Small for gestational age (GL916)

Approval and Authorisation

<table>
<thead>
<tr>
<th>Approved by</th>
<th>Job Title</th>
<th>Date</th>
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<tr>
<td>Maternity &amp; Children’s Clinical Governance Committee</td>
<td>Chair, Maternity Clinical Governance Committee</td>
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Change History

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<tr>
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<tr>
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<td>S Arora (Assoc. Specialist), S Bisht (Consultant Obstetrician), S Nistor (Registrar)</td>
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<td>New appendices added (pg 11) Growth scan quick look guide (pg 12) AHSN V2.1 SGA flowchart</td>
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This guideline is to be read in conjunction with the following:
- Ultrasound protocol for anomaly examination (CG473)
- DAU USS Guideline (GL1052)
- Low PAPP-A (GL1008)
- EMA88_12 week scan pathway quick look guide
- EMA89_Fetal anomaly quick look guide

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Diagnosis, investigation and management of the small for gestational age fetus

Small for gestational age (SGA) refers to the fetus which has failed to reach a specific size by a specific age. SGA is diagnosed when the fetal abdominal circumference (AC) is at or below the 10th centile for gestational age.

SGA fetuses are a heterogeneous group comprising babies that have failed to reach their growth potential (growth restriction), and babies that are constitutionally small or abnormal.

SGA fetuses are at greater risk of stillbirth, intrapartum asphyxia, and neonatal complications. It is likely that the bulk of this pathology occurs in the growth restricted fetus rather than the constitutionally small fetus, the majority of which will have no problems.

All patients who require a referral from community for scan or consultant care for suspected small for gestational age should be referred directly to either DAU or ANC.

If movements are normal, then the patient should be referred to ANC.

If the movements are reduced, patients should be sent to DAU for CTG, scan and doctor review. If this happens to occur on the weekend, then patients should be sent to DAU for CTG that day and a scan organised on the next Ultrasound dept. working day.

Recommendations to detect SGA/ IUGR

1. All women should be assessed at booking for risk factors for a SGA fetus/neonate to identify those who require increased surveillance.

2. A low level (< 0.3 MoM) of the first trimester marker PAPP–A should be referred for fetal growth and Umbilical Artery Doppler’s from 28 weeks of gestation (see Low PAPP-A guideline GL1008)

3. Women who have a major risk factor should be referred for serial ultrasound measurement of fetal size and assessment of wellbeing with umbilical artery Doppler from 28 weeks of pregnancy.

4. Women in whom measurement of SFH is inaccurate (for example: BMI > 35, large fibroids, hydramnios) should be referred for serial assessment of fetal size using ultrasound.

5. Serial measurement of symphysis fundal height (SFH) is recommended at each antenatal appointment from 24 weeks of pregnancy as this improves prediction of a SGA neonate.

6. When using two measurements of AC or EFW to estimate growth velocity, they should be at least 2 -weeks apart to minimise false–positive rates for diagnosing FGR.
7. Where the fetal AC or EFW is \( \leq 10 \)th centile or there is evidence of reduced growth velocity, women should be offered serial assessment of fetal size and umbilical artery Doppler.

**Diagnosis of SGA**

1. Accurate assessment of gestation ideally by scan before 16 weeks is helpful both for clinical and scan surveillance.

2. Serial symphysis-fundal height measurement is a useful screening test but has limited accuracy.

3. Abdominal circumference and estimated fetal weight are the most accurate predictors for SGA. Serial measurements to show growth velocities are better predictors for IUGR. Amniotic fluid deepest pool and Doppler studies can assist in describing fetal wellbeing as well as CTG monitoring. Measurements to be entered into charts in viewpoint. A copy of scan report to be filed securely in handheld notes and another copy in hospital records

**Investigations that are indicated in SGA fetuses**

1. Second trimester- Offer referral for a detailed fetal anatomical survey and uterine artery Doppler by a fetal medicine specialist (SA/SB) if SGA is identified at the 18–20 week scan (AC/EFW \( \leq 10 \)th centile, or HC/FL \( \leq 3 \)rd centile). SA/SB to decide further management plan.

