Worcestershire Acute Hospitals NHS Trust

Management of Fetal Growth Restriction (FGR)

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

This guideline is for use by the following staff groups:

Midwives and obstetricians monitoring pregnancy

Lead Clinician(s)

Dr Anna Fabre-Gray	Consultant Obstetrician
Dr Rachel Duckett	Consultant Obstetrician
Aldonna Morrison	Midwife Sonographer
Dr Swati Ghosh	Consultant Obstetrician
Approved by *Maternity Governance Meeting* on:	15th September 2023
Review Date: This is the most current document and should be used until a revised version is in place	15th September 2026

Key Amendments

Date	Amendment	Approved by
17TH June 2020	Guidance updated to recommend treatment from 12/40 -delivery in line with NICE guidelines.	Maternity Governance Meeting
12th Jan 2021	Updated Aspirin table and management of SGA fetus flowchart added to document	Maternity Governance Meeting
4th January 2023	Reviewed and in line with national guidelines	Maternity Governance Meeting
15th September 2023	Revewed and in line with SBLCBV3	Maternity Governance Meeting

Introduction

Small for gestational age (SGA) is a significant contributor to perinatal morbidity and mortality. The aim of antenatal diagnosis and appropriate management is to reduce perinatal mortality and morbidity, primarily by optimising the timing of delivery of the affected fetus.

Fetus identified as small for gestational age (SGA) during the antenatal period, comprise a heterogeneous group in regard to aetiology, management and prognosis.

Incorrect dating of the pregnancy is a common problem in late bookers or un-booked pregnancies and these may be mistaken as SGA.

In accurately dated pregnancies the causes of SGA are tabulated below:

80-85%	*Constitutionally small but healthy*
5-10%	*Chromosomal / structural / infection*
10-15%	*FGR/true SGA*

One of the most important aims of effective antenatal care is the detection of the fetus at risk from SGA, identification of FGR and the management thereof.

Risk factors to be identified at booking

All women should be assessed at booking for risk factors for SGA to identify those requiring increased surveillance.

Screening should be performed as per Saving Babies' Lives – 'Algorithm for using uterine artery Doppler as a screening tool for risk of early onset FGR' (see below)

If women have moderate, high or other risk factors identified, they should be referred for consultant led care and serial growth scans +/- uterine artery Doppler as per the algorithm.

If uterine artery Doppler provision is NOT available then serial growth scans should be commenced at 28 weeks of gestation.

RISK FACTORS ARE NOT ABSOLUTE AND CLINICAL DISCRETION SHOULD BE EMPLOYED.

ASPIRIN

NICE recommends that Aspirin reduces the risk of pregnancy complications from placental disease, particularly of pre-eclampsia. Therefore a full history at booking is essential (please note this is now a mandatory field on BadgerNet to ensure aspirin is given appropriately) Dosage is 150mg PO/OD from 12-delivery and may be more effective if taken at night.
Contraindications include Aspirin allergy and history of GI bleeding or ulceration.

A reduced dose 75mg may be considered in cases of hepatic or renal impairment

Aspirin should be stopped when labour commences or IOL started.

Risk level	Risk factors	Recommendation
High	Hypertensive disease in previous pregnancy Chronic renal disease Autoimmune disease such as SLE or APS Type 1 or 2 diabetes mellitus Essential hypertension Placental histology confirming placental dysfunction in a previous pregnancy	Low dose Aspirin in 1 or more high risk factors 150mg PO/OD/nocte from 12-delivery
Moderate	First pregnancy Maternal age (>40yrs at booking) Inter-pregnancy interval >10 years BMI >35 Family history of pre-eclampsia in first degree relative Multiple pregnancy	Low dose Aspirin in 2 or more moderate risk factors 150mg PO/OD/nocte from 12-delivery

FGR

The definition of FGR in a previous pregnancy as a risk factor is defined as any of the following:

