Oxford University Hospitals NHS
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Growth Scan Guideline

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Key Recommendations

- **(New in v1.4)** If fetal macrosomia is diagnosed at the 36-week USS (EFW >95th centile) – a fasting blood glucose test will no longer be performed.

- **(New in v1.4)** Women with an macrosomic baby detected at the 36-week USS will be offered referral (by the USS Department) to a Consultant for shared decision making regarding individualised birth planning.

- **(New in v1.4)** Any women that have missed a planned antenatal Glucose Tolerance Test (GTT) prior to the 36 weeks USS, who then have fetal macrosomia detected at the 36 weeks USS, will be offered referral to the Diabetes Service and treated on the Gestational Diabetes Mellitus (GDM) care pathway.

- **(New in v1.4)** If the EFW is >95th centile and the gestation at the scan is <35+1 weeks, glucose assessment using a GTT, should be arranged.

- **(NEW in v1.4)** If the EFW is >95th centile and the gestation at the scan is >35+0 weeks, glucose assessment using a GTT **should not** be performed.

- Please refer to the Diabetes Guideline.

- **(New in v1.4)** Where the fetus is macrosomic and diabetes is not present, the mode of birth should be discussed. A homebirth or MLU birth is not advised.

- If diabetes is not present, women should not be routinely offered caesarean section or induction of labour for this indication alone. If a homebirth or MLU birth is planned, referral to a Consultant clinic for a discussion should be offered.

- Repeat scans to assess the growth of a large baby should not be arranged.

- Uterine Dopplers will be performed at the anomaly scan and, depending on these results and defined risk factors, the woman may be offered additional growth scans at 28/40, or 28/40 and 32/40.
- Each woman will be offered a routine growth scan at 36/40, including MCA Dopplers

Polyhydramnios

- **(New in v1.4)** Where the AFI is ≥30, the woman should be referred to FMU.
- Where the AFI is raised but <30, the woman should be referred to a Consultant Antenatal Clinic. A GTT should be arranged of the gestation is <35+1 weeks; after this gestation, a GTT is less reliable and should not be performed.

Background

Small for gestation (SGA) babies, and those whose growth slows from what is expected, are at a significantly increased risk of stillbirth, neonatal death and perinatal morbidity.

Currently in the UK we identify only about 30% of babies who are small for their gestational age during pregnancy.

Since 2010 the number of additional scans, such as for growth, presentation and placental site, has been rising significantly. In 2015, the OUHFT performed 2000 more of these scans than in 2010, despite the number of anomaly scans remaining similar. This means that for each anomaly scan done, the same number of additional scans after 20 weeks were performed, adding significant pressures to the healthcare system.

The growth scan pathway is designed to reduce the need for a number of the additional scans and monitor the wellbeing of pregnancies in a more structured, planned and clinically effective way that should improve the identification of babies who are growing poorly in utero, and therefore at risk of a number of complications, including stillbirth.

Aims

The purpose of this guidance is to aid the identification and investigation of the SGA and particularly growth restricted fetus.

Scope

The document applies to all midwifery and medical staff who provide care, support and/or information to women and their families within the OUH NHS Foundation Trust.
A copy of the guideline is available to view on the intranet.

Definitions

Term	Definition
AC	Abdominal Circumference
AEDF	Absent End Diastolic Flow
CPR	Cerebroplacental Ratio (MCA PI/ UmbA PI)
EFW	Estimated Fetal Weight
EDF	End Diastolic Flow
FGR	Fetal Growth Restriction
FL	Femur Length
FMU	Fetal Medicine Unit
HC	Head circumference
IUGR	Intra Uterine Growth Restriction
MCA	Middle Cerebral Artery
PD	Pool Depth
PI	Pulsatility Index
PET	Pre Eclampsia
PAPP-A	Pregnancy associated plasma protein A
REDF	Reversed End Diastolic Flow
RI	Resistance Index
SGA	Small for Gestational Age
UmbA	Umbilical Artery

Possible reduction in growth velocity: The AC has dropped ≥40 centile points from the anomaly scan

Small for gestational age: The EFW is <10th centile

SGA risk: Either there is a reduction in AC growth velocity (see above) OR the fetus is small for gestational age

Abnormal umbA PI: The umbA PI is >95th centile

Abnormal CPR: The CPR is <1.0

Executive Summary

The use of ultrasound for assessment of fetal growth has been structured.