2. Karyotyping should be offered in severely SGA fetuses with structural anomalies and in those detected before 23 weeks of gestation, especially if uterine artery Doppler is normal (SA/SB)

3. Serological screening for congenital cytomegalovirus (CMV) and toxoplasmosis infection should be offered in severely SGA fetuses.

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

5. Third trimester- MCA Doppler and Cerebro-Placental Perfusion Ratio measurement by SA/SB to predict adverse perinatal outcomes in SGA fetuses. Management plan, scanning intervals and timing and mode of delivery to be suggested by SA/SB on individualised assessment.

**Major risk factors for Small for Gestational Age**

- History: previous SGA baby or previous stillbirth
- Maternal age \( \geq 40 \) years old
- Maternal disease: pre-eclampsia, essential hypertension, autoimmune disorders, chronic renal disease, substance misuse, smoking, alcohol excess, diabetes, thrombophilia
- Fetal: aneuploidy, congenital infection, echogenic bowel, structural abnormalities, skeletal dysplasia
Indications for serial growth scans

1) Suspected small or large for gestational age
   • If fundal height measurement - 3cm from gestational age (confirmed) on 1 occasion after 24 weeks.
   • Arrange fetal biometry on two occasions at least 14 days apart to document fetal growth velocity. If normal continue routine ANC with clinical assessment of fundal height. If abnormal follow plan below.

2) Previous SGA or IUGR fetus
   • Arrange monthly biometry from 28 weeks gestation.
   • If early onset SGA then scans in keeping with consultants care plan

3) Previous Obstetric History
   • at Consultant request

4) Diabetics
   • Type I and II - from 28 weeks 2 weekly
   • Gestational - 4 weekly if diet controlled. As for type II if on insulin

5) Multiple Pregnancies
   • Dichorionic Twins – 4 weekly from 26 weeks
   • Monochorionic Twins – 2 weekly from 16 weeks
   • Triplets and higher order pregnancies – 2 weekly from 16w

IF chorionicity not known (i.e. no first trimester scan, one placenta and same sex), treat as Monochorionic

6) Hypertension
   • Mild PIH at term (Diastolic BP< 95mmHg, less than + proteinuria) is not usually associated with IUGR and is thus not an indication for serial scans if fundal height in keeping with gestation.
   • Pre-existing hypertension increases the risk of pre-eclampsia and SGA and may be an indication for serial scans. Frequency of scans to be individualised.
   • Pre-eclampsia especially if it presents before 36 weeks or if severe can be associated with SGA and frequency of scans to be individualised.

7) Diminished fetal movements
   • Arrange growth scan if associated with Fundal height < 3cm for gestation. Scan on at least 2 occasions fortnight apart required to determine growth velocity. If these 2 scans are satisfactory then fundal height measurements can be used to follow up rest of the pregnancy
   • If 2 or more episodes of reduced fetal movements with fundal height in keeping with gestation growth scan and Doppler’s to be arranged for next working day.

8) Late booker
   • If late booker (18 weeks onwards), then 2 scans at fortnightly interval are required to confirm dates and check growth velocity. Uncertainty in
determining gestation accurately and hence determining growth centile of fetus on scan has to be taken into account during antenatal care.

9) Low PAPP-A levels (< 0.3 MoM) seen in the first trimester combined test
10) Abnormal uterine artery Doppler’s at 20-24 weeks gestation (defined as PI> 95th Centile with or without notching).

Interventions to be considered in the prevention of SGA fetuses/neonates

1. Antiplatelet agents may be effective in preventing SGA birth in women at high risk of pre-eclampsia. In women at high risk of pre-eclampsia, antiplatelet agents should be commenced at, or before, 16 weeks of pregnancy.

