SMALL FOR GESTATIONAL AGE FETUS

AIM

- To inform clinicians of the assessment and pregnancy management of the woman with a suspected small for gestational age fetus.
- To provide an antenatal clinic flowchart for diagnosis and management of SGA/IUGR.

BACKGROUND INFORMATION

The term 'small for gestational age' (SGA) refers to the fetus that has failed to reach a specific biometry or estimated weight threshold by a specific gestational age.\(^1\)\(^2\) It is estimated that 50-70% of fetuses born weighing less than the 10\(^{th}\) centile for gestational age are constitutionally small, with the growth appropriate for the parental size and ethnicity. The outcome is usually associated with normal placental function and normal outcomes. SGA fetuses with a birth weight less than the 50\(^{th}\) centile for gestational age have a greater likelihood of intrauterine growth restriction (IUGR).\(^1\)

SGA fetuses are at greater risk for stillbirth, birth hypoxia, neonatal complications, impaired neurodevelopment, and possibly Type 2 diabetes and hypertension in adult life, although the high incidence of adverse perinatal outcomes maybe contributed to the IUGR foetuses in this group. The majority of term SGA infants have no appreciable morbidity or mortality.\(^2\)

Biometric tests used to assess fetal size assist diagnosis of SGA, while biophysical tests are used to detect fetal wellbeing and are more indicative of IUGR.\(^2\) The use of the customised fundal height chart has been demonstrated to improve the accuracy to predict a SGA fetus, but ultrasound measurements of the abdominal circumference and estimated fetal weight provide the most accurate way to predict SGA.\(^2\) Symphysis fundal height (SFH) measurements may improve sensitivity and specificity for predicting SGA, whilst abdominal palpation alone has limited accuracy for identification of a SGA fetus\(^2\). The impact on perinatal outcomes of SFH measurement, compared to abdominal palpation, is uncertain with a Cochrane systematic review finding only one controlled trial that showed SFH measurements did not significantly change perinatal outcomes.\(^2\) Continuation of SFH measurement at each antenatal appointment has been recommended.\(^2\)\(^3\)

Assessment of fetal growth, abdominal circumference (AC) and estimated fetal weight (EFW), requires two ultrasound measurements at least three weeks apart, which will differentiate normally growing fetuses from those with IUGR.\(^2\) More frequent scanning may be required by the Obstetric team where awareness of EFW would assist in obstetric management, for reasons other than SGA diagnosis.\(^2\) Routine biometry is not justified in third trimester as it does not reduce the risk of SGA and does not improve perinatal outcomes\(^2\). Measurements only provide limited information to assist decision making for management for timing of delivery. Associated antenatal surveillance techniques assist in clinical judgement for timing of delivery. These techniques differentiate between a SGA fetus with a predicted normal outcome, and the fetus which is growth restricted resulting in adverse perinatal morbidity and mortality.\(^1\)\(^2\) Umbilical artery (UA) Doppler measurements can identify if a confirmed SGA fetus is affected by placental dysfunction, with end-diastolic flow velocity results providing valuable information on risk for perinatal mortality and morbidity.\(^1\)\(^2\)\(^4\)

KEY POINTS

1. SGA describes the fetus that has failed to reach the normal biometric weight by a specific gestational age. This does not always indicate a fetus is growth restricted.
2. The use of ultrasound biometry and biophysical tests can assist differentiation between the SGA with no expected perinatal morbidity or mortality risk, and the IUGR fetus with predicted poor perinatal outcomes.

3. To evaluate fetal growth over time at least two subsequent measurements two weeks apart should be performed. A three week interval further reduces false positive results.

4. Management is individualised according to gestation, fetal wellbeing and any compounding maternal or fetal health factors.

**DIAGNOSIS**

Most methods to detect SGA require an accurate estimation of gestation as a prerequisite.

Methods to detect SGA include:
- Measurement of symphysis pubis fundal height – recommended at each antenatal appointment from 24 weeks to improve prediction of SGA fetus.
- Abdominal palpation – has a limited diagnostic ability to predict the SGA fetus. If a SGA fetus is suspected, diagnosis should be supplemented by ultrasound biometry.
- Ultrasound biometry (AC or EFW <10th centile).
- Biophysical tests.

**MANAGEMENT**

At booking identify those needing increased monitoring:
- Where SFH is less accurate (large uterine fibroids, >BMI) = serial growth ultrasounds.
- One major or three minor risk factors present (see below).