The growth scan pathway is designed to reduce the need for a number of the additional scans and monitor the wellbeing of pregnancies in a more structured, planned and clinically effective way that should improve the identification of babies who are growing poorly in utero, and therefore at risk of a number of complications, including stillbirth.

Each woman will be offered a growth scan at 36/40 which will include the measurement of the umbilical artery (umbA) Doppler and Mid Cerebral Artery (MCA) Doppler to allow calculation of the cerebro-placental ratio (CPR).

In addition to the 36/40 growth scan, some women will be offered growth scans at 28/40, or 28/40 and 32/40 according to whether they have any of the defined risk factors and the results of a uterine artery Doppler which is performed routinely at the anomaly scan. The risk factors chosen are simple to allow easy early risk stratification; additional scans may be booked by the clinician according to more complex criteria.

Additional scans outside of the Growth Scan Pathway must meet the criteria for referral as detailed in the full guideline.

Growth scan pathways

From the 9/5/16 every woman will be offered a growth scan at 36/40 which will include the measurement of the umbilical artery (umbA) Doppler and Mid Cerebral Artery (MCA) Doppler to allow calculation of the cerebro-placental ratio (CPR).

In addition to the 36/40 growth scan, some women will be offered growth scans at 32/40, or 28/40 and 32/40 according to whether they have any of the risk factors* (see below) and the results of a Uterine artery Doppler which is performed routinely at the anomaly scan.

The pathway for each woman will be indicated on the Growth Scan Pathway Form by the sonographer. This will be filed in the hand-held notes at the time of the Anomaly Scan. The Ultrasound Department will book all the scans advised at the time of the anomaly scan. The scans can be booked +/- 5 days of the advised gestation.

The Pathway is as follows-

	Risk Factors +	**Uterine artery Doppler**	=	**ACTION**
Pathway A →	**No *risk factors** (no boxes ticked yes)	**Normal** Uterine arteries **(total PI <2.5)**	**Low risk for SGA/PET**	**36/40 growth scan**
Pathway C →	***Risk factors** (one or more boxes ticked yes)	**Normal** Uterine arteries **(total PI <2.5)**	**Med risk for SGA/PET**	**32/40 and 36/40 growth scans**
Pathway D →	***Risk factors** (whether ticked or not)	**Abnormal** Uterine arteries **(total PI ≥ 2.5)**	**High risk for SGA/PET**	**28/40, 32/40 and 36/40 growth scans** Needs to be under Consultant Care. Needs MW/ cons. appointment @25/40 and 31/40 for BP check or if booked under Silver Star, 24/40 SS appointment.
Pathway D →	**Dichorionic twin pregnancy (MC twins and high order multiples to FMU)**	**n/a**		**28/40, 32/40 and 36/40 growth scans** Please arrange usual clinic and scan follow up in the current manner if not already booked

***Risk factors:**

- **Previous (singleton) baby born <2500g (5lbs 8oz) at any gestation**
- **Smoking ≥10 day (not including e-cigarettes)**
- **Aged 40 or above and nulliparous**
- **PAPP-A <0.3MoMs** (this will 'flag' in Viewpoint when patient's entry 'opened')

The following Patient Information Leaflets are available in print and on the OUHFT Intranet to support this pathway

Mid-pregnancy Scan
Raised Uterine Dopplers
Growth scan

Additional scans outside of the Growth Scan Pathway

Requesting growth scans

Please ensure all referrals for scans meet the conditions below.
When requesting, it is essential that the indication for referral is clearly documented, and if 'other' is used detail should be provided.
The referral also needs to include the agreed EDD and clear patient contact details and referrer details.
Requests will be reviewed by a senior doctor.
Failure to complete the referral to these standards ***may result in a delay or refusal of the scan.***
In these circumstances the referrer will be responsible for liaison with the woman.

