2-weekly.
- Growth scan should not be repeated more frequently than every 14 days
- Use non stress test (CTG) as an additional assessment tool (see below)
- Umbilical artery RI or PI should be the primary surveillance tool for the SGA fetus at early gestation (< 32 weeks).

*The following are seen as minimum recommendations for surveillance – surveillance may need to be more intensive in individual cases (e.g., with preeclampsia) and additional information may be gained from assessing MCA flow.*

**Positive EDF with UmbA RI or PI < P95** (assessment of DV flow not indicated):

**EFW > P3 but < P10:**

Repeat BP, urine and Doppler 2-weekly.

If all remains normal (UmbA RI or PI < P95): reassess growth at 36 weeks and perform CTG:

- if normal growth rate + normal DVP, reactive CTG and no PE: continue surveillance as above and deliver at 38-40 weeks (this is SGA and not FGR)
- if MCA was assessed and MCA PI < P5 or CPR < P5 or < 1.11: twice weekly CTG and deliver at 37 weeks (perhaps 36 weeks if very low PI) (mild FGR)
- if growth rate is slow, EFW < P3 or oligohydramnios develops but CTG remains reactive: twice weekly CTG and deliver at 36-37 weeks (mild FGR)
- if growth rate is slow, EFW < P3 or oligohydramnios with a persistently non-reactive CTG on day of assessment: deliver (this is significant FGR)

*Induction of labour for FGR is not contraindicated but continuous CTG during labour is required*

**EFW < P3:**

If all remains normal (UmbA RI or PI < P95): reassess growth at 34 weeks and perform CTG:

- if normal growth rate + normal DVP, reactive CTG and no PE: reassess at 36 weeks - if all stable: deliver at 36-37 weeks
- if growth rate is slow or oligohydramnios develops but CTG is reactive at 34 weeks: twice weekly CTG and reassess weekly – deliver at 36-37 weeks
- if growth rate is slow or oligohydramnios develops with persistently non-reactive CTG on day of assessment: deliver

## *Follow up for FGR at viable gestation and weight (according to local criteria)*

### Positive EDF with UmbA RI or PI > P95:

- Twice weekly CTG (CTG must be reactive if > 34 weeks)
- Reassess weekly for signs of PE (BP, urine) and manage accordingly
- Reassess Dopplers and liquor at least weekly and follow the algorithm below if Dopplers deteriorate to ARED flow
- For early FGR, ductus venosus flow should ideally be assessed, hence referral to a fetal medicine specialist is advisable since clinical decisions are critical in view of severe prematurity.
- For late FGR, MCA flow should ideally be assessed.
- If ARED flow does not develop, it is useful to consult online calculators that can guide evidence-based management in terms of frequency of surveillance and timing of delivery:
    - https://medicinafetalbarcelona.org/calc/
    - https://fetalmedicine.org/research/manage/sga
- Deliver at 37 weeks due to the 1% still birth rate at term, but earlier if aggravating factors develop (preeclampsia, persistently non-reactive CTG after 34 weeks, AEDF or REDF)

*Induction of labour is not contraindicated but continuous CTG during labour is required*

### Absent end diastolic flow:

- Deliver if diagnosed (and confirmed) ≥ 34 weeks
- If diagnosed < 34 weeks:
    - Consider BMZ (< 34 weeks) and/or MgSO4 (< 32 weeks) provided CTG does not warrant immediate delivery
    - CTG at least alternate days (preferably daily)
    - Reassess clinically and UmbA Doppler2-3 times per week
    - Add DV flow assessment if feasible, otherwise assess venous pulsations in the free umbilical cord
    - Deliver no later than 34 weeks, but earlier if aggravating factors develop (preeclampsia, REDF, pathological CTG, persistently abnormal DV flow or pulsatile flow in the umbilical vein)

Elective CS is justified as the risk of intrapartum fetal distress is high

### Reversed end diastolic flow:

- Deliver if diagnosed after 32 weeks
- If diagnosed < 34 weeks:
    - Consider BMZ (< 34 weeks) and/or neuroprotection with MgSO4 (< 32 weeks) provided CTG does not warrant immediate delivery
    - Daily clinical review

    - Daily CTG (preferably inpatient management)
    - Repeat Dopplers incl. DV if feasible 2-3 times a week but preferably daily
- Normal DV PIV:
    - Deliver once there are CTG abnormalities or no later than 32 weeks, whichever comes first
- Abnormal DV PIV:
    - Intensive CTG monitoring and reassess DV flow within 12-24 hours if CTG still fine
    - If persistently abnormal DV PI, expedite delivery if > 29w, otherwise continue intensive CTG monitoring, reassess DV Doppler daily and deliver if reversed a-wave or abnormal CTG.