Consider preventative interventions in high risk groups (smoking cessation advice, antiplatelet agents in women at high risk of pre-eclampsia).

**RISKS FOR IUGR/SGA:**
- Maternal age >35, >40
- Nulliparity
- BMI <20
- IVF single pregnancy
- Daily vigorous exercise
- Low fruit intake pre-pregnancy
- Low maternal weight gain
- Previous stillbirth
- Pre-eclampsia (previous pregnancy or this pregnancy)
- Maternal or paternal SGA
- Pregnancy interval (<6months or >60months)
- Heavy bleeding (threatened miscarriage), unexplained APH, or Placental abruption
- Echogenic fetal bowel
- Caffeine >300mg/day in third trimester
- PAPP-A < 0.4 MoM
- Smoking
- Multiple pregnancy

**ASSESS FOR CAUSES OF THE SGA AND/OR THE IUGR FETUS**
- Constitutionally small mothers
• Poor maternal nutrition leading to a malnourished and underweight mother\textsuperscript{6,7}
• Previous birth of an SGA baby increases risk in a subsequent pregnancy\textsuperscript{2,6}
• Fetal structural abnormalities and congenital malformations\textsuperscript{6,8}
• Fetal chromosomal abnormalities\textsuperscript{6,8}
• Multiple pregnancy - a twin pregnancy is associated with a 10\% increased chance of IUGR\textsuperscript{6,8}
• Life style factors e.g. smoking\textsuperscript{2,6,8} (>11/day), alcohol and substance abuse\textsuperscript{7,8} (cocaïne)\textsuperscript{2}
• Fetal infections e.g. cytomegalovirus, malaria, parvovirus, rubella\textsuperscript{6,8}
• Maternal disease or disorders e.g. pregnancy induced hypertension\textsuperscript{2,6} (mild/severe); diabetes\textsuperscript{2}; vascular disease\textsuperscript{2}; chronic HTN\textsuperscript{2}
• Disorders of cartilage and bone\textsuperscript{7}
• Teratogens\textsuperscript{7}
• Renal disease\textsuperscript{2,7}
• Chronic hypoxia\textsuperscript{7}
• Placental and cord abnormalities\textsuperscript{7,8}
• Antiphospholipid Antibody Syndrome\textsuperscript{2,7}

➢ Note: Factors in bold represent major risk factors for IUGR

FETAL SURVEILLANCE

Ultrasound scans
1. If severe SGA identified on anatomy scan (from external results), arrange detailed anatomical ultrasound and uterine artery Doppler\textsuperscript{2} with fetal medicine sonographer.
   • Offer karyotyping in severe SGA with structural anomalies, those before 23 weeks gestation, particularly if UA Doppler normal\textsuperscript{2}
2. Arrange ultrasound assessment if a SGA fetus is suspected – biometry, amniotic fluid index (AFI), umbilical artery (UA) Doppler velocities, and fetal wellbeing.
3. If SGA is confirmed organise serial assessment of fetal size and umbilical artery (UA) Doppler\textsuperscript{2}:
   • Weekly ultrasounds including AFI and UA Doppler’s. UA Doppler is the primary surveillance tool in SGA\textsuperscript{2}.
     ➢ If normal UA Doppler flow: may be repeated every 14 days
     ➢ More frequently in severe SGA
     ➢ If abnormal UA Doppler flow indices and birth not indicated repeat
       • Twice weekly if end-diastolic velocities present
       • Daily if absent/reversed end-diastolic frequencies).\textsuperscript{2}
   • Fortnightly fetal biometry and fetal well-being.
4. In the preterm SGA fetus with abnormal UA Doppler, the Ductus venous Doppler should be used to assist in timing birth.\textsuperscript{2}
5. In the term SGA fetus with normal UA Doppler, the middle cerebral artery (MCA) Doppler should be used to assist in timing birth.\textsuperscript{2}

Cardiotocograph monitoring (CTG)
➢ If SGA is confirmed perform a CTG if the fetus is > 32 weeks gestation.
➢ If SGA is confirmed and the fetus is < 32 weeks gestation – discuss management with the obstetric team Consultant if CTG monitoring is required in correlation with ultrasound findings.
➢ Frequency of follow-up CTG monitoring in MFAU will be weekly or bi-weekly depending on the biophysical profile and the UA Doppler studies. The Consultant or Senior Registrar will make this decision.
➢ The CTG should be used in conjunction with other fetal monitoring for the SGA fetus.\textsuperscript{2}
MEDICAL REVIEW AND ANTENATAL CARE

SGA IS NOT CONFIRMED
If the ultrasound examination does not confirm SGA:

- Discuss with the team registrar or Consultant.
- Allow routine follow-up with the usual health care provider.