The indications for growth scans are:

New pregnancy complications (NEW)

These are:

- PV bleeding
- symphysis fundal height 3cms or more under gestation if more than 26 weeks (repeated scan assessments are not required if the SFH discrepancy does not increase with gestation)
- new hypertension
- reduced fetal movements (if criteria met according to reduced fetal movements guideline)
- gestational diabetes, (one extra scan only)**(NEW)**
- other (this must be stated)

Pre-existing problems

Women at very high risk on basis of pre-existing medical disease or previous obstetric history may have scans as requested by their clinicians, as currently occurs.
These are:

Previous SGA baby. Note that if the previous baby was <2500g they would already be on Pathway C or D (i.e. automatically have extra scan(s) in addition to a 36 week scan).

However if the previous birthweight was <10th centile but the baby was born after 36 weeks they should also have scan(s) from 38 weeks in addition to the routine 36 week scan. Babies that were SGA but born well at >2.5kg should NOT normally have 'serial growth scans' before 36 weeks

- previous pregnancy loss after 16 weeks
- pre-existing medical disease (antiphospholipid syndrome, chronic hypertension requiring treatment etc)

Additional scans: not permitted

The following indications may not be used for referral for ultrasound:

Placental site (no PV bleeding) unless not recorded at 20 weeks or equivocal at 36 week scan

- Presentation. If ≥36 weeks these should be referred to the breech clinic (see below)
- Large for dates
- Serial growth scans for 'low risk' indications e.g. IVF, previous SGA baby >2.5kg, anxiety

Growth scans requests for scans (unless Doppler only for known SGA risk baby) within 2 weeks of a previous scan are also not permitted.

Explanation of growth scan diagnosis codes

Fetal growth is assessed according to the following criteria, and used as diagnosis codes on ultrasound reports. The following is a simplified interpretation of diagnosis codes.

1. **Normal fetal growth.**

The baby has grown consistently and the estimated fetal weight (EFW) is ≥ 10th centile for gestational age, with normal Doppler indices (umbA or CPR). This baby is currently at low risk of adverse outcomes.

2. **Normal fetal growth but abnormal Dopplers**

This situation can be due to normal variation, over-estimation of size or, occasionally, acute placental events. These women should be reviewed in FMU to determine the best course of action. The ultrasound department will normally arrange this.

3. **SGA risk with normal Dopplers**

The EFW is <10th centile for gestational age or the abdominal circumference (AC) has dropped centiles, a 40+ centile drop from the anomaly scan, but fetal condition currently appears good. Repeat scans every 2-3 weeks are normally indicated if the gestation is <36 weeks. The ultrasound department will normally arrange these for 3 weeks after the scan and arrange a clinic appointment on the same day.

4. **SGA risk with abnormal Dopplers**

The EFW is <10th centile for gestational age, or the abdominal circumference (AC) has dropped centiles by 40 centile points from the anomaly scan and the umbilical artery Dopplers or CPR are abnormal. This baby is at risk of adverse outcome.

Management of singleton pregnancy according to scan findings

At any antenatal review the USS report should be examined by the clinician.

Decisions for delivery of a baby where the primary indication is SGA or abnormal Dopplers (risk of placental problems) should only be made by the FMU (FGA) team. Where delivery is expedited these babies are at risk of hypoglycaemia and should be monitored as per guideline for SGA babies.

Abnormal findings

If UmbA AEDF/ REDF:

Admit for CTG

<32 weeks: urgent FMU review

≥32 weeks: urgent consultant or FMU review, probably LSCS

If SGA risk with abnormal umbA Doppler:

<32 weeks: refer FMU

32-36 weeks: twice weekly umbA Doppler, book this in USS department. Ensure a consultant antenatal clinic appointment has been made. A CTG is not required unless another indication or AREDF is present.

>36 weeks: arrange delivery. Consider CTG

If SGA risk (with normal umbA Doppler) see Fig 2 and below:

<36 weeks

repeat scan in 2-3 weeks, usually with follow up antenatal clinic appointment the same day.

>36 weeks: refer to the FMU fetal growth assessment clinic who will manage:
According to EFW, CPR, gestation and other risk factors.

If abnormal umbA Doppler or CPR but *not* SGA risk:

All women should be referred to FMU growth assessment clinic where an assessment and management plan will be made. This will normally have happened from the ultrasound department. They should not be sent to the DAU or MAU and a CTG should not be routinely arranged. Pregnancy management should not be routinely altered.