2. Interventions to promote smoking cessation may prevent delivery of a SGA infant. The health benefits of smoking cessation indicate that these interventions should be offered to all women who are pregnant and smoke.

Interventions to be considered in the preterm SGA fetus

1. Women with a SGA fetus between 24+0 and 35+6 weeks of gestation, where delivery is being considered, should receive a single course of antenatal corticosteroids.

Optimal method and frequency of fetal surveillance in SGA

1. In a high–risk population, the use of umbilical artery Doppler has been shown to reduce perinatal morbidity and mortality. Umbilical artery Doppler should be the primary surveillance tool in the SGA fetus. When umbilical artery Doppler flow indices are normal it is reasonable to repeat surveillance every 14 days.

2. When umbilical artery Doppler flow indices are abnormal (pulsatility or resistance index > +2 SDs above mean for gestational age) and delivery is not indicated repeat surveillance by SA/SB twice weekly in fetuses with end–diastolic velocities present and twice weekly in fetuses with absent/reversed end–diastolic flow–.

3. CTG should not be used as the only form of surveillance in SGA fetuses. Interpretation of the CTG should be based on short term fetal heart rate variation from computerised analysis.

4. 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 vertical pocket.

5. In the preterm SGA fetus (32w), middle cerebral artery (MCA) Doppler has limited accuracy to predict academia and adverse outcome and should not be used to time delivery. In such foetuses, Ductus venous Doppler has moderate predictive value for academia and adverse outcome and should be used to time delivery.
In the term SGA fetus with normal umbilical artery Doppler, an abnormal middle cerebral artery Doppler (PI < 5th centile) has moderate predictive value for acidosis at birth and should be used to time delivery.

The optimal gestation to deliver the SGA fetus

1. In the preterm SGA fetus with umbilical artery AREDV detected prior to 32 weeks of gestation, delivery is recommended when DV Doppler becomes abnormal or UV pulsations appear, provided the fetus is considered viable and after completion of steroids. Even when venous Doppler is normal, delivery is recommended by 32 weeks of gestation and should be considered between 30–32 weeks of gestation.

2. If MCA Doppler is abnormal, delivery should be recommended no later than 37 weeks of gestation.

3. In the SGA fetus detected after 32 weeks of gestation with an abnormal umbilical artery Doppler, delivery no later than 37 weeks of gestation is recommended.

4. In the SGA fetus detected after 32 weeks of gestation with normal umbilical artery Doppler, a senior obstetrician/Fetal Medicine Specialist should be involved in determining the timing and mode of birth of these pregnancies. Delivery should be offered at 37 weeks of gestation if AC/EFW <= 3rd centile or if any other risk factors like low PAPP-A, age >40 years, IVF pregnancy, previous IUGR, PET. Otherwise, delivery to be considered by term.

How the SGA fetus should be delivered

1. In the SGA fetus with umbilical artery AREDV delivery by caesarean section is recommended.

2. In the SGA fetus with normal umbilical artery Doppler or with abnormal umbilical artery PI but end–diastolic velocities present, induction of labour can be offered but rates of emergency caesarean section are high and continuous fetal heart rate monitoring is recommended from the onset of uterine contractions.

3. Early admission is recommended in women in spontaneous labour with a SGA fetus in order to instigate continuous fetal heart rate monitoring.

Management of SGA (appendix 2, pg 10)

- Studies have shown that up to 19% of fetuses with an AC and EFW below the 5th centile at 28 weeks may have chromosomal defects. The risk is higher in the presence of structural fetal abnormalities. Therefore all fetuses found with an AC less than the 3rd centile should have a repeat anatomical survey performed by fetal medicine doctors.

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• An amniotic fluid volume of less than 2cm (deepest pool DP) has been shown to be associated with increased perinatal mortality and thus increased surveillance is warranted. Single deepest vertical liquor pocket is a better choice than amniotic fluid volume. Amniotic fluid index increases the rate of suspicion of Oligohydramnios without improving outcome.