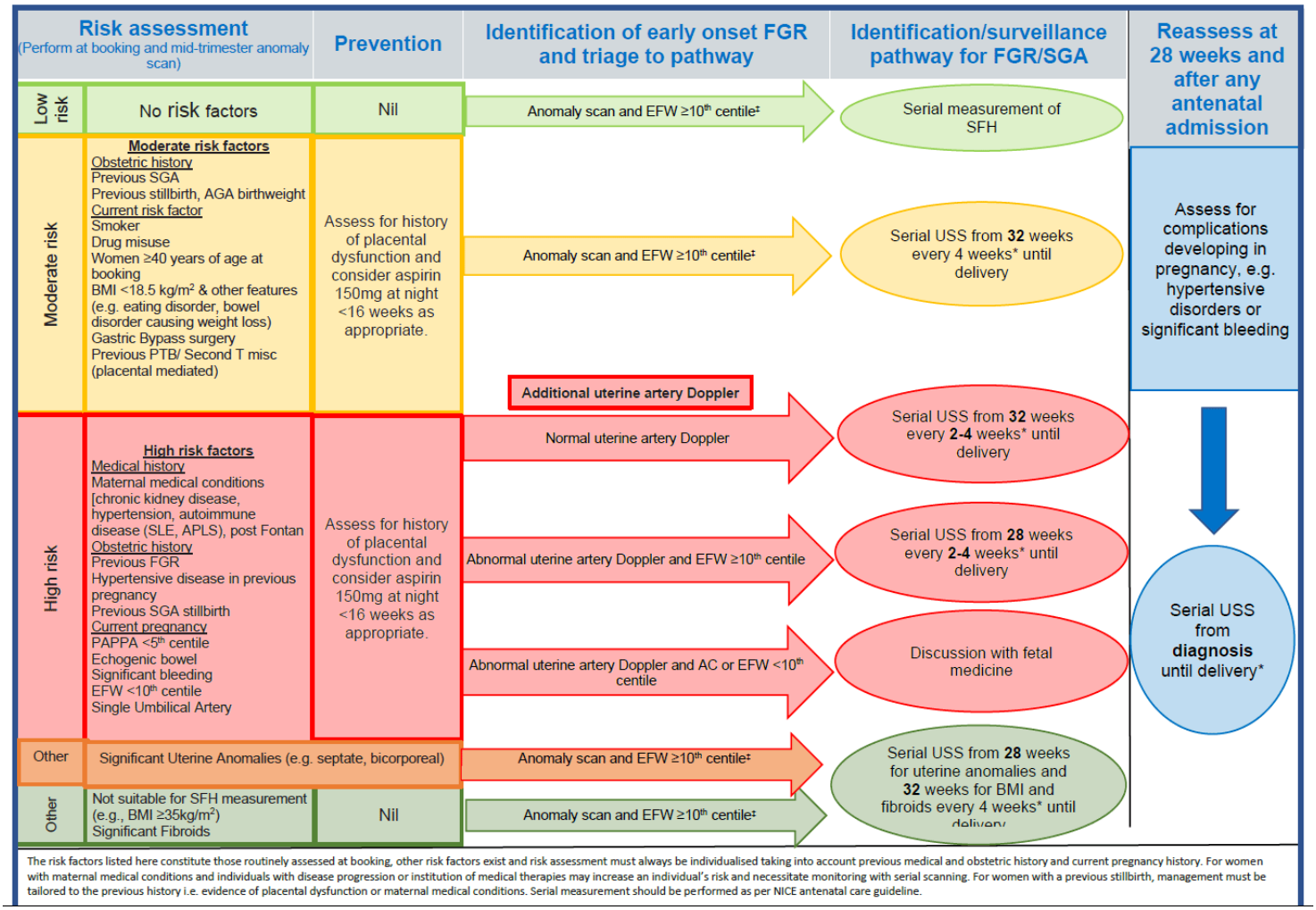
- Birth weight (BW) <3rd centile
- Early onset placental dysfunction requiring delivery <34/40
- BW <10th centile with evidence of placental dysfunction (defined below)

Definition of FGR in current pregnancy is defined as either of the following:

- EFW or AC<3rd centile
- EFW or AC <10th centile with evidence of placental dysfunction (either)
- Abnormal uterine artery Doppler (PI>95th centile) performed 20-24/40
- Abnormal umbilical artery Doppler (AREDF) or PI>95th centile
- >32/40 evidence of redistribution (MCA PI <5th centile or CP ratio <1
- Evidence of static or tail off in AC over 3 weeks

Risk Assessment and Screening

Early onset FGR is rare (0.5%) and the vast majority are associated with abnormal uterine artery Doppler. Women with normal uterine artery Doppler's are at low risk of utero-placental disease, therefore if the PI<95th centile, scanning for fetal biometry can safely be commenced from 32/40.



Investigation of SGA

If severe SGA is identified at the 20 week scan then the woman should be referred to a fetal medicine specialist for a detailed anatomical survey and uterine artery Doppler.