CONFIRMED SGA
1. Abnormalities of ultrasound examination or CTG monitoring should have urgent review by the Consultant or the Senior Registrar.
2. Document a management plan on the MR 004 ‘Obstetric Special Instruction Sheet’.
3. Organise ultrasound follow-up appointments in the Maternal Fetal Assessment Unit (MFAU).
4. Organise CTG monitoring according to gestation and medical management plan.
5. Arrange obstetric team antenatal clinic appointments weekly for medical review. Ideally the appointments should be made to coincide with appointments in MFAU.
6. If SGA is confirmed but serial ultrasound biometry and UA Doppler do not indicate IUGR or fetal compromise an individualised management plan should be documented.

CONFIRMED IUGR
1. If IUGR is diagnosed refer to Clinical Guideline Intrauterine Growth Restriction.
2. Consider administration of corticosteroids if pre-term delivery is anticipated.\(^2\)
ANTENATAL CLINIC FLOWCHART FOR DIAGNOSIS & MANAGEMENT OF SGA/IUGR

**ASSESS**
- **Risk factors at booking**
- **SFH at every visit**

Are measurements small for dates? AND/OR Are IUGR risk factors present? (1 major or 3 minor)

**YES**
- Check gestational age correct (dating scan)
- Review anatomy scan/ FTS/ possible causes
- Discuss with obstetric team if measuring small for dates
- Document plan in antenatal record & MR 004 Obstetric Instruction Sheet

**DIAGNOSE**
- Arrange ultrasounds
  - AFI / Dopplers / fetal biometry / BPP
  - Anatomy (if not already performed)

**MANAGE**
- Serial ultrasounds
- Schedule ultrasounds & antenatal visits same day
- If SGA confirmed but not IUGR & no fetal compromise document individualised care plan.

**NORMAL**
- UA Doppler
  - **Fortnightly**
    - UA Doppler
    - MCA Doppler
    - AC & EFW
  - **Weekly**
    - UA Doppler
    - CTG >32/40

**ABNORMAL**
- UA Doppler
  - **Weekly**
    - AC & EFW
  - **Daily**
    - UA Doppler
    - DV Doppler
    - CTG >32/40
  - AREDV
    - PI or RI >2SD, EDV present

**Birth**
- Offer by 37 weeks - timing d/w consultant
- Recommended by >34wks if:
  - Static growth over 3-4wks
  - MCA Doppler PI <5th centile
  - Consider steroids if CS birth & appropriate

**Intrapartum**
- Early admission in labour & Continuous CTG
- Caesarean birth recommended if UA Doppler AREDV
- IOL offered if normal UA Doppler or abnormal UA PI with EDV present, though increased rates of CS birth

**Birth**
- Recommended by 32 weeks – after steroids
- Consider 30-32wks
- Recommended <32wks after steroids if:
  - Abnormal DV Doppler &/or CTG
  - >24 wks & EFW >500g

(**Abbreviations**: AC- abdominal circumference; AFI- amniotic fluid index; AREDV- absent/reversed end diastolic velocities; BPP- biophysical profile; CS- caesarean section; CTG-cardiotocography; DV- ductus venosus; d/w- discuss with; EFW- estimated fetal weight; FTS-first trimester screen; IUGR-intrauterine growth restriction; MCA- middle cerebral artery; PI- pulsatility index; RI-resistance index; SD-standard deviation; UA-umbilical artery)

This flowchart represents minimum care & should be read in conjunction with the full guideline. Additional care should be individualised dependent on condition changes & co-morbidities.
REFERENCES (STANDARDS)


| National Standards – 9 Recognising and Responding to Clinical Deterioration |
| Legislation - Nil |
| Related Guidelines/ Policies – Quick Reference Guide Assessment of the (Suspected) Small for Gestational Age Fetus |
| Other related documents – Nil |

| RESPONSIBILITY |
| Policy Sponsor | HoD Obstetrics |
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