• Umbilical artery Doppler studies in high risk pregnancies including growth restricted fetuses have been shown to reduce the perinatal mortality and morbidity. As most tests show positive end diastolic flow, less intervention is required and less Cardiotocographs performed with its use in the management of SGA fetuses. However, screening a low risk population with umbilical artery Doppler does not cause any improvement in outcomes.

• Uses of biophysical profiles and CTG monitoring have never been shown to improve perinatal outcome. Biophysical profiles are time consuming and difficult to interpret and are not used at RBH to assess fetal well being. CTG monitoring from 26 weeks onwards is used antenatally in conjunction with the ultrasound and Doppler studies. A normal trace will provide some short term reassurance, though computer systems for CTG analysis may be better at predicting fetal compromise.

• When an anomaly scan and Doppler studies are normal, it is likely that the fetus is "normal small" and can be managed as an outpatient with 4 weekly growth scans. Timing of delivery is based on underlying cause for small fetus and gestation. Steroids improve fetal outcome when delivery is planned for before 36 weeks. Decision of delivery to be taken in liaison with Obstetric consultant and where indicated early involvement of neonatal team.

This guideline is to be read in conjunction with the Maternity USS Anomaly scan and growth scan guidelines and flow charts.

The following do not warrant a routine scan:

**Diagnosis:** APH before viability (<23 weeks gestation).

**Reason:** All vaginal bleeding in pregnancy is from the placental bed (once genital tract bleeding has been clinically excluded). Placental site is irrelevant in the management of the pregnancy. Fetal wellbeing is not established by ultrasound examination. Rupture of vasa praevia (for the pedants among us) is always associated with FHR abnormalities and loss of liquor.

**Diagnosis:** Abdominal/Uterine pain of unknown origin.

**Reason:** US can not see the causes of abdo/uterine pain. The chances of identifying a previously unseen fibroid or ovarian cyst are negligible in the absence of significant, new clinical findings.

**Diagnosis:** Suspected concealed abruption

**Reason:** Not possible by ultrasound examination
References

1. Investigation and management of the small for gestational age fetus. RCOG Green-top guideline 31. Jan 2014


3. Amniotic fluid index versus single deepest pocket as a screening test for preventing adverse pregnancy outcome, Nabhan AF Abdeloula YA. Cochrane Database Systematic Review, July 2008 16(3) CD006593


5. The use of electronic Fetal Monitoring. NICE Guideline May 2001


7. "Is the baby alright?" and "Using the Maternity Ultrasound Department". Previous published guidelines from the Maternity Department. Mark Selinger 1996, 2003 Jill Ablett (Consultant in feto-maternal medicine), August 2005

8. JRH SGA guidelines
Appendix 1

Fetal Medicine Referral Criteria for SGA

20-week USS

1) AC or EFW ≤ 10th %
2) HC or FL ≤ 3rd%

FM USS within 48hrs
- Anatomy, growth, liquor
- UmA and DV dopplers
- Uterine Artery Doppler
- TORCH
- Counselling
- Offer karyotyping

Any USS

1) AC or EFW ≤ 10th %
2) HC or FL ≤ 3rd%
3) ≥ 25% drop in any parameter over 2-4 weeks (HC, AC, FL, EFW)
4) Umbilical Artery PI or PI ≥ 95th%
5) Oligohydramnios (deepest pool < 2cm)

FM USS within 48hrs
- Anatomy
- Growth
- Liquor
- Umbilical Artery Doppler
- MCA if > 32 weeks
- DV if ≤ 32 weeks

FM Review immediately
- if Anhydramnios, or
- absent or reverse EDF in UmA

Refer to DAU if FM not available immediately

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### Appendix 2

**SGA Management**

1. **AC or EFW ≤ 10th %**
   - Umbilical Artery Doppler (UA)