Karyotyping should be offered in severely SGA fetuses with structural anomalies and in those detected prior to 23/40, especially if the uterine artery Doppler is normal.

Serological screening for Cytomegalovirus and Toxoplasmosis should be offered in severely SGA fetuses.

Testing for syphilis and malaria should be considered in high risk populations.

In early onset IUGR (<28/40) the fetal medicine team may consider screening for lupus anticoagulant and anti-cardiolipin antibody.

Estimated Fetal growth should be assessed at each antenatal visit from 24 - 26 weeks, by measuring the symphysis fundal height (SFH) and this should be plotted on the customised growth chart. SFH should be measured and plotted at every visit at 2 weekly intervals or more, as this improves prediction of an SGA neonate.

Referral for Suspected SGA.

Indications to refer for ultrasound assessment include:

- A single SFH measurement that plots less than the 10th centile.
- If during the course of the antenatal care the SFH measurements cross the centiles.

Whilst estimated fetal weight (EFW) and symphysis fundal height (SFH) may each be plotted on the customised GROW chart, there is no correlation between SFH and EFW measurements. On this monitoring tool EFW is an indication of fetal weight and SFH an indication of uterine growth. Comparison should only be made between measurements of the same kind to determine consistent or concerning growth (i.e. SFH and subsequent SFH).

If fetal growth restriction is suspected on clinical grounds follow the flow-chart ' Management of SGA fetus' below.

Management of suspected SGA

Low risk women (MLC)

- If there is a suspicion of static fetal growth on SFH measurement when plotted on the customised chart or a crossing of centiles on SFH measurement with no other concerning features (such as reduced fetal movements or other medical complications) the midwife should book a growth scan as a priority via DAU (within 72 hours ideally). If there is a problem in arranging an urgent scan the DAU midwife should speak directly to the consultant on call for further care and timing of scan.
- If the woman also has reduced fetal movements or other medical complications she should be referred to the registrar/consultant on-call for a more urgent plan of care.
- If the SFH plots below the 10th centile regardless of the pattern of fetal movements the woman should be reviewed by the obstetric team on the same day.
- The DAU midwife should review the scan and if growth is satisfactory no further scans are required and should only be repeated if further discrepancy is identified on SFH measurements.
- If on the basis of the growth scan there is a drop in the growth when plotted on the customised chart the women should be referred to the on-call medical staff (on-call registrar/consultant) and be reviewed the same day in obstetric day assessment unit/ delivery suite.
- A further plan should be made (on the basis of estimated growth / amniotic fluid volume / umbilical arterial Doppler's / CTG / fetal movements) by the on-call registrar in liaison with the consultant on call prior to the patient leaving hospital. Other clinical concerns including BP and diminished fetal movements must be taken into consideration.
- If follow up scans or medical review is required this should be arranged prior to the patient leaving the hospital.

High risk women (CLC)

If growth restriction is suspected in women booked under consultant care:

- A growth scan should be arranged as a priority (within 72 hours). The clinic midwife/ registrar or consultant may have to personally speak to the sonographers.
- If follow up appointments are not available in the clinic to review the woman with scan soon enough she should be seen and the scan reviewed in the obstetric day assessment unit by the on call registrar/ consultant.
- For such a patient a further follow up appointment should be made for the consultant clinic if possible as obstetric assessment unit is not meant for regular antenatal check-up for high risk patients and the care should remain with own consultant.

Management of confirmed SGA

- If USS confirms fetal growth restriction then follow the flow chart on management of SGA fetus below

Interventions

- Women with an SGA fetus between 24+0 and 35+6 weeks of gestation, where delivery is being considered, should receive a single course of steroids, where possible this decision should be made by the consultant responsible for the patients care or making delivery decision. (If delivery by Caesarean section is being considered prior to 38+6 weeks gestation then steroids should be considered following counselling).
- <32/40 consider MGSO4 for fetal neuroprotection
- Label pregnancy risk factor as FGR on Badgernet

Surveillance

In a high risk population, the use of umbilical artery Doppler (Um AD)has been shown to reduce perinatal morbidity and mortality and should be the primary surveillance tool in the SGA fetus.