Normal findings

If not SGA risk, normal umbA +/- CPR Dopplers:

<36 weeks

No routine scan follow up is required. However, the routine 36 week scan will go ahead unless a scan has been performed <7 days prior to the time for which it has been booked.

>36 weeks

No routine scan follow up is required.

Incomplete findings

If the MCA cannot be obtained, and there is no 'SGA risk' (see definitions) further scan appointments are not required. If there is SGA risk, the patient should be referred to FMU.

Late booking/ uncertain dates

If a woman books late and a growth scan after 20 weeks is being used to assign dates (HC), no routine second scan follow up is required, providing the umbilical artery Doppler is normal. If it is not, referral to FMU is indicated.

Abnormal presentation from 35 weeks (NEW)

1. Transverse lie

Multiparous women:

This is common at 35-36 weeks in multiparous women and is not abnormal. These women should **NOT** be sent to MAU, a Consultant clinic or the ECV clinic. There is usually no reason to admit them unless there are major risk factors for preterm birth. The presentation should be reviewed by the community midwife at around 38 weeks, and if malpresentation is still an issue they can then refer to the ECV clinic.

Nulliparous women:

Placental site should be rechecked, and the woman should be referred directly to the ECV clinic (extension 21987 or 21988) for the first Tuesday after 36+0 weeks' of gestation.

2. Breech presentation

Multiparous women should be sent to the ECV clinic for an appointment from 37+0 weeks.
Nulliparous women should be seen in the ECV clinic from 36+0 weeks.
Please give women referred a 'My baby is breech' leaflet.

Abnormal placental site

1. No prior caesarean sections:

In a woman with no bleeding the placental site should not alter management until confirmed at 36 weeks. Scans should not be requested for this indication.

At 36 weeks, if the placenta is found to be either covering the cervix, or the lowermost edge of the placenta is less than 2 cm distant from the internal os, an antenatal clinic appointment is required. Caesarean section should normally be offered.

2. Previous caesarean section

Ensure that women with a low placenta or placenta praevia have been referred to FMU placental clinic. This will normally have happened following the anomaly scan.

Large for dates

(New in v1.4) EFW >95th centile will replace AC>95th centile as a predictor of a macrosomic baby. Abdominal circumference (AC) should no longer be used as a measure to predict fetal macrosomia at the 36-week USS.

(New in v1.4) If fetal macrosomia is diagnosed at the 36-week USS (EFW >95th centile) – a fasting blood glucose test will no longer be performed.

(New in v1.4) Women with an macrosomic baby detected at the 36-week USS will be offered referral (by the USS Department) to a Consultant for shared decision making regarding individualised birth planning.

(New in v1.4) Any women that have missed a planned antenatal Glucose Tolerance Test (GTT) prior to the 36 weeks USS, who then have fetal macrosomia detected at the 36 weeks USS, will be offered referral to the Diabetes Service and treated on the Gestational Diabetes Mellitus (GDM) care pathway.

(New in v1.4) If the EFW is >95th centile and the gestation at the scan is <35+1 weeks, glucose assessment using a GTT, should be arranged.

(NEW in v1.4) If the EFW is >95th centile and the gestation at the scan is >35+0 weeks, glucose assessment using a GTT **should not** be performed.

Refer to Diabetes Guideline.

(New in v1.4) Where the fetus is macrosomic and diabetes is not present, the mode of birth should be discussed. A homebirth or MLU birth is not advised.

If diabetes is not present, women should not be routinely offered caesarean section or induction of labour for this indication alone. If a homebirth or MLU birth is planned, referral to a Consultant clinic for a discussion should be offered.

Repeat scans to assess the growth of a large baby should not be arranged.

Polyhydramnios

(New in v1.4) Where the AFI is ≥30, the woman should be referred to FMU.
Where the AFI is raised but <30, the woman should be referred to a Consultant Antenatal Clinic. A GTT should be arranged of the gestation is <35+1 weeks; after this gestation, a GTT is less reliable and should not be performed.

FAQs

If the pregnancy had abnormal/raised Uterine artery Dopplers at the Anomaly scan, but the scans afterwards show normal growth and the pregnancy has continued normally, can the woman be considered for delivery at the SPIRES, a MLU, or a homebirth?
Yes, but ensure there is no co-existing indication for induction of labour.