Elective CS is justified as the risk of intrapartum fetal distress is high

References:


- Fetal growth restriction Practise Bulletin No. 134. American Obstetricians and Gynecologists. Obstet Gynecol 2013;121(5):1122-33
- The Investigation and Management of the Small–for–Gestational–Age Fetus. Green–top Guideline No. 31 2nd Edition | February 2013 | Minor revisions – January 2014 - https://www.rcog.org.uk/globalassets/documents/guidelines/gtg_31.pdf


*Disclaimer:*

*This document has been developed by interdisciplinary healthcare teams utilising the best available evidence and resources believed to be accurate and current at the time of release. They are intended to provide general advice and guidance on which to base clinical decisions. SASUOG takes no responsibility for matters arising from changed circumstances or information that may have become available after issued. They must not be solely relied on or used as a substitute for assessing the individual needs of each patient.*

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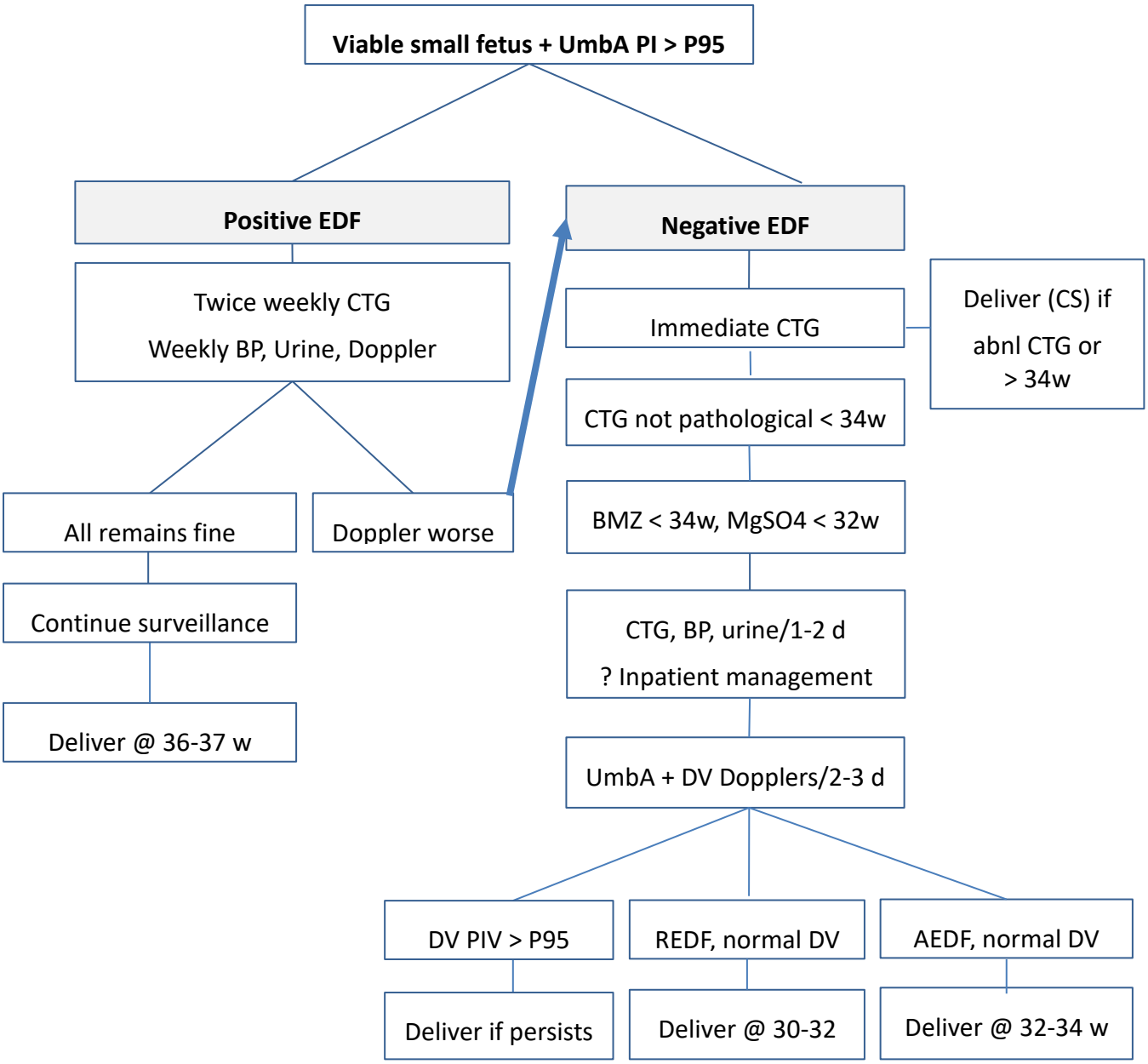
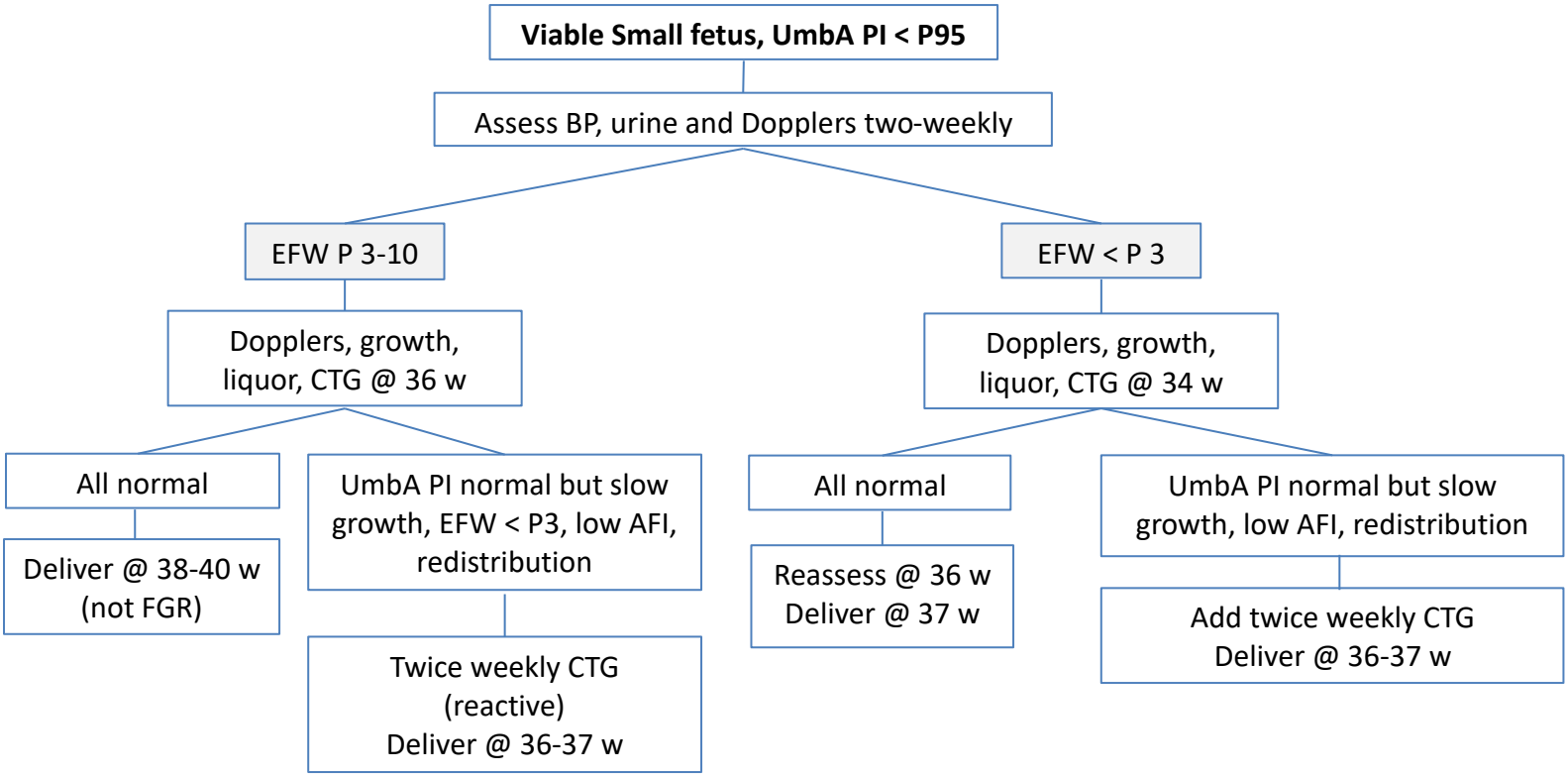
**ADDENDUM 1**




Deliver earlier if preeclampsia or persistently non-reactive CTG > 34 w!

**ADDENDUM 2**




Deliver earlier if preeclampsia or persistently non-reactive CTG >34 w!