- When UmAD flow indices are normal, surveillance can be repeated every 14 days. In severe SGA however it may be more appropriate to repeat surveillance more frequently.
- When umbilical artery Doppler flow indices are abnormal (PI>95th centile for the gestational age) and delivery is not indicated then repeat surveillance twice weekly if EDF is present and daily if absent or reversed (AREDF)
- UmAD evaluation is the primary assessment tool for FGR, if EFW <3rd centile or IAEDF/AEDF/REDF, these cases should be referred to the fetal medicine team
- CTG should not be the only form of surveillance in an SGA fetus, however, if Doppler is not available on a daily basis (such as at weekends or holidays), then CTG should be performed at least daily (frequency based on the clinical picture).
- If daily Doppler is not available when clinically indicated attempts should be made to transfer care to a unit able to provide this service. WHAT has an informal reciprocal arrangement with Birmingham Women's Hospital, Heartlands or City hospitals to provide daily Doppler assessment in high risk fetuses when fetal medicine consultants are on-call.
- Interpretation of the CTG should be based on the short term fetal heart rate variation from computerised analysis. This should not be used in isolation and the whole CTG should be evaluated in the context of the clinical picture.

- Ultrasound assessment of amniotic fluid volume should not be used as the only form of surveillance in SGA fetuses.
- Interpretation of amniotic fluid volume should be based on single deepest pool
- Middle cerebral artery (MCA) Doppler may be useful in timing delivery but should only be used after 32/40
- Ductus venosus (DV) Doppler may be used for surveillance in the pre-term SGA (<32/40) fetus with abnormal UmAD to time delivery.

Timing of delivery

There is general consensus that delivery is indicated when the risk of fetal death or significant morbidity from continuing with the pregnancy is greater than the risk of prematurity. Gestational age at delivery impacts both short-term and neurodevelopmental outcomes.

- Infant mortality at or after 32 weeks is low and immediate delivery can be supported for at risk fetuses.
- Infant mortality before 32/40 rises steadily with increasing fetal immaturity. Intact survival increases with gestation by 2% per day from 24-28/40 and by 1% per day 28-32 weeks of gestation. Therefore delaying delivery until after 32/40 is preferable if it is safe to do so.

Before 32 weeks

- If UmAD AREDF is detected prior to 32/40 then delivery is recommended when ductus venosus (DV) Doppler is abnormal. Even if the a-wave is present in the DV, delivery is recommended by 32 weeks and maybe considered between 30–32/40 depending on the whole clinical picture.
- In the SGA fetus <32/40, middle cerebral artery (MCA) Doppler should not be used to time delivery.