What should be done if a woman has not has an anomaly scan at the OUHFT – for example if she has moved from out of area, or has booked late?
She should be managed according to her pregnancy risk and growth scans only requested according to the above criteria. A routine 36 week scan will still be offered.

If a woman declines the additional growth scan/s, should any other care be put in place?
This should be documented and referral to a consultant antenatal clinic offered.

If a woman has an otherwise low risk pregnancy what does abnormal uterine artery Dopplers mean?
The pregnancy is at higher risk of growth restriction and pre eclampsia than was suggested by her history and repeat scanning is indicated. These women should be under consultant care. Nevertheless most women will still have a normal pregnancy outcome.

If a woman has a normally grown baby but the Dopplers are abnormal what does this mean?
In most cases the Doppler measurement has been taken inaccurately but occasionally this means that although the growth appears normal the baby is at more risk than suggested by its size. Because this is complicated and unusual these babies will usually be assessed in FMU.

If a baby is growing consistently but the EFW is below the 10th centile and the Dopplers are normal what does this mean?
This is likely to be a constitutionally normal baby, but after 37 weeks there is a slightly increased risk of adverse outcome. There are FMU guidelines for assessment of risk and follow up will be performed there.

Appendix 1 – Supporting information about Doppler Ultrasound

Umbilical artery (umbA) Doppler

This is a useful test before 35 weeks to help distinguish the normal small baby from the small compromised baby and helps determine monitoring frequency and iatrogenic preterm delivery. Chronic placental dysfunction may lead to increased resistance (RI) and pulsatility (PI) in the arteries. The waveform is considered abnormal if the pulsatility index is >95th centile or if there is absent or reversed end-diastolic flow. These latter two describe increasing degrees of placental dysfunction. Umbilical artery Doppler it is not useful after 35 weeks except as part of the 'CPR'.

Middle cerebral artery (MCA) Doppler

This has 2 principal uses.

Firstly it can be used to exclude fetal anaemia in at risk fetuses e.g. Rhesus disease. The peak systolic velocity PSV, or Vmax) is assessed.

Secondly the waveform (PI normally used) may demonstrate head sparing: more blood is sent to the brain in fetal diastole as a 'survival' mechanism. The pulsatility (PI) reduces in adverse circumstances. Its principal usage is therefore as part of the cerebroplacental ratio (see below).

Cerebroplacental ratio (CPR)

This is thought to be useful at after 35 weeks to help distinguish between the normal small baby from the small compromised baby and is considered abnormal if reduced. It may also help identify chronic fetal compromise babies that are not obviously small for gestational age. It is calculated by dividing the MCA PI by the umbA PI.

Uterine artery (utA) Doppler

This is a screening test, which is most effective for growth restriction and pre eclampsia that occurs before 34 weeks. It can be measured at any gestation but is routinely used at 20 weeks at the anomaly scan. A high pulsatility or resistance waveform (PI or RI) suggests less effective placental implantation. A normal result implies a low risk of early growth restriction or indeed pre eclampsia and this is a more effective screening test than just using maternal history: this allows fewer scans and intervention in apparently higher risk women. It is used in this protocol to reduce the number of women having 'serial scans' to allow more room for later pregnancy scans: late onset (>34 weeks) growth restriction is less reliably predicted by abnormal uterine artery waveforms.

Pregnancy associated plasma protein A (PAPP-A)

This serum analyte forms part of the combined test screening for aneuploidy at 12 weeks. A low level (<0.3MoMs) also suggests a higher later pregnancy risk of growth restriction, pre eclampsia and stillbirth.

Appendix 2 – Monitoring and Compliance

Compliance Standard	Monitoring method	Frequency of monitoring	Review Group/Committee
% Women having 36 week growth scan and within +/- 5 days	Viewpoint	Every 3 Years	MCGC/ AHSN
% Women having 36 week growth scan who are getting CPR calculation	Viewpoint	Every 3 Years	MCGC/ AHSN
No of women having growth scans outside standard pathway	Viewpoint	Every 3 Years	MCGC/ AHSN

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