2. **UA**
   - Normal
   - **PI or RI ≥ 95th % and EDF positive**
     - **AREDF**
     - **USS every 2 weeks**
     - **AC, EFW**
     - **UA Doppler**
     - **MCA if > 32 weeks**
     - **USS Doppler twice to thrice weekly**
     - **UA**
     - **MCA if > 32 weeks**

**Delivery**
- **By 40 weeks if EFW 4-10th % and no risk factors**
- **By 37-38 weeks if EFW 4-10th % and risk factors present (age >40, smoking, PIH/PET, IVF, low PAPP-A, RFM or poor obstetric history)**
- **By 37 weeks if EFW ≤ 3rd %**
- **Consider delivery >34 weeks if static growth (approx. 3 weeks)**

**Delivery IUT**
- **If ≥ 32 weeks, then deliver**
- **If <32 weeks, then (see AHSN chart) Intensive monitoring (daily DV and CTG)**
- **Consider IUT**

**Neonatal hyperglycaemia information (verbal and written) should be given if baby delivered at ≤ 37 weeks OR with EFW<3rd%**

*Inform Paeds team*

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Appendix 3 - Growth scan (26 weeks and above)

Look for
- Fetal heart beat and rhythm
- Anatomy is not expected to be re-checked, but watch for any obvious abnormalities

Measure and save images for
- HC, AC, FL
- Deepest pool of amniotic fluid
- UA Doppler PI / RI
- Renal pelvises if appear enlarged

Refer to Fetal Medicine within 48 hours if
- Drop in centiles of AC/EFW >25 centiles from previous growth scan (do not compare with anomaly scan size)
- AC/EFW <=10 centile and UA doppler normal
- FL/HC <=3rd centile
- UA PI/RI >=95th centile
- Any other abnormal / suspicious findings
- Deepest pool of amniotic fluid <2cm without SROM or >10cm

Discuss with FM doctor immediately if (send to ANC/DAU for the attention of the Obstetric Consultant if no FM doctor available to discuss)
- Absent or reverse EDF

Arrange ANC appointment (first available) if amniotic fluid 8 - 10cm
**APPENDIX 4 - AHSN ALGORITHM**

Maternity Guidelines – Small for Gestational Age (GL916)  
January 2019

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### Section 1: Management of Severe Preterm Singleton / DC Twin Intrauterine Growth Restriction (IUGR) Without Absent End-Diastolic Flow

**Management of Preterm Singleton / DC Twin Intrauterine Growth Restriction (IUGR):**

- **Version:** 2.1 14/11/2018
- **Authors:** M. Lawrence Imero, Oxford Patient Safety Collaborative Maternity Clinical Lead
- **Reviewed by:** Maternity Steering Group (MSG)

#### ETW ≤ AC2 ≤ 31 6 weeks

- **Ultrasound**
  - **Fetal origins**: Likely fetal origin
  - **Gestational Age >24+6 and ETW >500g**
  - **Ultraembryonic AEF**
  - **Monitor mother (BP and urinalysis)**

#### ETW ≤ AC2 < 31 6 weeks

- **Repeat anomaly scan**
  - **Check maternal CMV and toxoplasmosis (TPM) status**
  - **Consider external amniocentesis, karyotype, middle cerebral artery Doppler**

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### Section 2: Management of Severe Preterm Singleton / DC Twin IUGR Without Absent End-Diastolic Flow

#### ETW ≤ AC2 ≤ 31 6 weeks

- **Ultrasound AEF**
  - **≥32+0**
  - **See Section 2**
  - **Delivery by CS**

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**Footnotes:**

1. BP: Blood pressure
2. CS: Caesarean section
3. ETW: Estimated fetal weight
4. AEF: Absent end-diastolic flow
5. ETW: Estimated fetal weight
6. CS: Caesarean section
7. TPM: Toxoplasmosis and cytomegalovirus

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