After 32 weeks

FGR definition

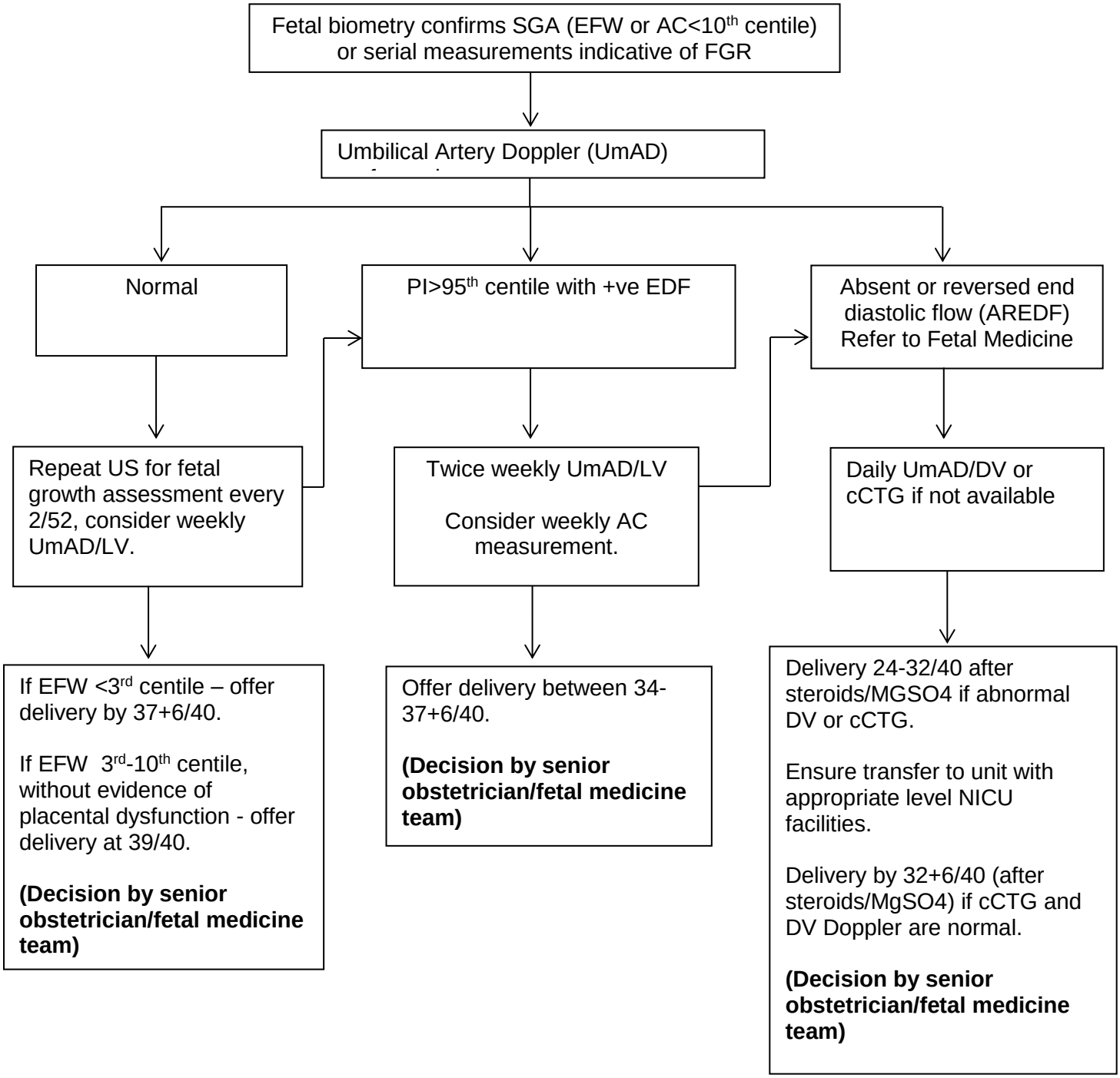
- *EFW or AC<3rd centile*
- *EFW or AC <10th centile with evidence of placental dysfunction:*
  - *Abnormal uterine artery Doppler (PI>95th centile) performed 20-24/40*
  - *Abnormal umbilical artery Doppler (AREDF) or PI>95th centile or evidence of redistribution (MCA PI <5th centile or CP ratio <1*
  - *Evidence of static or tail off in AC over 3 weeks*

- FGR fetuses detected after 32/40 **with evidence of placental dysfunction** should not be delivered between 32 - 37+6/40 depending on the clinical picture (this should involve a senior obstetrician/ member of the fetal medicine team)
- In FGR fetuses >34/40 there is a relatively low threshold for delivery if any of the following differences are present; low MCA PI, raised UmA PI or oligohydramnios
- If suspected FGR (see definition above) **without evidence of placental dysfunction** then timing of delivery should be offered between 37–37+6/40 (this should involve a senior obstetrician/ member of the fetal medicine team)
- In the SGA fetus (EFW 3-10thcentile) **without evidence of placental dysfunction,** or other concerns, the timing of delivery should be in the 39-39+6/40 (this should involve a senior obstetrician)
- In the term SGA fetus with normal umbilical artery Doppler, an abnormal MCA Doppler has a moderate predictive value for acidosis at birth and may be used by the fetal medicine team to time delivery.

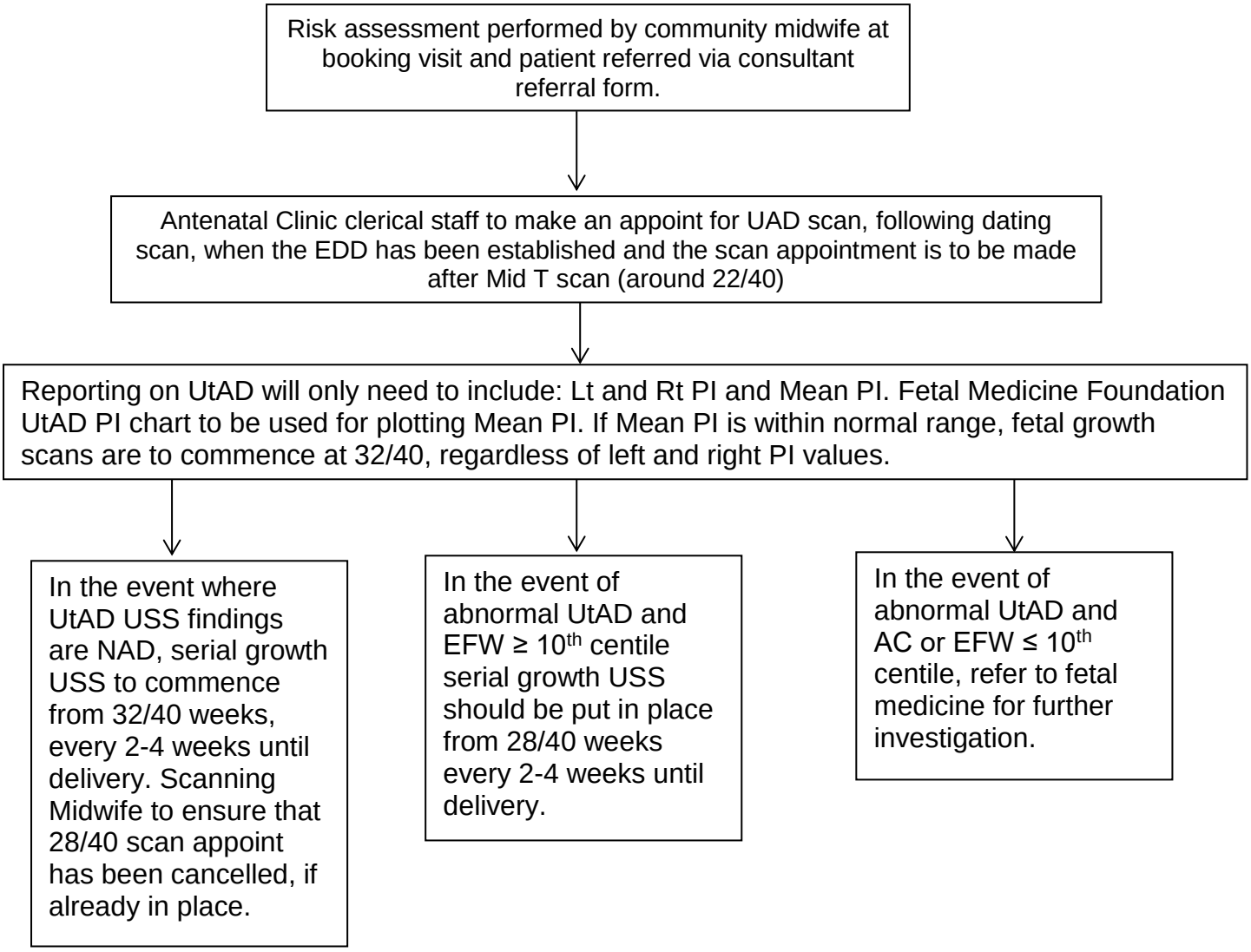
Mode of delivery

- In the SGA fetus with AREDV delivery by Caesarean section is recommended.
- If UmA Doppler normal or if raised PI but with end-diastolic flow present then IOL can be offered
- Continuous fetal heart rate monitoring is recommended from the onset of uterine contractions. These women should be given omeprazole as the rates of emergency C/S are increased.
- Early admission is recommended in women with spontaneous labour with an SGA fetus to order to commence continuous fetal monitoring.

Appendix 1 - Management of SGA Fetus Flow Chart



Appendix 2 - Uterine Artery Doppler USS Pathway



- In case of DNA, please follow the Antenatal DNA pathway.

Abbreviations used in guideline

AC	Abdominal Circumference
AEDF	Absent End Diastolic flow
AFI	Amniotic Fluid Index
AFV	Amniotic fluid volume
BW	Birthweight
BMI	Body Mass Index
CMV	Cytomegalo virus
CTG	Cardiotocograph
EDF	End diastolic flow
EFW	Estimated fetal weight
FGR	Fetal growth restriction
FM	Fetal movement
IOL	Induction of labour
IUGR	Intrauterine growth restriction
MPD	Mean pool depth
NICU	Neonatal Intensive Care Unit
REDF	Reverse End diastolic flow
RI	Resistance Index
SFH	Symphysis fundal height
SGA	Small for gestational age
UAD	Uterine Artery Doppler
UmAD	Umbilical Artery Doppler

Worcestershire Acute Hospitals NHS Trust

Monitoring

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the Policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	Saving Babies Lives Element 2	CATs Audit – in the maternity Audit Schedule	Quarterly	FGR Audit Lead	Audit Midwife	Quarterly
	CNST – Audit of FGR <10th centile undetected antenatlly	CATs Audit – in the maternity Audit Schedule	Yearly	FGR Audit Lead	Audit Midwife	Yearly